U.S. Department of the Interior
Bureau of Land Management

Rhyolite Ridge Lithium-Boron Project

Final Environmental Impact Statement

DOI-BLM-NV-B020-2021-0020-EIS

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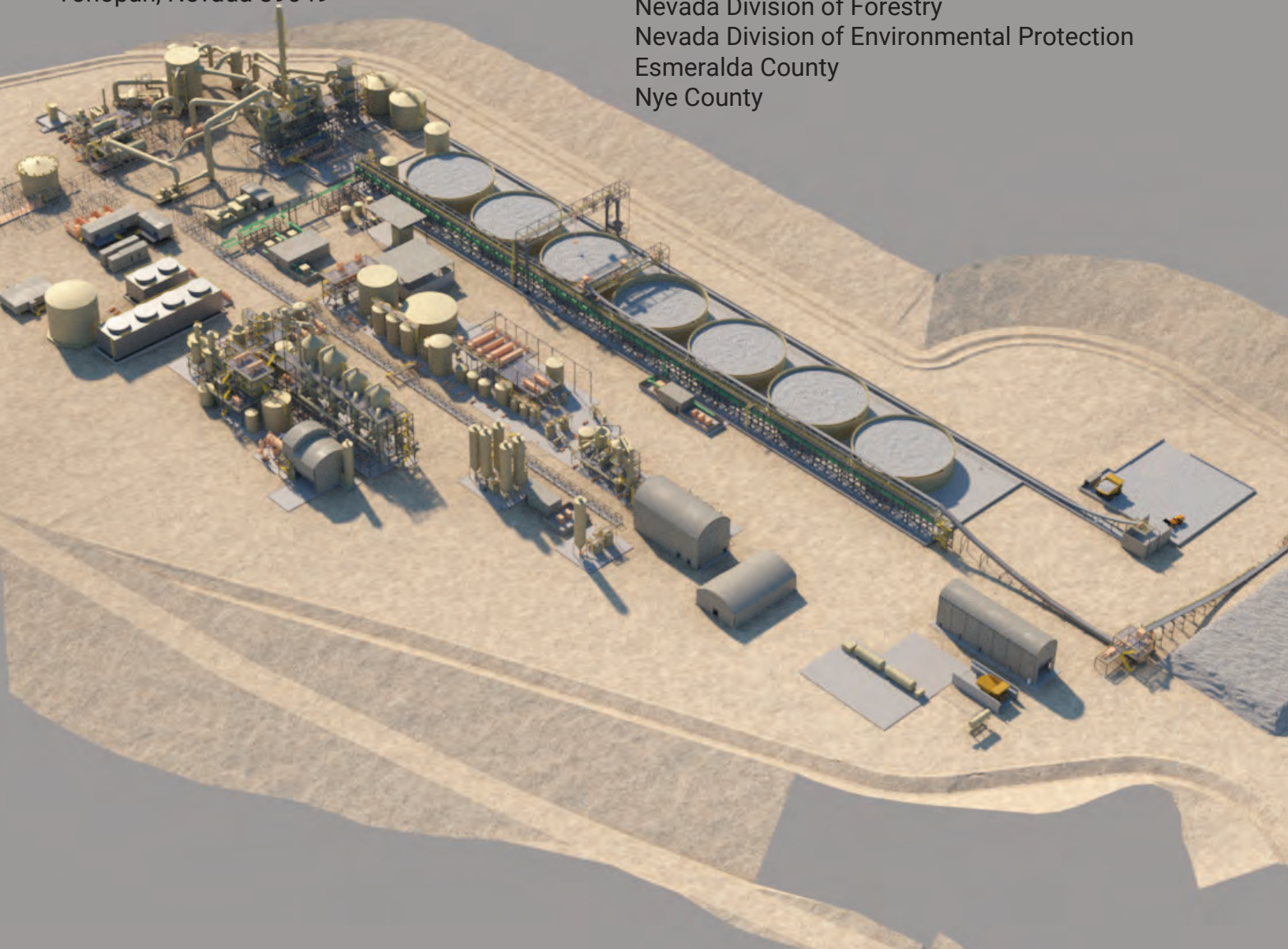
Bureau of Land Management
Battle Mountain District Office
Tonopah Field Office
1553 South Main Street
Tonopah, Nevada 89049

Cooperating Agencies:
United States Department of Energy
United States Environmental Protection Agency
United States Fish and Wildlife Service
Ecological and Migratory Bird Programs
Nevada Department of Wildlife
Nevada Division of Forestry
Nevada Division of Environmental Protection
Esmeralda County
Nye County



It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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List of Acronyms and Abbreviations

°F	Degrees Fahrenheit
µg/m^3	Micrograms Per Cubic Meter
AADT	Annual Average Daily Traffic
ACEPM	Applicant-Committed Environmental Protection Measure

AFFF	Aqueous Film-Forming Foam
AML	Appropriate Management Level
AMSL	Above Mean Sea Level
ANFO	Ammonium Nitrate Fuel Oil
AO	Authorized Officer
APE	Area of Potential Effects
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
BBCS	Bird and Bat Conservation Strategy
BLM	Bureau of Land Management
BMP	Best Management Practice
BSSG	Bi-State Sage-Grouse
CEQ	Council on Environmental Quality
CESA	Cumulative Effects Study Area
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
ECP	Eagle Conservation Plan
EIS	Environmental Impact Statement
EPFZ	Emigrant Peak Fault Zone
ERA	Ecological Risk Assessment
ESA	Endangered Species Act
ET	Evapotranspiration
FLPMA	Federal Land Policy Management Act
FLVFZ	Fish Lake Valley Fault Zone
FPPC	Final Plan for Permanent Closure
GHG	Greenhouse Gas
GIS	Geographic Information System
gpm	Gallons Per Minute
H_2S	Hydrogen Sulfide
H_2SO_4	Sulfuric Acid
HA	Hydrographic Area
HAP	Hazardous Air Pollutant
HMA	Herd Management Area
HPTP	Historic Properties Treatment Plan
I-80	Interstate 80
Ioneer	Ioneer Rhyolite Ridge LLC
KOP	Key Observation Point
km	Kilometer
kV	Kilovolt
LWC	Lands With Wilderness Characteristics
MCF	McAfee Canyon Fault
MDP	Monitoring and Discovery Plan
mg/L	Milligrams Per Liter
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
mph	Miles Per Hour
MSHA	Mine Safety and Health Administration
Mt	Million Tons
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NDEP	Nevada Division of Environmental Protection
NDF	Nevada Division of Forestry

NDNH	Nevada Division of Natural Heritage
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966
NO_2	Nitrogen Dioxide
NOAEL	No Adverse Effect Level
NOx	Nitrogen Oxide
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NVAAQS	Nevada Ambient Air Quality Standards
NWI	National Wetland Inventory
OHV	Off-Highway Vehicle
OPA	Operational Project Area
OSF	Overburden Storage Facility
PAG	Potentially Acid-Generating
PAPE	Physical Area of Potential Effects
PFAS	Per- and Poly-Fluoroalkyl Substance
Plan	Plan of Operations
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter Less Than 2.5 Microns in Diameter
PM_{10}	Particulate Matter Less Than 10 Microns in Diameter
PM_{30}	Total Particulate Matter Less Than 30 Microns in Diameter
PMU	Population Management Unit
ppb	Parts Per Billion
Project	Rhyolite Ridge Lithium-Boron Project
RFFA	Reasonably Foreseeable Future Action
RMA	Resource Management Area
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right-of-Way
RV	Recreational Vehicle
SER	Supplemental Environmental Report
SHPO	State Historic Preservation Office
SIR	Supplemental Information Report
SO_2	Sulfur Dioxide
SOSF	Spent Ore Storage Facility
SR	State Route
TDS	Total Dissolved Solids
TFO	Tonopah Field Office
tpy	Tons Per Year
U.S.	United States
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compound
VRM	Visual Resource Management
VWP	Vibrating Wire Piezometer
WPCP	Water Pollution Control Permit
WSA	Wilderness Study Area
ZoA	Zones of Analysis

Executive Summary

Ioneer Rhyolite Ridge LLC (Ioneer) submitted the Plan of Operations (Plan) (NVNV106205338 [NVN 098058]) and Nevada Reclamation Permit Application for the Rhyolite Ridge Lithium-Boron Project (Project) to the Tonopah Field Office (TFO) of the Battle Mountain District Bureau of Land Management (BLM) (Ioneer 2022). The Project is located in the Silver Peak Range in Esmeralda County, Nevada. The BLM's surface management regulations at 43 Code of Federal Regulations (CFR) 3809 require that the BLM fulfill its obligation under the National Environmental Policy Act of 1969 (NEPA) by analyzing and disclosing the potential environmental impacts of the BLM's approval of the Project Plan. The BLM determined the level of analysis necessary for the Plan was an Environmental Impact Statement (EIS). The BLM TFO is serving as the lead federal agency for preparing the EIS in compliance with NEPA.

Proposed Action

Ioneer is proposing the construction, operation, reclamation, and closure of a surface quarry from which lithium and boron ore would be extracted using conventional quarrying techniques and associated facilities as Alternative A – Proposed Action (Proposed Action). The proposed Plan boundary would include 7,166 acres and consist of two components: the 6,369-acre Operational Project Area (OPA) and the 797-acre Access Road and Infrastructure Corridor. The Access Road and Infrastructure Corridor would include a portion of State Route (SR) 264 within the existing right-of-way (ROW) and the access road between SR 264 in the Fish Lake Valley and the OPA including the existing Hot Ditch Road and Cave Springs Road. Within the Plan boundary, there are approximately 7,137 acres of land administered by the BLM and approximately 29 acres of private land. The private land is located within the ROW corridor along SR 264.

The proposed life of the Project is approximately 23 years and includes the construction phase of approximately four years (Years 1 through 4), the quarrying phase of approximately 17 years (Years 1 through 17), the processing phase of 13 years (Years 4 through 17), and the reclamation and closure phase of 6 years (Years 18 through 23). Monitoring would continue, as necessary. The Proposed Action facilities include: quarry; processing facility; overburden storage facilities (OSFs); spent ore storage facility (SOSF); contact water ponds; batch plant, haul road, service roads; dewatering pipeline; stockpiles; explosives storage area; sewage system; public road realignment; communication towers and all-terrain vehicle trails; proposed monitoring locations and access; proposed water supply testing and facilities including pipelines; and resource exploration drilling and dewatering wells. The Proposed Action would create an additional 2,306 acres of surface disturbance on public land administered by the BLM and private land.

Alternatives

Alternatives Eliminated from Detailed Analysis

There were 57 additional alternatives related to quarry footprint, quarry backfill/infill, facilities placement, ore conveyance, sulfuric acid plan design, leaching, power supply and infrastructure, aggregate sourcing, haulage and traffic control, access road, water use, and mine law. These alternatives were either dismissed from detailed analysis as they were considered to either be not environmentally reasonable, not economically feasible, not technically practical, or a combination of these rationales, or portions of these alternatives were incorporated into either the Proposed Action or North and South OSF Alternative. Additional details regarding the alternatives considered but dismissed, as well as the rationale for dismissal, is provided in the Project Alternatives Supplemental Information Report for the Rhyolite Ridge Lithium-Boron Project (BLM 2024a).

North and South Overburden Storage Facility Alternative

Alternative B – The North and South OSF Alternative (North and South OSF Alternative) would be similar to the Proposed Action; however, the facility layout has been modified to reduce the footprint within the Tiehm's buckwheat (*Eriogonum tiehmii*) designated critical habitat (Ioneer 2023a). Placement of overburden material would occur in the North OSF, Quarry Infill OSF, and the additional South OSF. The West OSF and associated infrastructure would not be constructed under the North and South OSF

Alternative (Ioneer 2023a). Total surface disturbance under the North and South OSF Alternative would be approximately 2,266 acres, which would be approximately 40 acres less than the Proposed Action.

The capacities of the North OSF and the Quarry Infill OSF would be the same as the Proposed Action; however, the South OSF would be constructed to accommodate the remaining material. The design of the South OSF would be consistent with the OSF designs included in the Proposed Action including the average slope of 3H:1V. The haulage distance between the quarry and the South OSF would be similar to the distance between the West OSF and the quarry as configured in the Proposed Action. Additional differences include a higher output steam turbine generator (40 megawatts instead of the 35 megawatts for the Proposed Action), and reconfiguration of the quarry to minimize impacts, to the extent practicable, in Tiehm's buckwheat designated critical habitat while maintaining slope stability required during operations and addressing long-term slope stability needs for Tiehm's buckwheat subpopulations. Additional Applicant Proposed Conservation Measures and pollinator habitat reclamation would be conducted as described in the *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* (WestLand 2024b).

No Action Alternative

Under Alternative C – No Action Alternative (No Action Alternative), the Project would not be approved. The existing 15 acres of exploration disturbance (i.e., drill sites, monitoring sites, and access roads), under relinquished Notices (NVN-97202 and NVN-97262), has occurred on public lands administered by the BLM and would be reclaimed. No additional surface disturbance would occur.

Resource Impacts

Air Quality and Climate Change

Proposed Action: Total Hazardous Air Pollutant emissions would be 0.81 tons per year (tpy) for up to 17 years, and less emissions for six years of reclamation. Particulate Matter (PM) of 30 microns or less (PM_{30}), PM less than 10 microns in diameter (PM_{10}), and PM less than 2.5 microns in diameter ($PM_{2.5}$) emissions would be 2,899.97, 1,277.86, and 227.92 tpy, respectively, for up to 17 years, and less emissions for six years of reclamation. Nitrogen oxides, carbon monoxide, sulfur dioxide, volatile organic compound, hydrogen sulfide, and sulfuric acid emissions would be 156.69, 130.84, 82.42, 7.92, 2.84, and 24.41 tpy, respectively, for up to 17 years and less emissions for six years of reclamation. On-site greenhouse gas (GHG) emissions would be 471,589 tpy of direct and 40,471 tpy of indirect. Off-site GHG emissions would be 5,447.20 tons carbon dioxide equivalent for up to 17 years, and less emissions for six years of reclamation. Mercury emissions of 4.7×10^{-4} tpy for up to 17 years, and less emissions for six years of reclamation. There would be a maximum 8-hour impact of 0.69 parts per billion for ozone.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action.

No Action Alternative: Minor amounts of emissions from 15 acres of reclamation on existing disturbance.

Cultural Resources

Proposed Action: Up to 12 cultural resource sites would potentially be impacted by surface disturbance, with four additional cultural resource sites within 100 feet of disturbance. Up to 28 cultural resource sites would potentially be impacted by auditory, vibrational, and/or visual impacts. Sites would be avoided to the extent possible or mitigated.

North and South OSF Alternative: Impacts would be the same as the Proposed Action except 16 cultural resource sites would potentially be impacted by surface disturbance.

No Action Alternative: There would be no impacts to cultural resources beyond what is already occurring.

Environmental Justice

Proposed Action: Impacts to environmental justice populations of concern may include air quality, visual, noise, water, traffic, hazardous material transportation, and social and economic values. Impact could occur for up to 23 years.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action.

No Action Alternative: No disproportionate effects to an environmental justice population are anticipated.

Geology and Minerals

Proposed Action: There would be up to 2,306 acres of new surface disturbance of which 383 would be permanent. There would be permanent removal of 25 million tons (Mt) of lithium-boron ore from the quarry. Additionally, approximately 406 Mt of overburden would be removed from the quarry and placed in the designated OSFs. Final slope configuration would result in a post-closure Factor of Safety close to or greater than 2.0, and 1.72 with the quarry lake. There is no anticipated significant damage to facilities for the life of the Project from faulting. Subsidence may occur within the groundwater drawdown cone with up to 10 inches in the vicinity of pumping wells and less than two inches anticipated in areas more than a quarter mile from pumping wells. About 80 percent of the overburden is classified as non-potentially acid generating and presents a low risk of acid rock drainage.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action except there would be up to 2,266 acres of new surface disturbance of which 211 would be permanent. About 406 Mt of overburden would be removed and placed in the designated OSFs.

No Action Alternative: Reclamation would occur on 15 acres of existing disturbance.

Hazardous Materials and Solid Waste

Proposed Action: There would be a diesel fuel release probability of 760 in 1,000 miles and 174.8 for each 230-mile transportation route from Las Vegas to the OPA and Reno to the OPA. There would be a corrosion inhibitor 3DT129 release probability of 30.5 in 1,000 miles and 7.0 for each 230-mile transportation route. There would be a liquid phosphate release probability of 25 in 1,000 miles and 5.8 for each 230-mile transportation route. Up to two loads of solid waste would be produced and shipped off site annually for up to 17 years.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action.

No Action Alternative: There would be limited potential for accidental spills or releases of hazardous materials during reclamation of 15 acres of existing surface disturbance.

Land Use and Realty

Proposed Action: Cave Springs Road (NVN 62084) and Argentite Canyon Road (N 54404) ROWs would be impacted from realignment to avoid Project features. Coordination with holders of ROWs, geothermal leases, and mining claims off Hot Ditch Road and in the OPA would be required for access. There would be up to 2,306 acres of new surface disturbance, of which 383 would be permanent. Approximately 559 acres of Tiehm's buckwheat designated critical habitat would be fenced with locked gates, with approximately 51 acres of Tiehm's buckwheat subpopulations fenced within.

North and South OSF Alternative: Impacts would be the same as the Proposed Action, except there would be up to 2,266 acres of new surface disturbance of which 211 would be permanent. Approximately 719 acres of Tiehm's buckwheat designated critical habitat would be fenced with locked gates.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance.

Livestock Grazing

Proposed Action: There would be disturbance of 140 acres (83 that provide livestock forage) of the Red Spring Allotment, 2,145 acres (1,726 that provide livestock forage) of the Silver Peak Allotment, and 21 acres (none that provide livestock forage) of the Fish Lake Valley Allotment. This disturbance would result in impacts to four animal unit months (AUMs) in Red Spring Allotment, 72 AUMs in Silver Peak Allotment (15 of which would be permanent), and no impacts to AUMs in the Fish Lake Valley Allotment. Fencing of 559 acres (469 that provide livestock forage) of Tiehm's buckwheat designated critical habitat would impact an additional 20 AUMs in the Silver Peak Allotment. This could result in up to $9,639 in annual economic impacts from reduction of 96 BLM-permitted AUMs for up to 23 years. There could be potential impacts to livestock water sources at 32 surface water sites if sourced from the aquifer proposed for dewatering.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action except there would be disturbance of 140 acres (83 that provide livestock forage) of the Red Spring Allotment, 2,105 acres (1,885 that provide livestock forage) of the Silver Peak Allotment, and 21 acres (none that provide livestock forage) of the Fish Lake Valley Allotment. This would result in impacts to four AUMs in Red Spring Allotment, 79 AUMs in Silver Peak Allotment (eight of which would be permanent), and no impacts to AUMs in the Fish Lake Valley Allotment. Fencing of 719 acres (591 that provide livestock forage) of Tiehm's buckwheat designated critical habitat would impact an additional 25 AUMs in the Silver Peak Allotment. This could result in up to $10,844 in annual economic impacts from reduction of 108 BLM-permitted AUMs for up to 23 years.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance. There would be no additional impacts to livestock grazing other than what is already occurring.

Native American Traditional Values

Proposed Action: Three areas of concern have been identified and direct surface impacts would be avoided by the proposed layout through Project design. Vegetation communities and wildlife species important to Native American Traditional Values may be impacted. There could be impacts to water supply at 32 surface water sites (including Cave Spring) if sourced from the aquifer proposed for dewatering. During consultation, tribes have indicated that some unevaluated sites in the general vicinity of sacred sites identified by tribal representatives may be associated with those sacred sites. Unevaluated sites potentially associated with sacred sites and that cannot be avoided would be mitigated under the HPTP.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action.

No Action Alternative: No additional impacts to Native American Traditional Values would occur, and 15 acres of existing disturbance would be reclaimed.

Recreation

Proposed Action: There would be a total of 2,306 acres of surface disturbance of which 383 would be permanent. Up to 559 acres of designated critical habitat (including 51 acres of subpopulations) would be fenced from some recreational uses (e.g., off-highway vehicle [OHV] use). Hunting would be restricted from areas of surface disturbance or security fencing. There would be disturbance to 869 acres (58 permanent) of semi-primitive motorized recreational areas. There would be disturbance to 1,975 acres (383 permanent) of OHV use restricted land, including 944 acres (80 permanent) limited to existing roads and trails and closed to competitive events and 1,030 acres (286 permanent) limited to existing roads and trails. There would be disturbance to 331 acres (16 permanent) of non-restricted areas. Regarding Lands with Wilderness Characteristics (LWCs) and Wilderness Study Areas (WSAs), there would be surface disturbance to 426 acres (32 permanent) of LWC328 and 1,356 acres (224 permanent) of LWC338. The LWCs would still meet the 5,000 roadless acre criteria for the LWC designation. Some Project components would be visible from some areas of the Silver Peak WSA. There would likely be an increased human presence and demand for recreation resources and opportunities from an increased population in the area. There would also be increased noise, traffic congestion, fugitive dust and emissions from vehicle traffic, and lighting from vehicles and operation from additional recreationalists.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action except there would be a total of 2,266 acres of surface disturbance (211 acres would be permanent). Up to 719 acres of Tiehm's buckwheat designated critical habitat would be fenced from some recreational uses (e.g., OHV use). There would be disturbance to 1,902 acres of OHV use restricted land including, 1,076 acres (155 permanent) limited to existing roads and trails and 826 acres (48 permanent) limited to existing roads and trails and closed to competitive events. There would be surface disturbance to 531 acres (28 permanent) of LWC328 and 1,151 acres (114 permanent) of LWC338. Some Project components would be visible from some areas of the Silver Peak WSA.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance.

Social and Economic Values

Proposed Action: There would be a construction workforce of 500 people for four years, plus 113 indirect and induced jobs, and there would be a quarrying and processing workforce of 350 people for 14 years, plus 79 indirect and induced jobs. Additional employment would result in an annual calendar year direct labor income of $54,141,401 and annual calendar year indirect and induced labor income of $2,619,995 for construction, and annual calendar year direct labor income of $125,142,545 and annual calendar year indirect and induced labor income of $18,709,469 for quarrying and processing. The total estimated annual calendar year direct value added would be $102,788,237, and total annual calendar year indirect and induced value added would be $10,028,255 from construction. The total estimated annual calendar year direct value added would be $71,951,766, and total annual calendar year indirect and induced value added would be $7,019,778 from quarrying and processing. Total tax generation would be $25,069,752 annual calendar year (direct, indirect, and induced), including $11,819,628 annual calendar year in federal taxes, $4,183,588 in state taxes, $5,911,690 annual calendar year in county-level taxes, and $3,154,846 annual calendar year in sub-county special district taxes during construction. Total tax generation would be $17,548,826 annual calendar year (direct, indirect, and induced), including $8,273,740 annual calendar year in federal taxes, $2,928,511 annual calendar year in state taxes, $4,138,183 annual calendar year in county-level taxes, and $2,208,392 annual calendar year in sub-county special district taxes during quarrying and processing. There would be potential for increased property tax to Esmeralda County. Housing demand during construction would be 328 units during construction and 230 units during quarrying and processing. There would be an increased need for improvements/modifications to the public utilities infrastructure, and additional requirements for law enforcement, fire protection, and emergency medical services. There would be an increased demand for healthcare services and practitioners, as well as grocery stores, retail stores, and other convenience and commodity needs. Increased school enrollment in Dyer, Silver Peak, Tonopah, Hawthorne, and Bishop would be approximately 140 additional students during construction and 98 additional students during quarrying and processing, likely spread throughout these communities. Additional disturbance, employment, and traffic generation may impact social values and cultural landscapes in the nearby communities. The communities could expect to see increased use of facilities and public lands. Water rights secured or leased from current agricultural water users in the Fish Lake Valley could reduce the level of agriculture in the area. There could be impacts after closure including housing market and economic declines.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action.

No Action Alternative: There would be no additional taxes or economic activity gained.

Soil Resources

Proposed Action: There would be up to 2,306 acres of new surface disturbance of which 383 would be permanent. There could be potential impacts to biological soil crusts if present.

North and South OSF Alternative: Impacts would be the same as the Proposed Action except there would be up to 2,266 acres of new surface disturbance of which 211 would be permanent.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance.

Threatened and Endangered Species

Proposed Action: For Bi-State Sage-grouse (BSSG) (*Centrocercus urophasianus*), there would be up to 1,064 acres (279 permanent) of potential habitat, and no disturbance to mapped habitat or proposed critical habitat. BSSG could potentially avoid the area from increased noise and human presence. Water sources could potentially be impacted if used by BSSG and if sourced from the aquifer proposed for dewatering. For monarch butterfly (*Danaus plexippus*), there would be up to 2,306 acres (383 permanent) of new surface disturbance of potential habitat that may support milkweed and nectar sources. Access road travel, construction activities, and operation could result in vehicle strikes or crushing of BSSG and monarch butterflies resulting in fatality. For Tiehm's buckwheat, there would be up to 354 acres (97 permanent) of surface disturbance to designated critical habitat. Up to 559 acres of designated critical habitat would be fenced, which includes the 51 acres of fenced subpopulations. There would be no direct disturbance to individuals or within the eight Tiehm's buckwheat subpopulations. Pollinator communities could be impacted by up to 2,306 acres of new surface disturbance of which 383 would be permanent. Surface disturbance could change overland flow patterns potentially affecting pollinator species communities or Tiehm's buckwheat designated critical habitat. Fugitive dust could impact Tiehm's buckwheat, Tiehm's buckwheat designated critical habitat, and pollinator species communities from reduced photosynthesis and decreased water-use efficiency.

North and South OSF Alternative: Impacts would be the same as the Proposed Action, except as follows. For BSSG, there would be surface disturbance of up to 776 acres (132 permanent) of potential habitat. For monarch butterflies and pollinator communities, there would be up to 2,266 acres (211 permanent) of new surface disturbance of potential habitat that may support milkweed and nectar sources. For Tiehm's buckwheat, there would be 191 acres (45 permanent) of designated critical habitat disturbed. Up to 719 acres of designated critical habitat would be fenced. There would be less overland flow alteration in designated critical habitat and potentially less impacts from fugitive dust due to less disturbance proposed in designated critical habitat. There would be up to 2,266 acres of total new surface disturbance within the Plan boundary, of which 211 would be permanent.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance. There would be no impacts to Tiehm's buckwheat or its designated critical habitat beyond what is already occurring.

Transportation and Access

Proposed Action: Approximately 4.7 miles of Cave Springs Road and 0.9 mile of Argentite Canyon Road would be realigned to avoid Project facilities. The realigned Cave Springs Road would have three new crossings with Project roads. There would be an additional estimated 186 to 248 vehicle passes per day during construction, an additional 230 to 288 vehicle passes per day during operations, and an additional 40 vehicle passes per day during closure on the access road. Traffic control systems on Cave Springs Road would temporarily stop public traffic at two autonomous haul road intersections to the processing facility and North OSF causing delays. A pilot car would guide the public through the OPA.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action except there would be 1.2 miles of Argentite Canyon Road realigned and two new crossings with Project roads.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance.

Vegetation Resources

Proposed Action: There would be up to 2,306 acres (383 permanent) of new surface disturbance of vegetation communities and ecological communities. Disturbance during construction, operation, and reclamation results in increased potential for establishment and spread of noxious species. There would be potential impacts to sagebrush cholla (*Opuntia pulchella*) and Tecopa birdbeak (*Cordylanthus tecopensis*) from fugitive dust or sedimentation. Because the extent of Mojave fishhook cactus (*Sclerocactus polyancistrus*) in the area is unknown, it could be impacted by disturbance. Plant species of ethnobotanical importance could be impacted by surface disturbance as well as fugitive dust.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action except there would be up to 2,266 acres (211 permanent) of new surface disturbance of vegetation communities and ecological communities. One sagebrush cholla would be impacted by disturbance from the South OSF unless relocated. There would be 40 acres less surface disturbance, reducing the area where noxious weeds could become established, as well as reducing the total potential impacts to plant species of ethnobotanical importance.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance. Noxious and invasive weed species could establish if not managed properly.

Visual Resources

Proposed Action: From Key Observation Points (KOPs) 1, 2, and 4, there would be no conflict with the Visual Resource Management (VRM) Class IV objectives. From KOP 3, there would be no conflict with the VRM Class III objectives. Visible portions from the Silver Peak WSA (VRM Class I) are not anticipated to change the overall quality of views. Nighttime lighting could cause an urban sky glow over the OPA. The brightness of the lights and darkness of the nearly black background would create a strong contrast, and thus make the lights visible.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance.

Water Resources

Proposed Action: There would be groundwater drawdown of up to 300 feet near the quarry, followed subsequently by groundwater recovery over a period of approximately 60 years. A 66-acre (surface size) quarry lake would form post-quarrying and after groundwater recovery. Nevada Division of Environmental Protection Profile III reference values in the quarry lake would be in exceedance for arsenic from 50 to 200 years post-closure, boron from five to 200 years post-closure, fluoride from five to 200 years post-closure, and molybdenum from five to 200 years post-closure. An ecological risk assessment indicated a low probability that risks to wildlife would occur based on the predicted water quality for the post-quarrying quarry lake. Impacts to 32 surface water sites are not anticipated because they are thought to be perched. If the springs are sourced from upwelling groundwater on the upgradient side of a low permeability fault zone, decreased amounts of spring flow may occur. A total of 2,306 acres of surface disturbance may cause erosion and sedimentation during construction and operation. Four surface water stock rights within the predicted 10-foot drawdown contour associated with the maximal drawdown prediction for the Proposed Action (SP-01, SP-03, SP-06, and SP-07), one surface stock water right, one groundwater stock right, and nine groundwater irrigation rights could be impacted by groundwater drawdown. There are no impacts predicted to groundwater quality because evaporation of the quarry lake would cause it to be a terminal sink.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action except 2,266 acres of surface disturbance may cause erosion and sedimentation during construction and operation.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance.

Wetland and Riparian Resources

Proposed Action: There would be direct disturbance to up to 0.16 acre of wetlands within the Access Road and Infrastructure Corridor where the Fish Lake Valley Hot Springs cross the access road and 54.04 acres of riverine, 0.40 acres of freshwater emergent wetland, and 0.02 acres of freshwater pond National Wetland Inventory (NWI)-mapped wetlands. The riparian area near Chiatovich Creek could be impacted from the water supply pipeline.

North and South OSF Alternative: Impacts would be the same as the Proposed Action except there would be surface disturbance to 54.87 acres of NWI-mapped wetlands.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance.

Wildlife Resources

Proposed Action: There could be impacts to water sources used by various wildlife species. Up to 32 surface water sites could have reduced or removed flow if sourced from the aquifer proposed for dewatering. One guzzler would be relocated away from Project features. Additionally, a quarry lake would form with a predicted low probability of risk to wildlife. Human presence and noise could cause wildlife avoidance and displacement in the area. Vehicles, vertical facilities, and lights may cause collisions, and there could be increased competition between wildlife species for available resources. Access road travel, construction activities, and operation could result in vehicle strikes or crushing of wildlife and/or burrows resulting in fatality. There would be removal of 2,306 acres (383 permanent) of avian nesting and foraging habitat and insect species, mammal species, and reptile/amphibian species habitat. There would be surface disturbance to 2,136 acres (383 permanent) of year-round mule deer (*Odocoileus hemionus*) habitat, 2,129 acres (383 permanent) of year-round desert bighorn sheep (*Ovis canadensis nelsoni*) habitat, 2,209 acres (381 permanent) of Brewer's sparrow (*Spizella breweri*) habitat, 1,065 acres (281 permanent) of pinyon jay (*Gymnorhinus cyanocephalus*) habitat, one acre of permanent disturbance to black-throated gray warbler (*Setophaga nigrescens*) habitat, and 2,306 acres (383 permanent) of potential habitat for Cassin's finch (*Haemorhous cassinii*), common nighthawk (*Chordeiles minor*), loggerhead shrike (*Lanius ludovicianus*), ferruginous hawk (*Buteo regalis*), and western burrowing owl (*Athene cunicularia*) habitat. Two golden eagle nesting territories are within one mile of proposed surface disturbance and/or two miles of quarry blasting. There would be removal of 2,306 acres (383 permanent) of potential golden eagle foraging habitat. There would be surface disturbance to 988 acres (96 permanent) of suitable soils for Botta's pocket gopher (*Thomomys bottae*) and desert kangaroo rat (*Dipodomys deserti*), and 1,039 acres (104 permanent) of suitable habitat for pale kangaroo mouse (*Microdipodops pallidus*). There would be surface disturbance to eight acres of potential habitat for California toad (*Anaxyrus boreas halophilus*) and western toad (*Anaxyrus boreas*), and potential impacts to habitat from sedimentation and fugitive dust. Potential impacts to water supply at 32 surface water sites (including Cave Spring) if sourced from the aquifer proposed for dewatering could impact Wong's springsnail (*Pyrgulopsis wongi*) and its associated habitat. Fish Lake Valley tui chub (*Siphateles bicolor* ssp. 4) and Fish Lake Valley pyrg (*Pyrgulopsis ruinosa*) habitat could be indirectly impacted from sedimentation and fugitive dust from use of the access road. There would be disturbance to three acres (one permanent) of cliff and canyon habitat and one acre (permanent) of pinyon-juniper habitat potentially used by bat species. The creation of a quarry lake may attract foraging bats, and the quarry walls could potentially provide bat roosting habitat. One adit would be removed from construction of the haul road.

North and South OSF Alternative: Impacts would be the same as described for the Proposed Action, except there would be removal of 2,266 acres (211 permanent) of avian nesting and foraging habitat and insect species, mammal species, and reptile/amphibian species habitat. There would be surface disturbance to 2,096 acres (211 permanent) of year-round mule deer habitat, 2,089 acres (211 permanent) of year-round desert bighorn sheep habitat, 2,011 acres (203 permanent) of Brewer's sparrow habitat, 896 acres (140 permanent) of pinyon jay habitat, 120 acres (eight permanent) of black-throated gray warbler habitat, and 2,266 acres (211 permanent) of potential habitat for Cassin's finch, common nighthawk, loggerhead shrike, ferruginous hawk, and western burrowing owl habitat. There would be removal of 2,266 acres (211 permanent) of potential golden eagle foraging habitat. There would be surface disturbance to 1,050 acres (66 permanent) of suitable soils for Botta's pocket gopher and desert kangaroo rat, and 1,106 acres (62 permanent) of suitable habitat for pale kangaroo mouse. There would be disturbance to 10 acres (none permanent) of cliff and canyon habitat and 120 acres (eight permanent) of pinyon-juniper habitat used by bat species.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance.

Wild Horses and Burros

Proposed Action: Disturbance to 2,286 acres (383 permanent) of the Silver Peak Herd Management Area (HMA); however, the appropriate management level for the Silver Peak HMA is zero. Up to 559 acres of Tiehm's buckwheat designated critical habitat would be fenced, which includes the 51 acres of fenced subpopulations. There would be Increased traffic on the access road that could lead to fatalities or injuries to wild horses or burros from collisions. Effects from human disturbance and noise could reduce the areas in the HMA utilized by wild horses and burros, causing increased use in other portions of the HMA.

North and South OSF Alternative: There would be disturbance to 2,164 acres (211 permanent) in the Silver Peak HMA, and 719 acres of Tiehm's buckwheat designated critical habitat fenced.

No Action Alternative: Reclamation would be completed on 15 acres of existing disturbance.

1.0 Introduction

1.1 Introduction and General Information

Ioneer Rhyolite Ridge LLC (Ioneer) submitted the Plan of Operations (Plan) (NVN 098058) and Nevada Reclamation Permit Application for the Rhyolite Ridge Lithium-Boron Project (Project) to the Tonopah Field Office (TFO) of the Battle Mountain District Bureau of Land Management (BLM) in May 2020. Following review by the BLM, revised Plans were submitted in July 2020, August 2020, November 2021, January 2022, and July 2022 (Ioneer 2022). The Plan was accepted by the BLM in August 2020 and subsequently in August 2022. The Plan was submitted to comply with Title 43 Code of Federal Regulations (CFR), subpart 3809 (43 CFR 3809.401 et seq., as amended), State of Nevada regulations governing the reclamation of mined lands (Nevada Administrative Code [NAC] 519A.010-635). The 43 CFR 3809 regulations require that the BLM fulfill its obligation under the National Environmental Policy Act of 1969 (NEPA) by analyzing and disclosing the potential environmental impacts of the Project. In compliance with the NEPA, the BLM, is preparing an Environmental Impact Statement (EIS) to address potential effects from the development of the Project. The BLM TFO is serving as the lead federal agency for preparing this EIS.

The Project is located approximately 40 air miles southwest of Tonopah and 13 air miles northeast of Dyer (**Figure 1-1**) and includes the construction, operation, and closure of a new lithium-boron project. Note all figures referenced in this document are included in **Appendix B**. The Plan boundary encompasses approximately 7,166 acres, which consists of the 6,369-acre Operational Project Area (OPA) and the 797-acre Access Road and Infrastructure Corridor. There are approximately 7,137 acres of land administered by the BLM and approximately 29 acres of private land within the Plan boundary. Ioneer controls 299 lode mining claims and 310 mill sites within the Plan boundary (WestLand 2024a).

The legal description of the Plan boundary is as follows: The OPA is in all or portions of Sections 19-23 and 26-35, Township 1 South, Range 37 East (T1S, R37E); and Sections 2-4 and 9-11, T2S, R37E, Mount Diablo Base and Meridian. The proposed Access Road and Infrastructure Corridor is in all or portions of Sections 13, 21-24, 28, and 33, T1S, R35E; Sections 4, 9, 16, 21, and 28, T2S, R35E; Sections 9, 10, 14-19, and 23-24, T1S, R36E; and Section 19, T1S, R37E, Mount Diablo Base and Meridian.

The United States (U.S.) Department of Energy, U.S. Environmental Protection Agency (USEPA), U.S. Fish and Wildlife Service (USFWS) Ecological Branch and Migratory Bird Program, Nevada Department of Wildlife (NDOW), Nevada Division of Environmental Protection (NDEP), Nevada Division of Forestry (NDF), Esmeralda County, and Nye County are serving as cooperating agencies for the preparation and review of the EIS.

1.2 Purpose of and Need for the Action

The BLM's purpose is to respond to Ioneer's proposal as described in the Plan and to analyze the environmental effects associated with the proponent's Proposed Action and alternatives to the Proposed Action, consider reasonable alternatives, and develop and consider mitigation, when necessary, to lessen effects to environmental resources.

The BLM's need for the action is established by the BLM's responsibilities under Section 302 of the Federal Land Policy Management Act (FLPMA) and the BLM Surface Management Regulations at 43 CFR 3809, to respond to Ioneer's submittal of a Plan and to prevent unnecessary or undue degradation of public lands as a result of the actions taken to prospect, explore, assess, develop, and process locatable mineral resources on public lands.

1.3 Decision to be Made

The BLM's decision relative to this EIS will consider the following: 1) approval of the Plan to authorize the proposed activities without modifications or additional mitigation measures; 2) approval of the Plan with additional mitigation measures that the BLM deems necessary to prevent unnecessary or undue degradation of public lands; 3) approval of the Plan with one of the alternatives analyzed in the EIS; or 4)

denial of the Plan and associated activities if the BLM determines that the proposal does not comply with 43 CFR 3809 and 43 CFR 3715 regulations.

1.4 Conformance and Permits

The Proposed Action and alternatives shall be consistent with federal laws, regulations, plans, and policies, including: NEPA; Council on Environmental Quality (CEQ) Regulations (40 CFR parts 1500-1508); Department of the Interior NEPA Regulations (40 CFR part 46); BLM NEPA Handbook H-1790-1 (BLM 2008); FLPMA; Mining and Mineral Policy Act of 1970; Endangered Species Act (ESA) of 1973; Surface Management Regulations (43 CFR 3809); Use and Occupancy under the Mining Laws (43 CFR 3715); and BLM Manual Handbooks for Reclamation Standards (H-3042-1), Surface Management (H-3809-1), and Surface Management Bond Processing (H-3809-2). Public involvement for the Project, as required by 36 CFR 800.2(d)(3) would be fulfilled through the public scoping and comment periods for the NEPA analysis, as well as on-going government-to-government consultation with applicable Tribes.

1.4.1 Other Project Permits

Implementation of the Proposed Action would require authorizations from other federal, state, and local agencies with jurisdiction over certain aspects of the Project. The list of permits and authorizations that may be necessary for the Project are included in **Appendix C**. Ioneer is responsible for acquiring necessary permits and authorizations.

1.4.2 Land Use Plan Conformance

The Project is located on public lands within the administrative boundaries of the BLM Battle Mountain District, TFO (**Figure 1-1**). The Project would be in conformance with the Tonopah Resource Management Plan (RMP) (BLM 1997), the Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (BLM 2015), the Land Use Plan Amendment for the Nevada and California Greater Sage-Grouse Bi-State Distinct Population Segment in the Carson City District and Tonopah Field Office (BLM 2016), NAC 519A.010, and Esmeralda County Public Lands Policy Plan (Esmeralda County 2013).

1.4.2.1 Tonopah Resource Management Plan

Public lands located within the BLM TFO boundaries are managed under the guidance of the Tonopah RMP, as amended, and Record of Decision (ROD). The Tonopah RMP ROD includes the following objective for locatable minerals (BLM 1997):

- To provide opportunity for exploration and development of locatable minerals such as gold, silver, copper, lead, zinc, molybdenum, etc., consistent with the preservation of fragile and unique resources in areas identified as open to the operation of the mining laws.

Standard operating procedures for locatable minerals include:

- BLM provides for mineral entry, exploration, location, and operations pursuant to the mining laws in a manner that 1) will not unduly hinder the mineral activities, and 2) assures that these activities are conducted in a manner which will prevent undue or unnecessary degradation of the public land.

- The Authorized Officer (AO) may require modifications of Plans of Operations to meet the requirements of the regulations and to prevent undue or unnecessary degradation of public land.

- Plans of Operations cannot be approved until Section 106 of the National Historic Preservation Act (NHPA), and Section 7 of the ESA, and the National Environmental Policy Act have been complied with.

- Reclamation of disturbed areas to meet BLM standards is required for all levels of activity: Casual Use, Notice, or Plan of Operations.

1.4.2.2 County Plans

The Project is within the jurisdictional boundaries of Esmeralda County. It is the responsibility of Ioneer to work with the county to demonstrate compliance with county plans and development code requirements. It is the responsibility of the counties to determine if the Proposed Action is in compliance with their master plan policies and development codes. Per CEQ regulations (40 CFR 1506.2(d)), the EIS shall discuss any inconsistency a project may have with any approved state, tribal, or local plan. While the EIS shall discuss any inconsistencies, NEPA does not require reconciliation (CEQ 2020).

Esmeralda County

The Esmeralda County Master Plan was formally adopted in 2011 (Esmeralda County 2011) and includes a Public Lands Policy Plan (Esmeralda County 2013) which provides the county's perspective on public lands policies and actions.

The Esmeralda County Public Lands Policy Plan emphasizes the county's support for, and dependence on, mineral resources development (Esmeralda County 2013). Specifically, the plan policy statement for mineral resources includes:

- Policy 7-1: Encourage the careful development and production of Esmeralda County's metal, mineral, and geothermal resources while recognizing the need to protect the environment and ecologic resources. Esmeralda County recommends Federal and State agencies take into consideration the potential economic or social impact of any proposed land management changes or natural resource related plans to the minerals industry, and on the citizens. Any economic impacts to the mineral industry directly impacts County tax revenues and County supported programs, such as the Esmeralda County School District. Therefore, Federal and State agency plans or management recommendations shall include a minerals and industry economic, social, and environmental impact description.

- Policy 7-3: Support State and Federal policies that encourage both large and small-scale mining and geothermal operations. Regulatory requirements, e.g., documentation, permitting, should be minimized and expedited in order to maintain the principles of the existing mining and leasing laws, including the Mining Law of 1872.

- Policy 7-5: Federal land management and state agencies should continue to enforce existing reclamation standards to ensure there is no undue degradation of the federally administered lands.

- Policy 7-6: Geothermal, mine, and exploration sites reclamation standards should be consistent with the best possible post site use for each specific area. Specific reclamation standards should be developed for each property rather than using broad based generic standards.

1.5 Issues and Comments

Issues identified during public scoping and internal scoping were documented in the Project scoping report (BLM 2023a). The issues relevant to the NEPA analysis are identified in **Table 1-1** with reference to the section where this issue is discussed in the Final EIS.

Table 1-1 Issues Identified

Issues Identified During Scoping	Addressed
Air Quality	
How would air pollutants (including hazardous air pollutants [HAPs] and particulate matter [PM]) from on-site and off-site Project operations impact air, soil, and water resources?	Section 4.1
How would emissions be controlled, evaluated, and mitigated?	Sections 2.1.13 and 4.1
What would the Project's contribution be to carbon dioxide (CO_2) and other greenhouse gases (GHG)?	Section 4.1
How would emissions and dust impact Tiehm's buckwheat (*Eriogonum tiehmii*)?	Section 4.12

Issues Identified During Scoping	Addressed
Alternatives	
What are the environmental impacts of each alternative and why were some alternatives not evaluated in detail?	Section 2.4, **Appendix D**
What is the Environmentally Preferred Alternative and has BLM considered the No-Action Alternative?	Sections 2.3 and 2.5
Climate Change	
How would the Proposed Action and alternatives contribute to or be affected by climate change?	Section 4.1
Cumulative Effects	
How would cumulative effects be analyzed in the EIS?	Section 4.20
Cultural Resources	
How would the Proposed Action and alternatives impact the cultural resource sites identified within the analysis area? How would impacts to these sites be avoided, or mitigated?	Section 4.2
Environmental Justice	
How would the Proposed Action and alternatives disproportionately and adversely impact environmental justice populations in and connected to area?	Section 4.3
Environmental Protection Measures	
Would proposed applicant-committed environmental protection measures (ACEPMs) reduce Project-related impacts?	Sections 2.1.13 and 4.0
Are the proposed ACEPMs feasible and why were some not incorporated into the Project?	Sections 2.1.13 and 2.4
Geochemistry	
How would the Project impact surface water and groundwater quality from potentially acid generating (PAG) waste rock? How would these impacts be monitored for and mitigated?	Sections 4.16 and 4.21
Geotechnical Design and Stability	
Would the proposed quarry be stable? How would natural events affect the stability of the quarry?	Section 4.4
Hazardous Materials and Waste	
What is the potential for contamination of surface water and groundwater?	Section 4.5
Which controls and containment systems would be in place to collect leaks, contain spills, and handle/store hazardous waste?	Section 4.5
How would accidental releases be handled?	Section 4.5
Land Use	
How does the Project comply with applicable land use designations, the local Master Plan, and FLPMA?	Sections 1.4 and 4.6
Livestock Grazing	
How would the Project impact permitted Animal Unit Months and livestock access to grazing allotments?	Section 4.7
Mitigation	
What mitigation measures are necessary during quarrying, closure and post-closure, and which ones are the proponent, the BLM, or other agencies responsible for?	Section 4.21
What mitigation measures are required to minimize criteria air pollutant emissions, impacts to special status species, Tiehm's buckwheat, archaeological sites, and traditional cultural properties from the Project?	Section 4.21
How is long-term monitoring and management enforced?	Section 4.21
Native American Traditional Values and Consultation	
How would the Proposed Action and alternatives affect important tribal sacred or religious sites, settings, or other important tribal values or resources?	Section 4.8
Noise	
How would noise from the Project affect wildlife and other noise sensitive resources?	Sections 4.3, 4.9, and 4.18
Reclamation	
Is the reclamation plan sufficient?	Sections 2.1.11, 4.21

Issues Identified During Scoping	Addressed
Is the financial assurance and bonding sufficient?	Plan of Operations
What are the BLM and State regulators reclamation bonding requirements and how are funds ensured for the completion of reclamation and closure activities?	Plan of Operations
Recreation	
What impact would the Project have on recreation?	Section 4.9
Social and Economic Values	
How would the Proposed Action and alternatives affect local and regional social and economic conditions through jobs, tax revenues, and local and regional spending?	Section 4.10
How would the Proposed Action and alternatives affect demand on local and regional resources and services (e.g., housing, roads, health care, law enforcement)?	Section 4.10
How would the Proposed Action and alternatives affect the quality of life and non-market values of local and regional populations?	Section 4.10
Soil Resources	
What impact would the Project have on soils?	Section 4.11
Threatened and Endangered Species	
How would the Proposed Action and alternatives impact Tiehm's buckwheat?	Section 4.12
How would the Proposed Action and alternatives impact bi-state sage-grouse (BSSG) (*Centrocercus urophasianus*)?	Section 4.12
Transportation and Access	
How would the Proposed Action and alternatives impact existing highway infrastructure, local and regional traffic volumes, traffic patterns, and public access?	Section 4.13
Vegetation	
How would the Proposed Action and alternatives affect vegetation and vegetation communities through direct removal and from loss of surface water resources?	Section 4.14
How would the Proposed Action and alternatives affect special status plant species?	Section 4.14
Visual Resources	
How would the Proposed Action and alternatives affect visual resources in the Project area?	Section 4.15
Water Resources	
How would the Proposed Action and alternatives affect groundwater in Fish Lake Valley?	Section 4.16
What baseline data, monitoring and mitigation measures, and protocols and procedures would be used for monitoring throughout all phases of the Project?	Section 4.16
How would current drainage patterns across the Project area change under each alternative?	Section 4.16
How would any water contaminated from PAG waste rock or spills be captured or treated?	Section 4.16
How would the Project impact water-dependent wildlife, ecosystems, and local communities?	Section 4.16
What mitigation is required for surface water and groundwater quality?	Section 4.21
Wetlands and Riparian Areas	
How would the Proposed Action and alternatives affect wetlands, drainages, and riparian areas?	Section 4.17
Wildlife and Special Status Species	
How would the Proposed Action and alternatives affect raptors, including golden eagles (*Aquila chrysaetos*)?	Section 4.18
How would the Proposed Action and alternatives affect big game use in and movement through the Project vicinity?	Section 4.18
How would the Proposed Action and alternatives affect the availability and quality of habitat for terrestrial game and non-game species?	Section 4.18
How would impacts to surface water features impact terrestrial and aquatic wildlife?	Section 4.18
What mitigation is required to minimize impacts to wildlife including special status species?	Section 4.21
Wild Horses and Burros	
How would the Proposed Action and alternatives affect wild horses and burros?	Section 4.19

2.0 Alternatives

2.1 Proposed Action

Ioneer is proposing to construct, operate, reclaim, and close a new lithium-boron project in the Silver Peak Range in Esmeralda County, Nevada. The description of the Proposed Action is summarized from the Plan (Ioneer 2022) and the *Project Alternatives Supplemental Information Report for the Rhyolite Ridge Lithium-Boron Project* (SIR) (BLM 2024a), unless otherwise specified. The life of the Project is approximately 23 years and includes the construction phase of approximately four years (Years 1 through 4), the quarrying phase of approximately 17 years (Years 1 through 17), the processing phase of 13 years (Years 4 through 17), and the reclamation and closure phase of six years (Years 18 through 23). Monitoring would continue, as necessary. Project facilities include a quarry; processing facility; West, North, and Quarry Infill overburden storage facilities (OSFs); spent ore storage facility (SOSF); contact water ponds; haul roads, service roads, and dewatering pipeline; stockpiles; explosives storage area; sewage system; batch plant; public road realignment; communication towers and all-terrain vehicle (ATV) trails; proposed monitoring locations and access; proposed water supply testing and facilities; and resource exploration drilling and dewatering wells.

The approximately 7,166-acre Plan boundary would consist of two components: the 6,369-acre OPA and the 797-acre Access Road and Infrastructure Corridor (**Figure 2-1**). There would be approximately 7,137 acres of land administered by the BLM and approximately 29 acres of private land within the Plan boundary. The Proposed Action would create an additional 2,306 acres of surface disturbance on public land administered by the BLM and private land. This includes approximately 35 acres of exploration disturbance in the OPA, 30 acres of disturbance for dewatering facilities in the OPA, and 20 acres of disturbance for water supply facilities in the Plan boundary. The 35 acres of proposed exploration disturbance in the OPA includes approximately three acres of existing authorized exploration-related disturbance conducted previously under Notices NVN-097202 and NVN-097262. The location of Project components are illustrated on **Figure 2-2**, and proposed surface disturbance by facility type is provided in **Table 2-1**.

Table 2-1 Proposed Action Surface Disturbance

Project Component	Area (acres)[1]	Comments
Quarry	201.5	Includes fence and water storage tanks. The total quarry would be 473.7 acres; however, 272.2 acres above the quarry rim would be occupied by the Quarry Infill OSF resulting in 201.5 acres of quarry.
Quarry Berm	19.1	200-foot-wide berm between the quarry and the wash.
Processing Facility	82.6	Includes contact water pond, minimum 20-foot disturbance buffer, and diversion channels.
West, North, and Quarry Infill OSFs	947.3	Includes contact water pond, minimum 20-foot disturbance buffer, and diversion channels.
SOSF	373.9	Includes underdrain pond, minimum 20-foot disturbance buffer, and diversion channels.
Ponds	11.9	Includes the North and West OSFs contact water ponds, drainage, and access.
Haul Roads and Service Roads	101.7	Includes all haul roads and service roads with 20-foot disturbance buffer. Includes buckwheat exclusion area road reroute of 1,327 feet with a 10-foot disturbance buffer.
Stockpiles	30.0	Includes growth media stockpiles with minimum 20-foot disturbance buffer.
Explosives Storage Area	2.6	Includes explosive storage and area access road including 20-foot disturbance buffer.
Septic Leach Fields	10.0	Includes primary and reserve leach field for septic sewage management.
Communication Towers and ATV Trails	3.0	Includes Towers 3 and 4, and 40-foot disturbance buffer for access to monitoring locations. Towers 1, 2, and 5 would occur on surface disturbance footprints of other facilities.
Proposed Monitoring Locations and Access	3.8	Includes five proposed monitoring wells (0.5 acres each) and associated access routes with 40-foot disturbance buffer.

Project Component	Area (acres)[1]	Comments
Project Area Exploration	35	Includes phased exploration activities (access routes, drill sites with sumps), including approximately three acres of existing disturbance not within the Proposed Action footprint. No new exploration disturbance would occur in Tiehm's buckwheat designated critical habitat.
Water Supply Facilities	20	Includes access routes, wells, power, and pipelines to bring water from agricultural wells in Fish Lake Valley.
Dewatering Facilities	30	Includes access routes, drill sites with sumps, wells, power, and pipelines, and would not occur in Tiehm's buckwheat designated critical habitat.
Cave Springs Road Realignment (within OPA)	46.8	Includes 28-foot road width plus 60-foot disturbance buffer for existing and realigned segments within the OPA.
Argentite Canyon Road Realignment	1.6	Includes a 15-foot road width.
Buckwheat Exclusion Area Fence	1.5	Includes five-foot disturbance width, for 51 acres of Tiehm's buckwheat subpopulations fenced, referred to as the Buckwheat Exclusion Area.
Buckwheat Critical Habitat Fence	9.8	Includes 30-foot disturbance width, for 559 acres of designated critical habitat fenced. The 51 acres of Tiehm's buckwheat subpopulation fencing would occur within this area.
Yards	80.8	Includes general surface disturbance that does not require grading.
Fencing	0.0	All fencing, unless described for Tiehm's buckwheat, is located on other facility footprints, thus 0.0 acres of disturbance assumed.
Cave Springs Wash Berm	37.1	Includes a 100-foot disturbance buffer.
Diversion Ditches	60	includes a 60-foot disturbance buffer.
Access Road and Infrastructure (within the Access Road and Infrastructure Corridor)	192.7	Maximum of 100-foot disturbance buffer along the access road for 67,531 feet and 50-foot disturbance buffer along State Route (SR) 264 for 32,842 feet.
Batch Plant	3.2	To be used during construction.
Proposed Action Disturbance	**2,306**	Includes Proposed Action and existing disturbance.

[1] All areas include a minimum 20-foot disturbance width around the feature unless otherwise specified.

2.1.1 Quarry

A quarry (**Figure 2-3**) would be developed using conventional open pit quarrying methods to extract overburden and ore. The final configuration of quarry wall slopes would be within the 201.5-acre footprint, which includes a quarry adjustment zone developed to account for final adjustments of the quarry footprint for stability. The quarry would be excavated using 30-foot-high benches, except along those portions of the western wall of the quarry that have lower geotechnical stability. In these areas, a combination of quarrying on 10-foot high benches and the use of ground anchors would be used. In addition, at the end of quarrying, an additional backfill would be placed against the west quarry wall from the quarry floor to a height of at least 10 feet vertically above the ground anchors as a buttress to ensure long-term stability of the west quarry wall (Ioneer 2022). The buttress material is included in Table 1 of Geo-logic and Associates 2023 Geotechnical Report (Geo-Logic Associates 2023). Continuous and advanced monitoring techniques detect potential instabilities in real-time, thereby preventing slope failures. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide data on slope movements and groundwater conditions (Geo-Logic Associates 2023). Geotechnical recommendations would be continually advanced and refined as more data are collected and actual excavation observations become available (EnviroMINE 2019).

The quarry would be developed using open cast quarrying methods that use heavy equipment (backhoe excavators/loaders/dozers/autonomous haul trucks) to remove overburden to the OSFs. Explosives would be used to fragment the rock to allow removal of overburden as well as the ore zone. Explosives would be stored on site in a secured fenced facility. There would be minimal blasting at the surface as no blasting would be required within the alluvium and/or lithium clay units. Following blasting, excavators would be used to extract the ore and overburden.

Development of the quarry is scheduled to be completed within approximately 17 years from initiation and would result in the quarrying of approximately 25 million tons (Mt) of lithium-boron ore and 406 Mt of overburden (including 23 Mt of lithium-rich clay).

2.1.2 Overburden Storage Facilities

The OSFs would be constructed within the valley west of the quarry (West OSF), the valley to the north of the quarry and the Cave Springs wash (North OSF), and in the southern and western portions of the quarry (Quarry Infill OSF) (**Figures 2-4** and **2-5**). The West OSF would contain a maximum of 120.7 Mt of overburden at a maximum overall height of 1,030 feet above existing ground surface. The North OSF would contain a maximum of 77 Mt of overburden at a maximum overall height of 700 feet above existing ground surface. The Quarry Infill OSF would contain a maximum of 208.3 Mt of overburden at a maximum overall height of 1,600 feet from the quarry floor. The OSFs would be constructed with 20-foot lifts separated by benches of sufficient width to maintain stacked inter-bench side slopes (between reclamation benches) of 3H:1V (Horizontal:Vertical).

The OSFs would be unlined facilities with underdrain systems consisting of foundation drainage collection piping and an inlet basin. Runoff from the facilities would be directed to and collected at lined contact water ponds. The OSF contact water ponds would be located downgradient of the facilities to capture runoff and seepage. Monitoring wells would be placed downgradient of the OSFs to assess groundwater quality.

Material placed on the OSFs would be predominantly non-PAG. The limited PAG material anticipated to be encountered and placed on the OSFs would be mixed with non-PAG material, which would result in net neutralization of the material. The OSFs would be managed according to the Overburden Management Plan (Piteau 2022a, 2023a, 2024a).

Lithium-rich clay would be extracted during quarrying and placed within the interior of the OSFs. Due to high clay content and the low shear strength at saturation, this material would be set back from the face of the OSFs and contained within certain elevations to control stability of the OSFs. This material could be utilized as a soil amendment for the SOSF cover system or other facilities.

2.1.3 Processing Facility

The processing facility would be located in the northwest portion of the OPA (**Figure 2-6**) and would include buildings, process machinery, bulk petroleum storage tanks, bulk solids storage facilities, process reagents, and parking areas. All fluids associated with the processing plant would be contained and managed as a closed system by use of concrete slabs, lined surfaces, directed runoff, or curbing. Fencing would be installed around the perimeter of the processing facility and adjacent contact water pond.

2.1.3.1 Processing

Approximately 2.8 Mt per year of ore is anticipated to be processed from ore extracted from the quarry through a series of components located at the processing facility. The processing facility would produce approximately 26,800 tons per year (tpy) of lithium carbonate and 219,000 tpy of boric acid. Over the next three to five years, approximately 78 percent of the total lithium carbonate produced by the mine (21,000 tpy) would remain within the United States. It should also be noted that efforts are underway to improve domestic lithium processing and manufacturing (PRNEWS 2021, 2022a, 2022b; Ioneer 2023b; USDOE 2023). The amount of material processed would be limited by availability of acid for leaching. The mineral processing circuit at the processing facility would include the following major components: ore crushing and vat leaching facilities; evaporation and crystallization circuits; production drying and packaging; and sulfuric acid plant, steam turbine, and generator.

2.1.3.2 Ore Crushing and Leaching

Ore would be trucked from the quarry to the processing facility and placed in one of two temporary stockpiles, a high-boron stockpile or a low-boron stockpile, prior to processing. From these stockpiles, front-end loaders would be used to blend and feed ore into the ore feed bin. After crushing, the ore would be conveyed directly to the leaching vats (i.e., large tanks). The base of the spent ore stockpile would be underlain by a concrete slab that would be graded toward a fluid collection/retrieval system, designed to

store direct precipitation from the 100-year, 24-hour storm event. The fluid collection/retrieval system would include a collection of drainage collection pipes embedded within a drainage medium (overliner), overlaying an integrated textured 80-mil high density polyethylene geomembrane liner. The liner would be placed upon a prepared subgrade consisting of compacted, moisture-conditioned, regraded alluvium. Collected fluids would feed back into the process circuit.

Seven steel leaching vats with acid-resistant lining would contain the crushed ore at various stages of the leach process. Crushed ore would be conveyed by a vat tripper to a vat loading shuttle conveyor into the appropriate vat, each containing a variable leach solution, leached for a specified time, washed, and then removed with a clam shell reclaimer for discharge to a dump hopper and conveyor that feeds a spent ore stockpile. From there, the spent ore is loaded into haul trucks for transport to the SOSF. In total, the leach cycle within the vats would be seven days including 48 hours of ore loading, solution flooding, and neutralization, and 72 hours of leaching. The last 48 hours of the seven-day cycle would include washing, unloading, draining, inspection, and stacking. Mineral extraction would utilize sulfuric acid produced on site to leach the lithium and boron from the quarried ore material. Lime and soda ash would also be used in the processing facility to obtain the final products of boric acid and lithium carbonate.

Reagents for ore processing would be stored within secondary containment in the processing facility. Two secondary containment areas would be present at the sulfuric acid plant. The strong acid containment area, at which the product storage tanks containing sulfuric acid are stored, would be sufficient to hold 100 percent of the capacity of the largest equipment plus 10 percent of the aggregate capacity of the tanks located in the containment area plus containment of a 25-year, 24-hour storm event. The other area of the sulfuric acid plant requiring secondary containment is the diesel tank area. Capacity at that area would be sufficient to hold 110 percent of the largest tank and volume of the 25-year, 24-hour storm event. Individual component leak detection systems would be visually inspected and installed and monitored as appropriate to protect against inadvertent releases of ore residuum and process solutions.

Beyond the chemicals used in the processing circuit, the primary chemical and reagent needs are associated with potable water treatment, blasting, and potentially dust suppression (if acceptable chemical options are identified and approved by Nevada Department of Transportation [NDOT] and BLM).

2.1.3.3 Sulfuric Acid Plant

All sulfuric acid required would be produced on site at the sulfuric acid plant. Liquid or solid sulfur would be delivered to the site and be processed with water to produce sulfuric acid. Sulfuric acid would be used for processing ore through a seven-day leach cycle. Heat produced during the production of sulfuric acid would be used during ore processing, as well as to power the steam turbine generator. Steam generated during the sulfuric acid production process would pass through a steam turbine generator to produce 35 megawatts of power, enough to power the facility and allow it to operate independently from the electrical grid. Under normal conditions, the steam turbine generator would have minimal fuel needs; in the event of lost power, a backup diesel generator and diesel boiler would be used to power the steam turbine's mechanical parts. A portion of the high-pressure steam generated would also be reduced in pressure and used in the process for drying, evaporation, crystallization, and heating.

2.1.4 Spent Ore Storage Facility

The SOSF, located in the southwest portion of the OPA (**Figure 2-7**), would store byproducts from the leaching and mineral extraction process, including spent ore, sulfate salts, and neutralization filter cake. The byproducts would be hauled by truck from the processing facility to the SOSF, which would provide permanent storage of approximately 60 Mt of composite material. The SOSF would be constructed in multiple phases, with each phase being developed to store approximately 12 Mt of composite material.

The SOSF would be built on a prepared subgrade and geomembrane liner, with a maximum stacking height of approximately 250 feet, and would have an overall slope of 3H:1V. Leached spent ore material would be used to construct the structural outer shell of the SOSF, encapsulating a mixture of composite materials in the interior (spent ore, sulfate salts, and precipitation filter cake). A perimeter road would provide light vehicle access around the SOSF.

Draindown from the composite material would be collected in the drainage system at the base of the SOSF then gravity fed to the underdrain pond. The underdrain solution collection system includes a drainage medium consisting of a sand and gravel mixture (referred to as an overliner) with a network of perforated piping. Water from the pond would be pumped to a geomembrane-lined water truck fill stand on a platform along the pond crest, for transport to the processing facility for use as makeup water.

2.1.5 Contact Water Ponds

Four lined contact water ponds would be constructed to collect contact water resulting from precipitation and run-on entering facilities; these would be located at the West and North OSFs, the processing facility, and the SOSF. Two additional ponds would be constructed at the SOSF as the facility is expanded. All ponds would be fenced for security and to prevent wildlife and/or livestock access. The ponds would include avian exclusion measures in accordance with the Industrial Artificial Pond Permits and would be monitored and reclaimed at closure.

2.1.6 Ancillary Facilities

2.1.6.1 Power Supply

Power during construction would be supplied by diesel-powered generators, which would meet approved emissions guidelines and permit requirements. Once construction is complete, power would be supplied by heat and steam created by a steam turbine generator at the sulfuric acid plant. The acid plant would contain a steam turbine generator, a water-cooled condenser, condenser transfer pumps, condensate booster pumps, steam bypass stations, and a let-down station. A backup diesel generator and diesel boiler would be used to power the steam turbine's mechanical parts in the event of acid plant outage.

2.1.6.2 Explosives Storage Area

Blasting would be performed during daylight hours; the exact schedule would be determined based on operational needs and under strict safety procedures as required by Mine Safety and Health Administration (MSHA), state, and federal authorities. Explosive agents would be purchased, transported, handled, stored, and used in accordance with federal provisions by the Department of Homeland Security and others. The primary explosive used would be ammonium nitrate fuel oil (ANFO), or ammonium nitrate prill in pellet form, which would be loaded into the explosives truck and transported to the blast site. At the blast site the ANFO would be mixed in the truck.

The explosives storage area would be fenced and secure. Ammonium nitrate prill would be stored in a silo. Boosters and detonators would be stored in separate storage magazines. Explosives would be handled by a licensed contractor and stored on site in compliance with Department of Homeland Security, MSHA, and other regulations. Federal, state, and county roads/highways would be used to transport explosives. All shippers would be licensed by NDOT and other appropriate agencies.

2.1.6.3 Water Supply Wellfield and Pipeline, Dewatering Wells, Sumps, and Tanks

Three existing test wells would be converted to dewatering wells, and an additional network of dewatering wells is also anticipated to be installed adjacent to or near the quarry to provide water during the construction phase of the Project. Activities associated with dewatering would include access routes, drill sites with sumps, dewatering wells, pipelines, and powerlines or generators. Water from dewatering wells and sumps at the quarry would be stored in one or more tanks around the quarry perimeter. The dewatering system would be used to provide water during construction. In addition, dewatering water would be pumped from the storage tank(s) into water trucks and used for dust suppression, as well as for other activities during operations (WestLand 2023a).

During quarrying and processing, water from quarry dewatering wells would be supplemented with water from new or existing wells on private land in Fish Lake Valley. Up to 2,500 gallons per minute (gpm) would be pumped from these wells. Agricultural use of an equivalent number of wells and associated pumping that are currently used for agriculture, plus the Nevada Division of Water Resources (NDWR) adjustment to account for the conversion from agricultural use to mining and milling use, would be suspended during Project operations. Thus, on an annual basis the Project groundwater pumping in Fish Lake Valley would be equal to the agricultural pumping, including the NDWR adjustment. The wells in Fish Lake Valley would

pump water to an adjacent booster station. The pipeline facilities and a booster station would be located on private land and connect with the pipeline adjacent to SR 264. An additional booster station would be located adjacent to the access road, within the Access Road and Infrastructure Corridor, to supply water to the OPA. Power for the additional booster station would be supplied from the Project power generation and delivered via above-ground powerlines within the Access Road and Infrastructure Corridor (WestLand 2023a).

2.1.6.4 Communication Towers

Five line-of-sight communication towers (Communication Towers 1 through 5) would be distributed through the OPA to provide combined cellular, broadband internet, and radio service to Project personnel and contract employees throughout operations. The towers would be 30 to 40 feet high and would supply broadband internet and radio; a single tower (Communication Tower 3) would also provide cellular service to the Project as well as to the public. Ioneer may co-own this tower with a major cellular service provider. Commercial use would require submittal and approval of a right-of-way (ROW) application. The communication towers would utilize a combination of battery and solar power. Towers would be accessed by existing and/or proposed service roads, or by utility vehicle along proposed overland ATV trails.

2.1.6.5 Facilities and Site Security

Administrative facilities at the processing facility would include offices for security and reception, administrative staff, a first aid station, and a meeting/training room. A guard house near the main facility entrance would control the entrance to the processing facility. Various levels of security control would be implemented across the OPA, depending on the sensitivity of the equipment or processes being protected. Security measures around the processing facility would include limiting access to only authorized persons and implementing cameras, alarms, and other measures.

An on-site ambulance and trained first aid responder would be available to respond to fire and medical emergencies at the site 24 hours per day, seven days per week. An Emergency Medical Technician would be staffed on site during day shift at the medical clinic near the administration building (Ioneer 2022). Phones would be used for emergency communication and radios would be used as back-up. If an injury requires medivac, the Sheriff Deputy, local emergency services, or dispatcher would request an air ambulance service from Las Vegas and return to Las Vegas for medical treatment. A helipad would be located west of the processing facility parking lot.

2.1.6.6 Truck Maintenance Facilities

Equipment maintenance and storage would be in designated areas and would include considerations for spill prevention. The truck maintenance shop would be supported on a reinforced concrete slab, with the center aisle section designed to support trucks weighing up to 200 tons. Any release of oil would be contained within the building. The truck wash bay would be located within an open area adjacent to the truck maintenance shop, with a reinforced concrete slab on grade designed to support a 200-ton class truck. The slab on grade would slope to a sump connected to a concrete settling pit. Truck wash water, and likely also dust suppression water, would be supplied by a tank located by the truck wash bay. The tire change facility would be an open area, in line with the truck wash bay. The surface of the area would be covered with hardstand and concrete.

2.1.6.7 Autonomous Haul Truck Calibration Sites

Autonomous haul trucks would be used at the Project and require calibration sites to ensure that the trucks operate within design specifications. Two different areas are required to complete the calibration. The first is a 500-foot by 424-foot area. The second area is 2,600 feet long and 200 feet wide. The calibration sites would be located in one of four different areas depending on the state of Project development at any given point. The locations for the sites would be within the three OSF and quarry footprints.

2.1.6.8 Borrow Material

Aggregate material would be required during the construction phase of the Project. Material may be sourced from development of the quarry or from stripping and grading of surficial aggregate from other Project facilities (namely the processing facility and SOSF). Private off-site commercial quarry sources may also

be utilized. Portable crushers and screens may be used to meet design specifications, depending on parent material type. Crushing and/or sorting facilities would be temporary, in use during construction, and would be located within the footprints of other Project facilities.

2.1.6.9 Laydown Yards

Laydown yards would be constructed to accommodate off-loading of supplies and equipment needed to support Project construction as well as over-sized items. These yards would be located within and adjacent to the designated footprints for other facilities. The primary laydown yard would be located at the SOSF.

2.1.6.10 Fencing

Fencing would be used to protect facilities, exclude livestock and wildlife, and prevent trespassing. Fence specifications would be determined in consultation with BLM and NDOW. Individual Project components would be fenced separately along the outer clear and grub line, including the quarry, processing facility, explosives storage area, and various facility ponds. Gates or cattle guards may be installed along roadways within the OPA, as needed to exclude public access to Project facilities and maintain existing access to public areas. All fencing would be monitored on a regular basis and repairs made as needed. Fencing proposed for the protection of Tiehm's buckwheat is discussed in Section 2.1.13.1.

2.1.6.11 Cave Springs Wash Berm

A berm would be constructed of on-site materials on the south side of the Cave Springs wash between the haul road and the Cave Springs Road to control erosion during flood events in the wash. The east end of the berm would connect with the quarry berm and extend west to the western edge of the OPA. The berm would generally be 60 feet wide and 10 feet high.

2.1.6.12 Sewage Management

Sewage waste would originate as effluent from restroom facilities, lunch facilities, and offices. Sewage may be managed through either a package sewage plant or a septic system. If applicable, effluent would be routinely monitored to verify the treatment systems are functioning as designed and meet applicable environmental design criteria and treated liquid effluent may be recycled back into the process or used for dust control on the roads. Conceptual leach field locations (primary and reserve) have been proposed to allow for the possibility of a septic system.

2.1.7 Work Force and Schedule

Approximately 400 to 500 workers, including both Ioneer staff and contracted personnel, would be needed during the approximately four-year construction period. Approximately six 10-hour construction shifts are anticipated per week. Staff-level hiring would begin with salaried personnel to support Project development, followed by hourly personnel. Up to approximately 350 workers would be needed during quarrying and processing, staggered in shifts. Personnel would include skilled workers and several management staff. Operations would be continuous, 365 days per year, 24 hours per day. In addition, a limited number of contractors would be on site to complete specified activities, such as exploration and water well drilling, and other tasks. Ioneer would work with the local communities to develop temporary and long-term housing accommodations for the construction and quarrying and processing phases. Ioneer is reviewing various housing options on private land, including use of recreational vehicle parks, local hotels, and home rentals.

2.1.8 Transportation and Access

2.1.8.1 Plan Boundary Access

Within the OPA, haul roads and service roads would be constructed between the major Project facilities. A portion of Cave Springs Road would be realigned to provide separated, safe public access through the Plan boundary (**Figure 2-8**). Ioneer would be responsible for maintaining and improving access roads consistent with their road improvement and maintenance Memorandum of Understanding (MOU) with Esmeralda County (Esmeralda County and Ioneer 2023; NewFields 2022d).

2.1.8.2 On-Site Access

Project-related traffic entering and exiting the OPA would include vehicular traffic, semi-trucks providing material and supplies, and vehicles transporting employees. The initial traffic would include equipment for early construction and site grading, as well as construction equipment and materials for the batch plant.

The two primary types of roads constructed in the OPA would be service roads and haul roads. Service roads would be constructed to move equipment and supplies between the various Project components and to provide for light vehicle traffic. Service roads would be approximately 20 feet wide plus shoulders, sufficient to safely pass. Haul roads, constructed with a surface comprised of competent overburden from the quarry, would allow haul trucks to transport ore, overburden, and spent ore between the quarry, processing facility, OSFs, and SOSF, with enough space to allow for safe passage of two 150-ton haul trucks with safety berms and surface water runoff control systems. Additionally, ancillary roads would be constructed to reach monitoring wells and planned resource exploration sites, as needed, within the OPA. These roads would be for occasional use and would be signed and closed when not in use. Overland ATV trails would be used to access communication towers and environmental monitoring sites.

2.1.8.3 Cave Springs Road Realignment

Cave Springs Road (aka Cave Springs Road-Coyote Summit) is a public road currently maintained by Esmeralda County that bisects the OPA. Approximately 4.7-miles of the road would be realigned within the OPA. It is assumed that the rerouted road within the OPA would be transferred to Esmeralda County at closure, presumably by way of an amendment to Esmeralda County's existing ROW grant with BLM. This segment of the Cave Springs Road would be designed and maintained similar to the existing route; 28 feet wide with associated ditches and berms.

Traffic control systems would be installed to maintain the safety of the public and Project employees. These would include establishment of strictly enforced speed limits, installation of a rail-road type crossing guard at the intersection of the haul road and Cave Springs Road near the processing facility and the intersection of the haul road and the North OSF, and installation of stop signs at the intersection of Cave Springs Road and the service road to the explosives storage area from the quarry.

2.1.8.4 Argentite Canyon Road Realignment

Argentite Canyon Road is a public road currently maintained by Esmeralda County that intersects the Cave Springs Road and provides access through the southern portion of the OPA. This public road would require a localized approximately 0.9-mile realignment around the quarry.

2.1.8.5 Material Transport

Boron and lithium products would be packaged in palletized one-ton super sacks and loaded into box trucks or sea containers to be transported off site by licensed contract carriers. Approximately 115 round-trips per day would be made by trucks bringing needed materials and supplies to the site and transporting product from the site. It is anticipated the trucks transporting these goods would range in size from single- to double-axle tractor trailers and would operate every day, to the extent possible.

2.1.9 Resource Exploration

Up to 35 acres of phased surface disturbance to support additional exploration, resource definition, and geotechnical drilling would occur within the Plan boundary in the vicinity of the quarry, but outside of Tiehm's buckwheat designated critical habitat. Ioneer is responsible for approximately three acres of existing surface disturbance from previous exploration activities in the OPA outside of the planned facility footprints (an additional 12 acres would be within the proposed surface disturbance). This existing surface disturbance would be incorporated into the Plan under the 35 acres of permitted acreage for phased activities described above and covered under the bond established for the Project. Exploration activities may consist of reverse circulation and core drilling from constructed drill sites with single or double sumps, constructed roads, overland travel routes, bulk sampling, geotechnical auger holes, and geological test pits. The exact location of these proposed surface disturbances would be determined as exploration activities progress.

2.1.10 Water Management

2.1.10.1 Water Usage and Water Supply

An operational site-wide water balance has been developed to achieve the Project's goals of recycling water and achieving zero discharge. It is anticipated that water needs would be approximately 2,500 gpm, the majority of which would be used for processing and cooling, with lesser amounts required for potable needs and dust suppression. Water derived from dewatering wells, water collected from in-quarry sumps, contact water (as available), and supplemental groundwater resources (supply wells and associated pipelines) within the OPA would be utilized to support the water demands associated with the Project.

During construction, water required for construction needs (such as concrete) and for dust suppression would be sourced from existing test wells within the footprint of the quarry and stored in tanks located within the quarry footprint, as well as the contact water pond at the processing facility. During quarrying and processing, the Project's water supply would be from new or existing wells on private land in Fish Lake Valley, which would be pumped from two new booster stations with one located on private land and one within the Access Road and Infrastructure Corridor. Booster stations would assist with pumping water to the OPA via a pipeline adjacent to SR 264 and the access road to the processing facility in the OPA.

Ioneer has acquired or leased all necessary water rights, for which the points of use and/or diversion would be transferred to the appropriate locations within the Plan boundary. As part of the water rights acquisition, an equivalent amount of agricultural pumping would cease, resulting in the Project having no "net change" in the amount of groundwater pumped in Fish Lake Valley (WestLand 2023a).

2.1.10.2 Stormwater

Within the OPA, the main drainage for the area is an ephemeral unnamed stream which extends northwest from Cave Spring and the Silver Peak Range. This stream parallels Cave Springs Road and runs centrally through the OPA (referred to as Cave Springs wash), collecting water from surrounding ephemeral drainages before terminating in Fish Lake Valley.

Project stormwater infrastructure would include diversions and sediment control structures constructed to direct stormwater away from (around and downgradient of) Project facilities (**Figure 2-9**). A Stormwater Management Plan (NewFields 2022a) has been prepared for the Project to provide an overview of site conditions, facilities, potential on-site impact sources to natural drainages from stormwater, and best management practices (BMPs) that would reduce potential impacts from erosion and sedimentation. Appropriate downgradient stormwater and sediment control features would be installed at the onset of construction and throughout the construction process in accordance with the Stormwater Management Plan. Surface water diversion channels would border the Project components to capture surface runoff from the surrounding natural topography. Non-contact water would be diverted around the quarry, OSFs, SOSF, and processing facility and directed toward the natural drainages. Temporary sediment control structures would be installed as part of the incremental development of the OSFs and would be sized for a100-year, 24-hour storm event.

Stormwater management measures would include the reduction of contact between stormwater and industrial quarrying activities (including disturbed unvegetated ground), erosion and sediment controls, structural controls, fugitive dust control, and non-structural controls such as good housekeeping, inspections, training, and maintenance.

Water from precipitation entering the quarry would be intercepted by in-pit sumps and dewatering wells. Dewatering wells would be installed around the periphery of the quarry to intercept the majority of water before it flows into the quarry. Any deep groundwater or surface water that occurs along the haul roads or in the bottom of the quarry would be intercepted by intermediate sumps. Dewatering water and stormwater collected in contact water ponds would be used as makeup water in the process circuit and may also be used for dust suppression within the quarry or on Project roads (Ioneer 2022). The groundwater quantity impacts report prepared for the Project expects dewatering rates to range from about 60 gpm to a maximum annual average of 650 gpm in year 2033 (Piteau 2023b).

2.1.10.3 Potable and Fire Suppression Water System

Potable and fire suppression water would be derived from on-site groundwater sources and stored in a process/fire water tank in the processing facility. The upper section of the water tank would be available for process water supply and potable use; water from this tank would be piped to various areas of the processing facility, as needed. The lower section of the water tank would be reserved for fire water. The fire water distribution system would include a dedicated water storage tank and pump. Fire hydrants, sprinkler systems, hose stations, and extinguishers would be located strategically throughout the facilities. Fire water would be pumped to a fire pump skid to provide fire water throughout the site using buried distribution piping to surface fire hydrants.

Per NDEP Bureau of Safe Drinking Water regulations, a potable water treatment facility and public water system would be constructed to supply potable water to workers and for other Project needs during operations. During construction, bottled water would be provided for all potable needs.

2.1.11 Reclamation

Reclamation of disturbed areas resulting from activities outlined in the Plan would be completed in accordance with the BLM and NDEP regulations. Procedures and standards to ensure that operators prevent unnecessary or undue degradation and reclaim disturbed lands are established under 43 CFR Subpart 3809. The sections below provide a summary of closure and reclamation activities for the Proposed Action. Additional detailed information regarding the proposed reclamation is in the Plan (Ioneer 2022) and the SIR (BLM 2024a). As proposed, Ioneer is committed to reclaiming all Project-related infrastructure and roads created in the Plan boundary with the exception of those features listed in **Table 2-2** under NAC 519A.250. Post-reclamation topography is shown on **Figure 2-10**.

Table 2-2 Proposed Action Facilities Permanent, Post Reclamation Features

Feature	Permanent Post Reclamation Feature Acres
Argentite Canyon Road Realignment	1.6
Cave Springs Road Realignment (within OPA)	46.8
Cave Springs Wash Berm	37.1
Communication Towers and ATV Trails	2.5
Evapotranspiration (ET) Cell	3
Diversion Channels	60
Quarry, Quarry Infill, and Quarry Lake	230.9
Unmaintained ATV Trails	0.5
Exclusion Area Road Reroute	0.3
Total	**382.7**

Post-closure, Communication Tower 3 may remain and continue to provide cellular service under other ownership. This use would require a ROW. Existing unmaintained and county-maintained roads, including the realigned portions of the Cave Springs Road and Argentite Canyon Road, would remain. As determined appropriate by the BLM and Esmeralda County, any roads on public lands suitable for public access or providing public access consistent with pre-operational conditions would not be reclaimed at closure.

A quarry lake would form in the quarry at an elevation of 5,650 feet above mean sea level (AMSL) and would be approximately 66 surface acres. The majority of recovery of the groundwater table is predicted to occur within approximately 60 years (Piteau 2023b). A safety berm would remain in place around the perimeter of the quarry and warning signs would be constructed prior to decommissioning of the quarry fence at the end of operations. A single quarry access point would remain to allow for periodic quarry lake monitoring, with a gate installed to restrict access and prevent public entry. An overland ATV trail from the public road to the quarry would remain for monitoring of water in the quarry by Project personnel as long as is required. The ATV trail to the quarry would be bermed and signed for safety and to prevent public access. A diversion feature would continue to re-direct stormwater run-on from upgradient of the quarry

into natural drainages, to the extent practical. Stormwater diversions would be designed to withstand a 500-year, 24-hour storm event (Ioneer 2022).

Concurrent reclamation would be completed as areas become available and when reclamation is practical and safe. Final reclamation would occur over a minimum of six years of phased reclamation after Project facilities are closed, or until the reclamation of the site or component has been accepted by the BLM and NDEP. Additional environmental monitoring (including the quarry lake) is expected to extend beyond the date of revegetation release, as guided by final closure plans. Perimeter fencing around reclaimed Project features would remain to preclude livestock and wildlife access until successful revegetation; at that time fences would be removed.

All buildings, concrete slabs and footers, and other ancillary features would be buried or removed from the processing facility. Disturbed areas would be recontoured. Sloped features, such as the OSFs and SOSF would be graded to smooth benches but would remain as landforms on the landscape. The regraded surface of the SOSF would be covered with an ET cover system composed of on-site alluvium. Monitoring and production wells would be abandoned and reclaimed as required by the general provision for underground water and wells (NAC 534). In accordance with Nevada Revised Statutes (NRS) 534.425 through 428, drill holes would be immediately plugged after data collection is complete.

All reclaimed surfaces would be revegetated. Prior to seeding, disturbance areas would be recontoured, surfaces would be ripped or scarified (where conditions warrant), and growth media would be distributed. Seed mixes would be approved by the BLM, and seed mixtures may be modified per BLM approval based on limited species availability, poor initial performance, new plant material releases, or advances in reclamation technology. All seed would be certified, properly labeled, and would meet the requirements of the Federal Seed Act and the seed and noxious weed laws of Nevada.

As outlined in the Tiehm's Buckwheat Protection Plan (Ioneer 2022), certain areas of the OSFs growth media cover would be constructed to resemble the geochemical and physical characteristics of the occupied Tiehm's buckwheat designated critical habitat. These areas would be used for propagation of Tiehm's buckwheat.

Slope stability monitoring would include visual inspections of the OSFs, SOSF, and quarry slopes. Quarry maintenance and stability monitoring would occur as long as needed, and to the minimal degree required to maintain safe access to the quarry lake for water monitoring activities during the period of responsibility for quarry lake monitoring.

Water quality and elevation monitoring of the anticipated quarry lake would continue as long as required by the BLM and NDEP (anticipated to be until the quarry lake has reached approximately 90 to 95 percent of its anticipated filling depth), and in accordance with monitoring parameters documented within the Water Pollution Control Permit (WPCP). As specified in the Final Plan for Permanent Closure (FPPC), selected quarry dewatering wells may be converted into vibrating wire piezometers (VWPs) for water level confirmation and reporting as needed.

Water remaining within the OSF contact water ponds and SOSF underdrain pond would be monitored for water quality until ponds are dry and/or chemical constituents of the fluid fall below regulatory or background limits, as agreed upon in the FPPC. At that time, all pond liners would be removed or perforated, and all ponds would be removed and/or regraded and revegetated, along with all processing plant facilities. Post-quarrying groundwater and surface water quality would be monitored according to the requirements established by NDEP and BLM, upon approval of the FPPC, with the goal of demonstrating non-degradation of groundwater quality.

2.1.12 Hazardous Materials

Hazardous materials would be transported, stored, and used in accordance with federal, state, and local regulations. Employees would be trained in the proper transportation, use, and disposal of hazardous materials. Hazardous wastes would be collected and trucked to an off-site licensed disposal facility in accordance with all federal and state regulations. Explosives are discussed under Section 2.1.6.2.

2.1.13 Applicant-Committed Environmental Protection Measures

Ioneer has committed to the following ACEPMs for the Proposed Action. ACEPMs are prepared by the proponent and included as part of the Proposed Action. These measures are outlined by resource below.

2.1.13.1 Tiehm's Buckwheat

The USFWS Reno Fish and Wildlife Office received a petition to list Tiehm's buckwheat under the ESA as an endangered or threatened species and to concurrently designate critical habitat on October 7, 2019. On June 4, 2021, the USFWS announced its 12-month finding on a petition to list Tiehm's buckwheat as an endangered or threatened species under the ESA. The USFWS determined that the petitioned action to list Tiehm's buckwheat was warranted. On October 7, 2021, the USFWS issued a proposed rule to list Tiehm's buckwheat as endangered under the ESA. In addition, on February 3, 2022, the USFWS issued a proposed rule for Tiehm's buckwheat critical habitat, which encompasses a 500-meter area around the subpopulations. On December 16, 2022, the USFWS published a final rule listing Tiehm's buckwheat as an endangered species and designating 910 acres of critical habitat (USFWS 2022a).

The NDF received a petition to add Tiehm's buckwheat to the State list of fully protected species of native flora in NAC 527.010, also on October 7, 2019. The NDF is currently in the process of reviewing the species for listing under their state regulations. Eight subpopulations of Tiehm's buckwheat were mapped and extensively studied within the OPA (EM Strategies 2020a). None of Ioneer's exploration activities have disturbed any of these subpopulations. Extensive surveys have been performed both within and outside of the OPA. The total number of plants was estimated to be approximately 44,000 in 2019. Many plants were killed or damaged by herbivores in 2020. The most recent population census was conducted from May 25 to June 7, 2023, and a total of 24,916 plants were counted (WestLand 2024b). Collectively, the subpopulations occupy approximately 10 acres (EM Strategies 2020a).

Ioneer has been engaged with the BLM and the USFWS regarding the protection of Tiehm's buckwheat and measures to ensure the long-term viability of the species. As a result of these discussions the Tiehm's Buckwheat Protection Plan (Ioneer 2022) was developed. Information regarding the plant and the means Ioneer would protect the plant, include: establishing disturbance buffers around the subpopulations; installing fencing around known populations as soon as a continuous proponent presence is on site; implementing a propagation and transplant program for plants at new locations; and constructing growth media area on the reclaimed OSF that reflects the geochemical and physical characteristics of the occupied Tiehm's buckwheat designated critical habitat. Specifics of these measures are provided in the Tiehm's Buckwheat Protection Plan, which has been developed by Ioneer to conserve and expand the species (Ioneer 2022). The size and shape of the buffer areas were developed based on the specific topographic characteristics at each subpopulation and designed to avoid direct effects to the subpopulations from the Project. It should be noted that these ACEPMs for Tiehm's buckwheat are designed to only address potential threats to the species for Project-related activities. In addition, all activities including quarrying have been designed to avoid any surface disturbance within the Buckwheat Exclusion Area, and thus the subpopulations. The Buckwheat Exclusion Area would be fenced.

The extent of Tiehm's buckwheat designated critical habitat would be fenced, approximately 7.98 linear miles around approximately 559 acres, except where site topography makes fence construction impracticable or unsafe. There would be locked gates included in the fencing (BLM 2024b).

2.1.13.2 Air Quality

Ioneer's products (lithium and boron) would be produced using an energy-neutral process with minimal CO_2 emissions from electricity that leverages innovative technologies, resulting in a plant with low emissions of GHGs and minimal HAPs. Air Quality operating permits have been obtained from NDEP Bureau of Air Pollution Control prior to Project construction. Air quality protection would include control of stationary source emissions and fugitive dust control per Bureau of Air Pollution Control regulations.

Appropriate emission control equipment would be installed at point (stationary) sources and operated in accordance with the construction and operating air permits. Where required, pollution control devices

installed by equipment manufacturers would control combustion emissions. Pollution control equipment would be installed, operated, and maintained in good working order to minimize emissions.

Fugitive dust would be controlled on roadways and other areas of disturbance with water or NDEP/BLM-approved dust suppressants, where appropriate. Fugitive emissions at the crusher and material drop points would be minimized through application of water sprays or other dust control measures as per accepted industry practice and permit stipulation. Disturbed areas would be seeded with an interim seed mix developed in conjunction with the BLM to minimize fugitive dust emissions from exposed, unvegetated surfaces.

Ioneer would use BMPs to operate the ultra-low emission sulfuric acid plan (including low emissions for sulfur dioxide [SO_2], nitrogen oxides [NO_x], and sulfuric acid [H_2SO_4]).

These measures would include the use of Tier 4 equipment, controlling emissions of HAPs, minimizing impacts to the ambient air quality, and ensuring compliance with applicable standards.

2.1.13.3 Cultural Resources

Class III cultural resource surveys were conducted within and near the OPA. The types and locations of cultural resources within this area have been documented and would be avoided, where possible, during all phases of Project implementation. In the event impacts to cultural resources potentially eligible or unevaluated for the National Register of Historic Places (NRHP) are unavoidable, Ioneer would undertake actions in accordance with the Memorandum of Agreement (MOA) between the BLM and Nevada State Historic Preservation Office (SHPO), which is currently in preparation. For eligible cultural resources that cannot be avoided by the Project, Ioneer is working with the BLM and SHPO to develop a Historic Properties Treatment Plan (HPTP) for data recovery, archaeological and architectural documentation, and report preparation that would be based on the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (NPS 1983).

If an unevaluated site cannot be avoided, additional information would be gathered to evaluate the site for inclusion on the NRHP. If the site does not meet eligibility criteria as defined by the *National Register Criteria for Evaluation* (NPS 1990), no further cultural work would be performed. If the site meets NRHP eligibility criteria, it would be mitigated during Phase II data recovery as detailed in the HPTP.

If previously unknown cultural resources are encountered on BLM-administered land during Project construction or implementation, procedures spelled out in the Monitoring and Discovery Plan (MDP), HPTP, and/or MOA would be followed. Project activities would not recommence in these areas until a Notice to Proceed is issued by the BLM consistent with these documents. The BLM AO would be notified, in accordance with Section VI.B.1. of the *State Protocol Agreement between the Bureau of Land Management, Nevada and the Nevada State Historic Preservation Officer for Implementing the National Historic Preservation Act* (Revised December 22, 2014) (BLM and SHPO 2014).

If human remains, funerary objects, or objects of cultural patrimony are encountered, the location of the find would not be publicly disclosed, and the remains would be secured and preserved in place. Ioneer or its contractors would also immediately notify the Esmeralda County Sheriff of the discovery. Any discovered Native American human remains, funerary objects, or items of cultural patrimony found on federal land would be handled in accordance with the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA). Non-Native American human remains would be handled in accordance with Nevada state law. An evaluation of the resource would determine any subsequent actions to be taken. Project activities would not recommence in the isolated area until a Notice to Proceed is issued by the BLM.

Ioneer would inform all field personnel of their responsibilities to protect cultural resources and report inadvertent discoveries. This includes training employees and contractors not to engage in the illegal collection of historic and prehistoric materials, avoidance procedures and avoidance buffer zones to cultural resources, and off-road travel procedures. Ioneer would also inform all field personnel of various regulations and penalties in place to protect these resources, including the Archaeological Resources Protection Act of 1979 and NAGPRA (Public Law 101-601).

2.1.13.4 Vibration Monitoring at Cultural Sites

Predicted indirect effects on cultural resources from blasting and equipment use were quantified as part of the Class III Cultural Resources evaluation to identify any potential resources that may be indirectly affected as a result of vibration caused by Project activities. An HPTP would be developed for eligible or unevaluated cultural resources deemed adversely impacted by the Project. Should vibration monitoring be deemed necessary by the BLM and SHPO, Ioneer would perform monitoring at the appropriate sites identified in the HPTP. If monitoring indicates that adverse impacts not initially anticipated in the HPTP have occurred at these sites, additional mitigation may be required. Mitigation options may include, but are not limited to, the implementation of a data recovery program that could include detailed site documentation, surface collection, and/or excavation and analysis to gather a representative sample of surface and subsurface cultural deposits capable of addressing identified research questions.

2.1.13.5 Paleontological Resources

Ioneer would not knowingly disturb, alter, injure, or destroy any scientifically important paleontological deposits. In the event that previously undiscovered paleontological resources are encountered, work in the areas would cease and they would be left intact and brought to the attention of the BLM. If significant paleontological resources are encountered, avoidance, recordation, and/or data recovery may be required, as determined by the BLM.

2.1.13.6 Erosion and Sediment Control

Erosion and sediment control would be accomplished through the application of BMPs to limit erosion and reduce sediment from precipitation or snowmelt runoff. Surface water would be managed using surface stabilization measures, runoff and run-on control and conveyance systems, and sediment traps and barriers. These practices are detailed in the Project's Stormwater Management Plan (Ioneer 2022).

Following construction, areas such as cut-and-fill embankments and growth media stockpiles would be seeded with an interim seed mix developed in conjunction with the BLM to stabilize material, reduce erosion and minimize the establishment of undesirable weeds, and sediment controls would be applied to limit wind and water erosion. Concurrent reclamation would be implemented, to the extent possible, to accelerate stabilization of disturbed areas. All sediment and erosion control measures would be inspected regularly, with any needed repairs performed or additional BMPs implemented.

2.1.13.7 Water Resources

The Project is located in the Fish Lake Valley Hydrographic Basin (10-117) which is considered endorheic and does not contribute to traditionally navigable waters. No perennial streams are present in the OPA.

There is an avoidance area around Cave Spring where no surface-disturbing activities would occur.

The Project's water needs would be derived first from dewatering wells located near the quarry and then from new or existing wells in the Fish Lake Valley. In general, there are few domestic water users in the Fish Lake Valley, with agricultural operations currently holding the majority of groundwater rights within the basin. All necessary water rights have been secured or leased by Ioneer and would be transferred to the appropriate points of diversion and places of use. If impacts to surface water are observed and found to be related to Project activities, such impacts would be addressed.

Process components would be designed, constructed, and operated in accordance with NAC 445A. Water would be recycled to the maximum extent practicable to conserve water resources. Stormwater management would ensure that clean water and contact water are not intermingled. Stormwater monitoring would be completed according to the Stormwater Management Plan (Ioneer 2022) to ensure that all surface water controls are stable and well maintained.

2.1.13.8 Geology and Minerals

A Quarry Lake Evaluation Report, Geochemical Characterization Report, and Overburden Management Plan (Ioneer 2022) have been prepared in accordance with BLM and NDEP guidance, in addition to a

Geology and Minerals Baseline Technical Report for the Operational Project Area and vicinity (NewFields 2019a). The Geochemical Characterization Report describes the potential for acid rock drainage, metals and metalloids leaching, and salinity generation from overburden, ore, and process residual materials as well as the potential for mobilization of deleterious constituents.

The Quarry Lake Evaluation Report describes the anticipated geochemical and hydrogeological characteristics of a predicted post-closure quarry lake. The Overburden Management Plan includes recommendations, from an environmental geochemistry standpoint, for overburden handling, overburden placement, and OSF design. Objectives of the Overburden Management Plan include: minimizing leaching of metals and metalloids; minimizing sulfide oxidation and development of localized acidic conditions; limiting seepage through overburden materials; and facilitating closure of the OSFs.

2.1.13.9 Materials and Waste Management

The Project may result in the use and generation of hazardous and non-hazardous waste materials. The management of regulated solid and hazardous wastes that are not Bevill Amendment exempt waste (e.g., fossil fuel combustion waste; waste from the extraction, beneficiation, and processing of ores and minerals [including phosphate rock and overburden from uranium ore mining]; and cement kiln dust) or associated with process components would be managed according to BMPs and requirements of regulatory permits. Efforts to find markets for other leached materials would continue during operations as a means to reduce waste quantities. Spill contingency and emergency response measures are included in the Emergency Response and Spill Contingency Plan (Ioneer 2022).

2.1.13.10 Hazardous Materials

Hazardous materials would be transported, stored, and used in accordance with federal, state, and local regulations, including regulations identified in Standards Applicable to Generators of Hazardous Waste (40 CFR 262). Management of hazardous materials associated with the Project would comply with all inventory and reporting requirements. If any hazardous waste is generated on site, it would be properly disposed of at a licensed facility. Transportation and handling of hazardous materials would be conducted by licensed carriers and properly trained workers. Employees would be trained in the proper transportation, use, and disposal of hazardous materials.

Blasting components, including ammonium nitrate, would be stored away from other Project facilities and a minimum of 700 feet from Cave Springs Road in compliance with MSHA, state, and federal requirements. Boosters and detonators would be stored at a separate location nearby.

All liquid petroleum products and reagents used in the process would be stored in above-ground tanks within a secondary containment area capable of holding 110 percent of the volume of the largest vessel in a given containment area, as per NAC 445A.436.

2.1.13.11 Sanitary and Solid Waste Disposal

Employee training plans would address appropriate disposal practices, to include education on which wastes may be placed in a landfill, as well as management of regulated substances. Non-hazardous solid wastes would be disposed of off site in a licensed facility. Used solvent, liquids drained from aerosol cans, accumulations of mercury fluorescent lights, and used antifreeze may be regulated under Resource Conservation and Recovery Act and would be managed accordingly. Ioneer anticipates that the facility would fall in the “conditionally exempt small quantity generator” category. Domestic wastewater would be routed, treated, and disposed of appropriately.

2.1.13.12 Petroleum-Contaminated Soils

Petroleum-contaminated soils resulting from spills or leaks of hydrocarbons would be addressed immediately and removed from the spill site and stored in appropriate secondary containment areas in accordance with NDEP guidelines. Ioneer would excavate and transport any petroleum-contaminated soil to a licensed off-site disposal facility.

2.1.13.13 Growth Media and Soil Salvage

Suitable growth media/cover material would be salvaged and stockpiled during Project development. Growth media stockpiles would be located such that they would not be disturbed by Project development. The surfaces of the stockpiles would be contoured with slopes at 3H:1V to reduce erosion. To minimize wind and water erosion, growth media stockpiles would be seeded with an interim seed mix developed in conjunction with the BLM to stabilize material, reduce erosion and minimize the establishment of undesirable weeds. Surface water would be diverted around stockpiles as needed to prevent erosion from stormwater runoff. BMPs such as silt fences or staked weed-free straw bales would be applied as necessary to limit wind and water erosion.

2.1.13.14 Monitoring Plan and Other Plans

Baseline monitoring and characterization were completed at the onset of this Project. These findings would be utilized as a basis for assessing potential impacts to air, water, and biological resources that may result from the Project. The Monitoring Plan (Ioneer 2022) and other commitments (leak detection, fluid management, etc.) to be included in the WPCP would serve as a basis for monitoring activities. These plans may be updated as the Project progresses to accommodate changes in conditions and ensure ongoing protection of the environmental integrity of resources on site.

Ioneer is working on a S/B Development Agreement with Esmeralda County.

2.1.13.15 Wildlife and Avian Protection

Ioneer is committed to protecting wildlife and avian species and their supporting habitat as much as possible. The following ACEPMs would be implemented by Ioneer to reduce or preclude risks to raptors, birds, bats, grazing animals, and other species that may interact with Project activities or facilities.

- The open adit adjacent to the Project haul road may be closed in coordination with NDOW and BLM.
- Operators would be trained to monitor the OPA for the presence of larger wildlife such as deer, antelope, and sheep. Mortality information would be collected and reported, as necessary.
- Ioneer would establish wildlife protection policies that prohibit feeding or harassment of wildlife within the OPA boundary.
- Following Project construction, areas of disturbed land no longer required for operations would be reclaimed as required by the BLM to promote the reestablishment of native plant and wildlife habitat.

Ioneer has developed a draft Bird and Bat Conservation Strategy (BBCS) that includes measures to reduce impacts to birds and bats (WestLand 2023c). The BBCS includes, but is not limited to, the following:

- Land clearing or other surface disturbance associated with the Project would be conducted outside of the avian breeding season, whenever feasible, to avoid potential destruction of active nests or young birds in the area. When surface disturbance must occur during the avian breeding season (March 1 through July 31), a BLM-qualified biologist would survey the area prior to land clearing activities in accordance with current BLM protocols. Surveys would be conducted no earlier than 10 days prior to construction in the affected area to identify breeding birds and nests. If a nest is found, it would be protected until the young have fledged or until the nest is no longer active. Appropriately sized species-specific disturbance buffers would be adhered to if activities continue around in-use migratory bird nests, including eagles unless an incidental eagle disturbance take permit is obtained. Survey results would be submitted to BLM before surface disturbance occurs.
- Primary pond liners would consist of 80-mil high-density polyethylene single-sided textured geomembrane with the textured side up to facilitate wildlife egress.

- Avian exclusion measures (e.g., bird balls, netting, BirdXPellers) would be used where required. Ioneer employees would check the avian exclusion measures and the fencing around all ponds at least once per 12-hour shift or as specified in the permit. Ponds would be monitored and reclaimed at closure.

- The interior side slopes of the processing facility contact water pond are designed at 3H:1V with the exterior cut fill slopes designed at 2H:1V to ensure that there are no shallow 'mud-flat' areas that could allow birds to wade, forage, and rest along the shore.

- Ioneer would maintain a record of all mortalities (birds and bats) associated with permitted facilities.

- During all phases of the Project, all food, waste, and other trash would be placed in containers with lids or covers that can be closed to discourage scavenging by wildlife.

- Speed limits would be posted at 35 miles per hour (mph) on haul roads, 45 mph on access roads, and 25 mph on all other roads in the OPA.

- Powerlines would be designed to provide sufficient separation between phases and grounds to reduce the risk of electrocution for raptors, birds, and bats.

- The processing facility, the quarry, explosive storage area, and contact water ponds would be fenced to specifications outlined in the BLM Handbook 1741-1, as applicable. All fences would include double swing gates to allow for human access. Ioneer would also coordinate with NDOW on fencing specifications. Avian and wildlife protection measures would be in compliance with Industrial Artificial Pond Permit measures.

- Blasting would be performed during daylight hours.

2.1.13.16 Noxious Weeds and Invasive Non-native Species

Ioneer has developed a Noxious and Invasive Weed Management Plan (Ioneer 2022) for the Project. Prevention, detection, containment, and removal would be priority strategies for weed control. Weeds on site would be physically removed or treated with approved herbicides by certified applicators. Weed treatment activities within the Tiehm's buckwheat avoidance area and the subpopulations would be limited. Monitoring would include creation of an occurrence and treatment database including geographic locations of sites. The results from annual monitoring and treatment would be reported to the BLM and shall serve as the basis for updating the plan and developing ongoing annual treatment programs.

2.1.13.17 Public Safety and Accessibility

Public safety would be maintained throughout the life of the Project by excluding unauthorized access to sensitive Project facilities through installation of fencing and security features (including cameras and personnel) as well as installation of traffic-control measures. The latter would include establishment of speed limits (to be strictly enforced) for Project-related traffic on public and haul roads, installation of a rail-road type crossing guard (plus stop signs) at the intersection of the haul road and Cave Springs Road near the processing plant, and installation of stop signs at the intersection of Cave Springs Road and the service road to the explosives storage area from the quarry area (Ioneer 2022). These measures would also provide for continued accessibility of the public to and through the OPA. All equipment and facilities associated with the Project would be maintained in a safe and orderly manner as another measure to provide for the safety of the public. In addition, all activities would be conducted in conformance with applicable federal and state health and safety requirements; site visitors would be properly instructed in site safety procedures prior to admittance.

2.1.13.18 Transportation and Access

Ioneer's Transportation and Access Plan (Ioneer 2022) outlines safe procedures and mandatory practices for Project-related personnel travel and material transport to and from the Project. The plan includes description of how safe public access would continue to be accommodated through the Project area, in

coordination with Esmeralda County and other existing road users. In addition, Ioneer realizes that certain road engineering upgrades and maintenance activities must be implemented to safely accommodate the increased traffic that would result from Project activities. Accordingly, an Access Road Improvement and Maintenance Plan (Ioneer 2022) has been produced. Together, the Transportation and Access Plan (Ioneer 2022) and the Access Road Improvement and Maintenance Plan (Ioneer 2022) outline the various commitments Ioneer has made related to road improvement, management, and maintenance.

2.1.13.19 Visual Resources and Night Skies

A Visual Resources Technical Report was prepared to characterize existing conditions associated with visual aspects in and around the Project Area (NewFields 2022b). Ioneer would seek to minimize the visual impact of activities and structures to viewers along publicly accessible roadways, public use areas, and within the Wilderness Study Area in consideration of guidance included in Appendix 3 of BLM's Visual Resource Contrast Rating Manual 8431 (BLM 1986). Dark sky lighting best practices would also minimize the effects of lighting on wildlife that may be present in the area, including bats. Several examples of measures Ioneer intends to implement include:

- Careful placement and blending of stored materials to minimize contrast;
- Selection of building sites and new roads such that they would be hidden from view behind topographical features, where possible; and
- Consultation with BLM on choice of colors of machinery, fencing, and powerlines; lighting design and color; and design, color, and surface texture treatments for the processing plant structures.

To minimize the effects from lighting, Ioneer would utilize hooded stationary lights and lighting plants. Lighting would be directed onto the pertinent site only and away from adjacent areas not in use, with safety and proper lighting of the active work areas being a priority.

2.1.13.20 Fire Protection and Emergency Response

The Emergency Response and Spill Contingency Plan (Ioneer 2022) details procedures for responding to emergency incidents including fire, accidents, and spills. Fire protection equipment would be secured and a fire protection plan would be established for the Project in accordance with National Fire Codes for Fire Protection and State Fire Marshal. The Project would operate in conformance with all applicable MSHA and Occupational Safety and Health Administration safety regulations (30 CFR 1-199).

Smoking would only be permitted in designated areas that are free of flammable materials and only if allowed by state law or federal regulations. Ioneer would immediately contact the appropriate dispatch or coordination center in the event of a fire and report all wildland fires to BLM and other relevant agencies. Project vehicles would be equipped with radios and/or cellular telephones for fire preparedness and prevention, suppression operations, and emergency response purposes. Crew vehicles and equipment would also be supplied with an emergency communication list that would include emergency contact information for administering agencies.

2.2 North and South OSF Alternative

The North and South OSF Alternative would be similar to the Proposed Action; however, locations of facilities would be relocated to minimize impacts to Tiehm's buckwheat designated critical habitat (**Figure 2-11**). Placement of overburden material would occur in the North OSF, Quarry Infill OSF, and the additional South OSF. The West OSF and associated infrastructure would not be constructed under the North and South OSF Alternative (Ioneer 2023a). Total new surface disturbance associated with the North and South OSF Alternative would be approximately 2,266 acres (**Table 2-3**), which would be approximately 40 acres less than the Proposed Action.

The portion of the haul road that exits the quarry is located east of Tiehm's buckwheat designated critical habitat along the eastern edge of the quarry, between the quarry and Cave Springs Road (**Figure 3-1**). Due to the relocation of the haul road out of the quarry, the eastern traffic control gate on Cave Springs Road

would be relocated further to the east (**Figure 2-11**). The capacities of the North OSF and the Quarry Infill OSF would be the same as the Proposed Action; however, the South OSF would be constructed to accommodate the remaining material. The design of the South OSF would be consistent with the OSF designs included in the Proposed Action including the average slope of 3H:1V. The haul distance between the quarry and the South OSF would be similar to the distance between the West OSF and the quarry as configured in the Proposed Action. Additional differences proposed for the North and South OSF Alternative include a higher output steam turbine generator (40 megawatts instead of the 35 megawatts included in the Proposed Action) and reconfiguration of the quarry to minimize impacts, to the extent practicable, in designated critical habitat while maintaining slope stability required during operations and addressing long-term slope stability needs for Tiehm's buckwheat. The extent of Tiehm's buckwheat designated critical habitat would be fenced, approximately 7.57 linear miles around approximately 719 acres, except where site topography makes fence construction impracticable or unsafe (BLM 2024b). There would be locked gates included in the fencing (BLM 2024b). The Explosives Storage Area would be moved to the west, outside of Tiehm's buckwheat designated critical habitat (**Figure 2-11**). Pollinator habitat reclamation would occur as described in the *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* (WestLand 2024b), which is specific to the North and South OSF Alternative. Up to 30 acres of conceptual surface disturbance would occur within the Plan boundary, but outside of Tiehm's buckwheat designated critical habitat. All other details and appendices included in the Plan would apply to the North and South OSF Alternative.

Table 2-3 North and South OSF Alternative Surface Disturbance

Project Component	Area (acres)[1]	Comments
Quarry	202.8	Includes fence and water storage tanks.
Quarry Berm	19.2	Includes 200-foot-wide berm between the quarry and the wash.
Processing Facility	82.6	Includes contact water pond, minimum 20-foot disturbance buffer. Excludes diversion channels.
North, South, and Quarry Infill OSFs	933.6	Includes contact water pond, minimum 20-foot disturbance buffer. Excludes diversion channels.
SOSF	374.1	Includes underdrain pond, minimum 20-foot disturbance buffer. Excludes diversion channels.
Ponds	0.0	Acreage of contact water ponds are included in the footprints of the OSFs and SOSF.
Haul Roads and Service Roads	55.6	Includes all haul roads and service roads with 20-foot disturbance buffer.
Stockpiles	30.0	Includes growth media stockpiles with minimum 20-foot disturbance buffer.
Explosives Storage Area	1.1	Includes explosive storage and area access road including 20-foot disturbance buffer.
Septic Leach Fields	10.1	Includes primary and reserve leach field for septic sewage management.
Communication Towers and ATV Trails	2.7	Includes Towers 3, 4, and 5, and 40-foot disturbance buffer for access to monitoring locations. Towers 1 and 2 would occur on surface disturbance footprints of other facilities.
Proposed Monitoring Locations and Access	3.8	Includes 5 proposed monitoring wells (0.5 acre each) and associated 40-foot disturbance buffer.
Project Area Exploration	35.0	Includes phased exploration activities (access routes, drill sites with sumps). This includes approximately 3.3 acres of existing exploration disturbance not within the North and South OSF Alternative footprint. No new exploration disturbance would occur in Tiehm's buckwheat designated critical habitat.
Water Supply Facilities	20.0	Includes access routes, drill site sumps, wells, power, and pipelines to bring water from agricultural wells in Fish Lake Valley.
Dewatering Facilities	30.0	Includes access routes, drill sites with sumps, wells, power, and pipelines, and would not occur in Tiehm's buckwheat designated critical habitat.
Cave Springs Road Realignment (within OPA)	46.8	Includes 28-foot width plus 60-foot disturbance buffer for existing and realigned segments within the OPA.

Project Component	Area (acres)[1]	Comments
Argentite Canyon Road Realignment	2.0	Includes a 15-foot disturbance buffer.
Buckwheat Critical Habitat Fence	15.1	719 acres of Tiehm's buckwheat designated critical habitat would be fenced with 30-foot disturbance buffer.
Yards	100.5	General surface disturbance.
Fencing	0.0	All fencing, unless described for Tiehm's buckwheat, is located on other facility footprints, thus 0.0 acres of disturbance assumed.
Cave Springs Wash Berm	28.2	Assumes a 100-foot disturbance buffer.
Diversion Ditches	44.1	Assumes a 60-foot disturbance buffer.
Access Road and Infrastructure (within the Access Road and Infrastructure Corridor)	192.7	Assumes a maximum of 100-foot disturbance buffer along the access road for 67,335 feet and 50 foot disturbance buffer along SR 264 for 32,888 feet.
Batch Plant	3.2	To be used during construction.
General Surface Disturbance	30.0	Includes surface disturbance anticipated to occur outside of designated critical habitat that is not currently associated with a specific location or facility.
Seeding and Transplant Plots	3.0	Pollinator habitat plots would be located outside of designated Tiehm's buckwheat critical habitat and vary from 0.5 to 1.0 acres but not exceed 3.0 acres total.
North and South OSF Alternative Disturbance	**2,266**	Includes North and South OSF Alternative and existing disturbance

[1] All areas include a minimum 20-foot disturbance buffer around the feature unless otherwise specified. Includes existing and realigned segments within the OPA only. The access road is included as a separate line item.

2.2.1 North and South OSF Alternative Reclamation

Reclamation proposed for the North and South OSF Alternative would be similar to the Proposed Action. For areas within Tiehm's buckwheat designated critical habitat, reclamation would occur as described in the *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* (WestLand 2024b). The overall goal of the reclamation within designated critical habitat under this alternative is to support the restoration of ecosystem processes and function. Specifically, reclamation efforts inside of designated critical habitat would be designed to accelerate the establishment of habitat suitable for the various life history stages of the diverse pollinator guild that supports Tiehm's buckwheat, while limiting risk from undesirable species which are common in early-phases of reclamation. Facilities not subject to reclamation are provided in **Table 2-4**. Post-reclamation topography for the North and South OSF Alternative is provided on **Figure 2-12**. The final quarry lake would be approximately 66 surface acres, which is the same as the Proposed Action.

Table 2-4 North and South OSF Facilities Permanent, Post Reclamation Features

Feature	Permanent Post Reclamation Feature Acres
Argentite Canyon Road Realignment	2.0
Cave Springs Road Realignment (within OPA) and Haul Roads and ATV Road	52.2
ET Cell	3.0
Diversion Channels	44.1
Quarry and Associated Quarry Lake	110.1
Total	**211.4**

2.2.2 North and South OSF Alternative ACEPMs

The ACEPMs for the North and South OSF Alternative include those described for the Proposed Action, and the following revised ACEPMs (Ioneer 2023a):

- Ioneer has committed to the operating practices described in the Plan (Ioneer 2022) and is working with the BLM and other cooperating agencies to refine and expand on ACEPMs to

prevent unnecessary or undue degradation of public lands during the life of the Project. These practices are consistent with BLM's surface management regulations at 43 CFR 3809, Nevada Bureau of Mining Regulation and Reclamation regulations (NAC 519A), and other guidance documents. The purpose of 43 CFR 3809 (Surface Management) is to prevent unnecessary or undue degradation of public lands by operations authorized by the General Mining Law.

- Ioneer has been engaged with the BLM and the USFWS regarding the protection of Tiehm's buckwheat and measures to ensure the long-term viability of the species. Ioneer has developed the *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* document specific to the North and South OSF Alternative (WestLand 2024b). The document is based on input from the USFWS, BLM, and is responsive to comments received during public scoping. This input provided the basis for development of the North and South OSF Alternative designed to avoid and minimize impacts to Tiehm's buckwheat and its designated critical habitat. Ioneer would implement the *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* (WestLand 2024b).

2.2.3 North and South OSF Alternative Biological Opinion

The BLM has consulted with the USFWS on the North and South OSF Alternative for the Rhyolite Ridge Lithium-Boron Project. The BLM prepared a Biological Assessment (BLM 2024b) which analyzed effects of the North and South OSF Alternative to Tiehm's buckwheat and its designated critical habitat. The USFWS issued a Biological Opinion on September 4, 2024, in which the USFWS concluded that the activities considered in the biological opinion are not likely to jeopardize the continued existence of Tiehm's buckwheat or result in the destruction or adverse modification of its critical habitat (USFWS 2024) (**Appendix E**).

2.3 No Action Alternative

Under the No Action Alternative, the proposed Project would not be approved. The existing 15 acres of exploration disturbance (i.e., drill sites, monitoring sites, and access roads), under the relinquished Notices (NVN-97202 and NVN-97262), has occurred on public lands administered by the BLM and would be reclaimed (**Figure 2-13**). No additional surface disturbance would occur under the No Action Alternative.

2.4 Alternatives Considered but Eliminated from Detailed Analysis

In accordance with 40 CFR 1502.14(a), agencies are required to describe the alternatives considered, but eliminated from detailed study and to provide a brief rationale for eliminating the alternative. Potential alternatives were reviewed to determine if they met the following criteria of a "reasonable alternative" as defined in CEQ 1502.1(z): "Reasonable alternatives means a reasonable range of alternatives that are technically and economically feasible, and meet the purpose and need for the proposed action." Alternatives were also reviewed to determine if they were environmentally reasonable or provided an environmental benefit over the Proposed Action. These alternatives are listed in **Table 2-5** with dismissal criteria provided in **Appendix D.** A description of each alternative and rationale for eliminating the alternative are provided in the SIR (BLM 2024a). Portions of these alternatives may have been incorporated into the Proposed Action or North and South OSF Alternative, and this is noted in the table in **Appendix D**.

Table 2-5 Alternatives Considered but Dismissed from Detailed Analysis

Alternative Category	Alternative Considered but Eliminated from Detailed Analysis
Quarry Footprint Alternatives	Larger Quarry
	Quarry North of Cave Springs Road
	Quarry Avoids All Tiehm's Buckwheat Designated Critical Habitat
	Quarry Avoids All Tiehm's Buckwheat Subpopulations
	Quarry Depth Avoids Groundwater Interception

Alternative Category	Alternative Considered but Eliminated from Detailed Analysis
Quarry Backfill/Infill Alternatives	In-Quarry Base Case Storage
	In-Quarry Alternative Storage
	Partial Backfill to Prevent Post-quarrying Quarry Lake
	Backfill of Quarry to Create Post-quarrying Flow-through Conditions
	Rapid Infilling of the Post-quarrying Quarry with Water.
Facilities Placement Alternatives	Adit Avoidance Alternative
	Moving Crushing Plant and Truck Facilities East closer to the Quarry
	Separate Stockpiles North-Northwest of the Quarry
	North OSF
	Reduced Quarry Plan
	North and Southwest OSF
	Comingled Stockpile West of the Quarry
	Processing Plant in Sparks, Nevada
	SOSF, Separate Facilities at Siting Area 1 (South of Cave Springs Road)
	SOSF, Comingled Facility at Siting Area 2 (North of Cave Springs Road)
	Cultural Resource Site Avoidance
	Surface Disturbance Avoids All Tiehm's Buckwheat Designated Critical Habitat
	Surface Disturbance Avoids All Tiehm's Buckwheat Designated Critical Habitat and a One Mile Buffer
Ore Conveyance Alternatives	Conveyor
	Autonomous Haul Trucks
	Electric Vehicle (EV) Fleet
Sulfuric Acid Plant Design	Importing Sulfuric Acid (vs having a Sulfuric Acid Plant on site)
	Single absorption with a tail gas scrubber (with caustic reagent)
	Single absorption with MAX3™ (with solvent scrubber)
	Double absorption with heat recovery system and tail gas scrubber (with caustic reagent)
Leaching Alternatives	Heap Leach Facility
	Agitated Tank Tailings Storage Facility
Power Supply and Infrastructure Alternatives	55-kilovolt (kV) and 120-kV Transmission Lines and a 15-megawatt Service from NV Energy
	15-megawatt Prime Power Diesel Generation
	Grid Connection
	Diesel Internal Combustion Engine Alternative
	Natural Gas
	CNG/LNG/Propane Fuel
Aggregate Sourcing Alternatives	Near-Site Source
	Existing Commercial Sources
Haul Road From Quarry Road Alignment and Traffic Control Alternatives	Utilize Existing Road Where Possible
	Maximize Road Separation
	Overpass to Avoid Intersection
	Re-Route Road North of Processing Plant to Avoid Intersection
	Four-Way Stop
	Manned Guard Booth

Alternative Category	Alternative Considered but Eliminated from Detailed Analysis
Access Road Alternatives	Slowing of Quarrying Rate
	Silver Peak Access Road
	Gap Springs Access Road
	Alternate Adjacent Access Road
	Partial Paving
	Group Lithium-Boron trucks in Units From Site (compared to free flow)
	Conveyor vs Truck Traffic
	Traffic Control Devices to Manage Traffic
	Cave Springs Road Revised Reroute Alternative
Water Use Alternatives	Pumping From Fish Lake Valley
Mine Law	Permit the Project Under 2920 Regulations

2.5 BLM-Preferred Alternative

The BLM has determined the North and South OSF Alternative is the BLM's environmentally preferred alternative. This alternative was developed in coordination with the cooperating agencies and would result in reduced environmental impacts to threatened and endangered species; therefore, was selected as the BLM's preferred alternative.

2.6 Comparison of Effects by Alternative

Table 2-6 compares the anticipated effects from the Proposed Action and alternatives on the resources analyzed in this EIS. The existing or baseline conditions are described in **Chapter 3**. The anticipated effects from the Proposed Action and alternatives are described in **Chapter 4.** Additional detail supporting the information in Chapters 3 and 4, including analysis methods and rationale for the effect's conclusions can be found in the resource Supplemental Environmental Reports (SERs) (BLM 2024c through 2024u).

Table 2-6 Comparison of Effects by Alternative

Potential Impact	No Action Alternative	Proposed Action	North and South OSF Alternative
Air Quality			
Fugitive Particulate Emissions and Gaseous Emissions	Minor amount of emissions from completion of reclamation of 15 acres.	Total HAP emissions of 0.81 tpy for up to 17 years, and less emissions for six years of reclamation.	Total HAP emissions of 3.56 tpy for up to 17 years, and less emissions for six years of reclamation.
PM (total PM 30 microns or less [PM_{30}]), PM_{10}, and $PM_{2.5}$ Emissions	Minor amount of emissions from completion of reclamation of 15 acres.	2,899.97, 1,277.86, and 227.92 tpy, respectively, for up to 17 years, and less for six years of reclamation.	2,881.03, 1,129.68, and 197.64 tpy respectively, for up to 17 years, and less for six years of reclamation.
NO_x, CO, SO_2, VOC, H_2S, and H_2SO_4 Emissions	Minor amount of emissions from completion of reclamation of 15 acres.	156.69, 130.84, 82.42, 7.92, 2.84, and 24.41 tpy, respectively, for up to 17 years and less for six years of reclamation.	469.14, 251.92, 82.62, 12.93, 2.84, and 24.41 tpy, respectively, for up to 17 years and less for six years of reclamation.
On-site GHG Emissions	Minor amount of emissions from completion of reclamation of 15 acres.	471,589 tpy of direct and 40,471 tpy of indirect GHG emissions for up to 17 years, and less emissions for six years of reclamation.	545,834 tpy of direct and 40,471 tpy of indirect GHG emissions for up to 17 years, and less emissions for six years of reclamation.
Off-site GHG Emissions	Minor amount of emissions from completion of reclamation of 15 acres.	5,447.20 tons CO2e for up to 17 years, and less emissions for six years of reclamation.	Similar to the Proposed Action.
Mercury Emissions	Minor amount of emissions form completion of reclamation of 15 acres.	Mercury emissions of 4.7×10^{-4} tpy for up to 17 years, and less emissions for six years of reclamation.	Similar to the Proposed Action.
Ozone Impacts	Minor amount of emissions form completion of reclamation of 15 acres.	Maximum 8-hour impact of 0.69 parts per billion (ppb).	Similar to the Proposed Action.
Cultural Resources			
Direct Impacts to Cultural Resources	No impacts to cultural resources would occur.	12 sites potentially impacted by surface disturbance, four within 100 feet of surface disturbance.	16 sites potentially impacted by surface disturbance, three within 100 feet of surface disturbance.
Indirect Impacts to Cultural Resources	No impacts to cultural resources would occur.	28 sites potentially impacted by auditory, vibrational, and/or visual impacts.	Same as the Proposed Action.
Environmental Justice			
Disproportionate Effects on Environmental Justice Populations	No disproportionate effects to an environmental justice population are anticipated.	Impacts to environmental justice populations of concern may include air quality, visual, noise, water, traffic, hazardous material transportation, and social and economic values.	Same as the Proposed Action.
Geology and Minerals			
Surface Disturbance	15 acres of existing surface disturbance would be reclaimed.	Up to 2,306 acres of new surface disturbance of which 383 would be permanent.	Up to 2,266 acres of new surface disturbance of which 211 would be permanent.
Ore removal	Not applicable. Under the No Action Alternative, the quarry would not be developed.	Permanent removal of 25 Mt of lithium-boron ore and 406 Mt of overburden (including 23 Mt of lithium-rich clay).	Same as the Proposed Action.

Potential Impact	No Action Alternative	Proposed Action	North and South OSF Alternative
Quarry stability	Not applicable. Under the No Action Alternative, the quarry would not be developed.	Final slope configuration would result in a post-closure Factor of Safety close to or greater than 2.0 and 1.72 with the quarry lake.	Same as the Proposed Action.
Faulting	Not applicable. Under the No Action Alternative, the quarry would not be developed.	No significant damage to facilities are anticipated during the life of the Project.	Same as the Proposed Action.
Subsidence	Not applicable. Under the No Action Alternative, the quarry would not be developed.	Subsidence may occur but would be limited due to the clay content of the Cave Spring Formation and the distribution of the volcanic baseline rocks.	Same as the Proposed Action.
Geochemistry	No impacts would occur.	80 percent of the overburden is classified as non-PAG and presents a low risk of acid rock drainage.	Same as the Proposed Action.
Hazardous Materials and Solid Waste			
Accidental Spills / Releases During Transportation or Storage	Limited potential for accidental spills or releases during reclamation of 15 acres of surface disturbance.	Diesel fuel release probability of 760 in 1,000 miles and 174.8 for each 230-mile transportation route. Corrosion inhibitor 3DT129 release probability of 30.5 in 1,000 miles and 7.0 for each 230-mile transportation route. Liquid phosphate release probability of 25 in 1,000 miles and 5.8 for each 230-mile transportation route.	Same as the Proposed Action.
Solid Waste Generation	No solid waste generated.	Up to two loads of solid waste annually for up to 17 years.	Same as the Proposed Action.
Land Use and Realty			
Impacts to ROWs	No impacts to land use or realty would occur.	Impacts to two ROWs Cave Springs Road (NVN 62084) and Argentite Canyon Road (N 54404) from realignment. Coordination required with holders of ROWs, geothermal leases, and mining claims off Hot Ditch Road and in the OPA for access.	Same as the Proposed Action.
Loss of Public Land for Multiple Uses	15 acres of existing surface disturbance would be reclaimed.	Up to 2,306 acres of new surface disturbance of which 383 would be permanent. 559 acres of Tiehm's buckwheat designated critical habitat fenced with locked gates, with 51 acres of subpopulations fenced within.	Up to 2,266 acres of new surface disturbance of which 211 would be permanent. 719 acres of Tiehm's buckwheat designated critical habitat fenced with locked gates.
Livestock and Grazing			
Loss of Forage	15 acres of existing surface disturbance would be reclaimed.	Disturbance of 140 acres (83 that provide forage) of the Red Spring Allotment, 2,145 acres (1,726 that provide forage) of the Silver Peak Allotment, and 21 acres (none provide forage) of the Fish Lake Valley Allotment. Fencing of 559 acres (469 that provide forage) of Tiehm's buckwheat designated critical habitat.	Disturbance of 140 acres (83 that provide forage) of the Red Spring Allotment, 2,105 acres (1,885 that provide forage) of the Silver Peak Allotment, and 21 acres (none that provide forage) of the Fish Lake Valley Allotment. Fencing of 719 acres (591 that provide forage) of Tiehm's buckwheat designated critical habitat.

Potential Impact	No Action Alternative	Proposed Action	North and South OSF Alternative
Impacted Animal Unit Months (AUMs)	No reduction of AUMs would occur, and 15 acres of disturbance would be reclaimed.	Impacts to 4 AUMs in Red Spring Allotment, 72 AUMs in Silver Peak Allotment (15 of which would be permanent), and no impacts to AUMs in Ice House or Fish Lake Valley allotments. Impacts to 20 AUMS from fencing of Tiehm's buckwheat designated critical habitat in the Silver Peak Allotment.	Impacts to 4 AUMs in Red Spring Allotment, 79 AUMs in Silver Peak Allotment (8 of which would be permanent), and no impacts to AUMs in Ice House or Fish Lake Valley allotments. Impacts to 25 AUMs from fencing of Tiehm's buckwheat designated critical habitat in the Silver Peak Allotment.
Indirect Economic Impacts	No economic impacts from reduced AUMs would occur.	Up to $9,639 in annual economic impacts from reduction of 96 BLM-permitted AUMs for up to 23 years.	Up to $10,844 in annual economic impacts from reduction of 108 BLM-permitted AUMs for up to 23 years.
Livestock Water Resources	No impacts to surface water sites would occur.	Potential impacts to water supply at 32 surface water sites if sourced from the aquifer proposed for dewatering.	Same as the Proposed Action.
Native American Traditional Values			
Impacts to Traditional Cultural Properties, Properties of Traditional Religious and Cultural Importance, or Sacred Sites	No additional impacts to Native America traditional values would occur.	Three areas of concern have been identified and would be avoided by the current layout through Project design. During consultation, tribes have indicated that some unevaluated sites in the general vicinity of sacred sites identified by tribal representatives may be associated with those sacred sites. Unevaluated sites potentially associated with sacred sites and that cannot be avoided would be mitigated under the HPTP. Vegetation communities and wildlife species important to Native American Traditional Values may be impacted. Potential impacts to water supply at 32 surface water sites (including Cave Spring) if sourced from the aquifer proposed for dewatering.	Same as the Proposed Action.
Recreation Resources			
Impacts to Quality of Recreation	No impacts to recreation would occur and 15 acres of existing disturbance would be reclaimed.	Increased human presence and demand for recreation resources and opportunities. Increased noise, traffic congestion, fugitive dust and emissions from vehicle traffic, and lighting from vehicles and operation.	Same as the Proposed Action.
Off-Highway Vehicle (OHV) Use	No impacts to recreation would occur and 15 acres of existing disturbance would be reclaimed.	Disturbance to 869 acres (58 permanent) of semi-primitive motorized recreational areas. Disturbance to 1,975 acres (383 permanent) of OHV use restricted land, including 945 acres (80 permanent) limited to existing roads and trails and closed to competitive events and 1,030 acres (286 permanent) limited to existing roads and trails. Disturbance to 331 acres (17 permanent) of non-restricted areas.	Disturbance to 719 acres (22 permanent) of semi-primitive motorized recreational areas. Disturbance 1,902 acres of OHV use restricted land including, 1,076 acres (155 permanent) limited to existing roads and trails and 826 acres (48 permanent) limited to existing roads and trails and closed to competitive events.
Impacts to Recreational Opportunities	No impacts to recreation would occur and 15 acres of existing disturbance would be reclaimed.	Up to 2,306 acres of surface disturbance of which 383 would be permanent. Up to 559 acres of Tiehm's buckwheat designated critical habitat fenced from some recreational uses.	Up to 2,266 acres of surface disturbance (211 acres would be permanent). Up to 719 acres of Tiehm's buckwheat designated critical habitat fenced from some recreational uses.

Potential Impact	No Action Alternative	Proposed Action	North and South OSF Alternative
Lands with Wilderness Characteristics (LWCs) and Wilderness Study Areas (WSAs)	No impacts to recreation would occur and 15 acres of existing disturbance would be reclaimed.	Surface disturbance to 426 acres (32 permanent) of LWC328 and 1,356 acres (224 permanent) of LWC338. The LWCs would still meet the 5,000 roadless acre criteria for the LWC designation. Some Project components would be visible from some areas of the Silver Peak WSA.	Surface disturbance to 531 acres (28 permanent) of LWC328 and 1,151 acres (114 permanent) of LWC338. The LWCs would still meet the 5,000 roadless acre criteria for the LWC designation. Some Project components would be visible from some areas of the Silver Peak WSA.
Social and Economic Values			
Employment	500 construction jobs and 350 quarrying and processing jobs would not be created.	Construction workforce of 500 people for four years, plus 113 indirect and induced jobs. Quarrying and processing workforce of 350 people for 14 years, plus 79 indirect and induced jobs.	Same as the Proposed Action.
Labor Income	There would be no labor income generated from the No Action Alternative.	Direct labor income per calendar year of $54,141,401 and indirect and induced labor income of $2,619,995 for construction. Direct labor income per calendar year of $125,142,545 and indirect and induced labor income of $18,709,469 for quarrying and processing.	Same as the Proposed Action.
Value Added	There would be no value added generated from the No Action Alternative.	Total estimated direct value added per calendar year of $102,788,237, and total indirect and induced value added would be $10,028,255 from construction. Total estimated direct value added per calendar year of $71,951,766, and total indirect and induced value added would be $7,019,778 from quarrying and processing.	Same as the Proposed Action.
Housing	There would be no additional demand for housing.	Demand for 328 housing units during construction; demand for 230 housing units during quarrying and processing.	Same as the Proposed Action.
Community Services, Healthcare, and other Services	There would be no increased demand for community services.	Increased need for improvements or modifications to the public utilities infrastructure, and additional requirements for law enforcement, fire protection and emergency medical services. Increased demand for healthcare services and practitioners. Increased demand for grocery stores, retail stores, and other convenience and commodity needs.	Same as the Proposed Action.
Taxes and Economic Activity	There would be no additional taxes or economic activity gained from the No Action Alternative.	Total tax generation per calendar year of $25,069,752 (direct, indirect, and induced), including $11,819,628 in federal taxes, $4,183,588 in state taxes, $5,911,690 in county-level taxes, and $3,154,846 in sub-county special district taxes during construction. Total tax generation per calendar year of $17,548,826 (direct, indirect, and induced), including $8,273,740 in federal taxes, $2,928,511 in state taxes, $4,138,183 in county-level taxes, and $2,208,392 in sub-county special district taxes during quarrying and processing. Potential for increased property tax to Esmeralda County.	Same as the Proposed Action.
Education	There would be no increase in school enrollment.	Increased school enrollment in Dyer, Silver Peak, Tonopah, Hawthorne, and Bishop with approximately 140 additional students during construction and 98 additional students during quarrying and processing.	Same as the Proposed Action.

Potential Impact	No Action Alternative	Proposed Action	North and South OSF Alternative
Social Values and Cultural Landscapes	There would be no increase in population or change to the social and cultural landscape.	Additional disturbance, employment, and traffic generation may impact social values and cultural landscapes in the nearby communities. The communities could expect to see increased use of facilities and public lands. Water rights secured or leased from current agricultural water users in the Fish Lake Valley could reduce the level of agriculture in the area. Potential closure impacts including housing market and economic declines.	Same as the Proposed Action.
Soil Resources			
Disturbance to Soils	No impacts to soils would occur.	Up to 2,306 acres of new surface disturbance of which 383 would be permanent. Potential impacts to biological soil crusts (biocrusts), if present.	Up to 2,266 acres of new surface disturbance of which 211 would be permanent. Potential impacts to biocrusts, if present.
Threatened and Endangered Species			
BSSG Habitat and Habitat Use	15 acres of existing disturbance would be reclaimed.	Disturbance of up to 1,064 acres (279 permanent) of potential habitat. No disturbance to mapped habitat or proposed critical habitat. Potential avoidance of the area from increased noise and human presence. Potential impacts to water supply at 32 surface water sites if sourced from the aquifer proposed for dewatering.	Same as the Proposed Action except disturbance of up to 776 acres (132 permanent) of potential habitat.
Monarch Butterfly (*Danaus plexippus*) Habitat	15 acres of existing disturbance would be reclaimed.	Up to 2,306 acres (383 permanent) of new surface disturbance of potential habitat that may support milkweed and nectar sources.	Up to 2,266 acres (211 permanent) of new surface disturbance of potential habitat that may support milkweed and nectar sources.
Vehicle strikes (BSSG and Monarch Butterfly)	None expected beyond what is already occurring.	Access road travel, construction activities, and operation could result in vehicle strikes or crushing of BSSG and monarch butterflies resulting in fatality.	Same as the Proposed Action.
Tiehm's Buckwheat Critical Habitat Disturbance	15 acres of existing disturbance would be reclaimed. Potential for disturbance from other authorized or unauthorized activities.	Disturbance to 354 acres (97 permanent) of designated critical habitat. Up to 559 acres of designated critical habitat would be fenced.	Disturbance to 191 acres (45 permanent) of designated critical habitat. Up to 719 acres of designated critical habitat would be fenced.
Tiehm's Buckwheat Subpopulation Impacts	15 acres of existing disturbance would be reclaimed. Potential for disturbance from other authorized or unauthorized activities.	Up to 559 acres of designated critical habitat would be fenced. Within this, 51 acres of subpopulations would be fenced. No direct disturbance would occur within the eight Tiehm's buckwheat subpopulations.	Up to 719 acres of designated critical habitat would be fenced. No direct disturbance would occur within the eight Tiehm's buckwheat subpopulations
Tiehm's Buckwheat Pollinator Impacts	15 acres of existing disturbance would be reclaimed.	Up to 2,306 acres of new surface disturbance of which 383 would be permanent. Impacts to pollinator communities if present.	Up to 2,266 acres of new surface disturbance of which 211 would be permanent. Impacts to pollinator communities if present.
Tiehm's Buckwheat Water Impacts	No changes from what is already occurring.	Changes to overland flow patterns in designated critical habitat around Project features.	Same as the Proposed Action, but less flow altercation required from less proposed in designated critical habitat.

Potential Impact	No Action Alternative	Proposed Action	North and South OSF Alternative
Dust	15 acres of existing disturbance would be reclaimed.	Fugitive dust potential to impact Tiehm's buckwheat and pollinator supporting habitat from reduced photosynthesis and decreased water-use efficiency.	Same as the Proposed Action, but less impacts from less disturbance in designated critical habitat.
Transportation and Access			
Road Alignments and Crossings	No impacts to road alignments or crossings would occur.	4.7-mile realignment of Cave Springs Road and 0.9-mile realignment of Argentite Canyon Road. The realigned Cave Springs Road would have three new crossings with Project roads.	Same as the Proposed Action except 1.2 miles of Argentite Canyon Road realignment and two new crossings with Project roads.
Traffic	No impacts to traffic would occur.	An additional 186 to 248 vehicle passes per day during construction, additional 230 to 288 vehicle passes per day during quarrying and processing, and additional 40 vehicle passes per day during closure on the access road. Traffic control systems on Cave Springs Road would temporarily stop public traffic at the two autonomous haul road intersections to the processing facility and North OSF causing delays. Pilot car would guide public through the OPA.	Same as the Proposed Action.
Vegetation			
Vegetation Removal	15 acres of existing disturbance would be reclaimed.	Up to 2,306 acres (383 permanent) of new surface disturbance of vegetation communities and ecological communities.	Up to 2,266 acres (211 permanent) of new surface disturbance of vegetation communities and ecological communities.
Establishment of Noxious Weeds	Existing disturbance would provide opportunity for establishment of noxious weed species until reclaimed.	Potential for establishment and spread of noxious species during construction, operation, and reclamation.	Same as the Proposed Action, but 40 acres less of disturbance.
Special Status Plant Species	No impacts to special status plant species would occur.	Potential impacts to sagebrush cholla (*Opuntia pulchella*) and Tecopa birdbeak (*Cordylanthus tecopensis*) from fugitive dust or sedimentation. No impacts from groundwater drawdown anticipated. Unknown if surface disturbance would impact Mojave fishhook cactus (*Sclerocactus polyancistrus*).	Same as the Proposed Action except one sagebrush cholla would be impacted by disturbance from the South OSF unless relocated.
Ethnobotanical Plant Species	No impacts to ethnobotanical plant species would occur.	New surface disturbance of 2,306 acres (383 permanent) may impact plant species of ethnobotanical importance.	New surface disturbance of 2,266 acres (211 permanent) may impact plant species of ethnobotanical importance.
Visual Resources			
Contrasting Visual Elements	No additional impacts to visual resources.	From Key Observation Points (KOPs) 1, 2, and 4, there would not be a conflict with the Visual Resource Management (VRM) Class IV objectives. From KOP 3, there would not be a conflict with the VRM Class III objectives. Visible portions from the Silver Peak WSA (VRM Class I) are not anticipated to change the overall quality of views.	Same as the Proposed Action.
Night Sky Impacts	No impacts to night skies would occur.	Nighttime lighting could cause an urban sky glow over the OPA. The brightness of the lights and darkness of the nearly black background would create a strong contrast, and thus make the lights visible.	Same as the Proposed Action.

Potential Impact	No Action Alternative	Proposed Action	North and South OSF Alternative
Water Resources			
Quarry Lake Formation	No quarry lake would form.	66-acre (surface) quarry lake.	Same as the Proposed Action
Seep and Spring Flow	No impacts would occur.	Impacts to 32 surface water sites are not anticipated because they are thought to be perched. If the springs are sourced from upwelling groundwater on the upgradient side of a low permeability fault zone, decreased amounts of spring flow may occur.	Same as the Proposed Action.
Quarry Lake Water Chemistry	No impacts would occur.	NDEP Profile III reference values in the quarry lake would be in exceedance for arsenic from 50 to 200 years post-closure, boron from 5 to 200 years post-closure, fluoride from 5 to 200 years post-closure, and molybdenum from 5 to 200 years post-closure. The ecological risk assessment (ERA) indicated a low probability that risks to wildlife would occur based on the predicted water quality for the post-quarrying quarry lake.	Same as the Proposed Action.
Sedimentation and Erosion	No impacts would occur.	2,306 acres of disturbance may cause erosion and sedimentation during construction and operation.	2,266 acres of disturbance may cause erosion and sedimentation during construction and operation.
Groundwater Availability	No impacts would occur.	Drawdown of up to 300 feet near the quarry, followed subsequently by the majority of groundwater recovery over a period of approximately 60 years.	Same as the Proposed Action.
Water Rights	No impacts would occur.	Four surface water stock rights located within the predicted 10-foot drawdown contour associated with the long-term maximal drawdown prediction for the Proposed Action (SP-01, SP-03, SP-06, and SP-07), and one groundwater stock right. One surface stock water right, one groundwater stock right, and nine groundwater irrigation rights that could be impacted by groundwater drawdown.	Same as the Proposed Action.
Groundwater Quality	No impacts would occur.	No impacts anticipated because evaporation of the quarry lake would cause it to be a terminal sink.	Same as the Proposed Action.
Wetland and Riparian Resources			
Wetland and Riparian Resources	No impacts would occur.	Direct disturbance to up 0.16 acre of wetlands within the Access Road and Infrastructure Corridor where the Fish Lake Valley Hot Springs cross the access road and 54.04 acres of riverine, 0.40 acres of freshwater emergent wetland, and 0.02 acres of freshwater pond National Wetland Inventory (NWI)-mapped wetlands. Potential impacts to riparian area near Chiatovich Creek from the water supply pipeline.	Same as the Proposed Action except disturbance to 54.87 acres of NWI-mapped wetlands.
Wildlife Resources Including Migratory Birds and Special Status Wildlife Species			
Water Sources	No impacts would occur.	Potential impacts to water supply at 32 surface water sites if sourced from the aquifer proposed for dewatering. One guzzler would be relocated. A quarry lake would form with a predicted low probability of risk to wildlife.	Same as the Proposed Action.

Potential Impact	No Action Alternative	Proposed Action	North and South OSF Alternative
Displacement from Human Activity and Disturbance and Collision	No additional impacts would occur.	Human presence and noise could cause wildlife avoidance and displacement. Vehicles, vertical facilities, and lights may cause collisions. Increased competition between wildlife species for available resources.	Same as the Proposed Action.
Crushing and Vehicle Strikes	No additional impacts would occur.	Access road travel, construction activities, and operation could result in vehicle strikes or crushing of wildlife and/or burrows resulting in fatality.	Same as the Proposed Action.
Habitat Change	15 acres of surface disturbance would be reclaimed.	Removal of 2,306 acres (383 acres permanent) of avian nesting and foraging habitat, and insect species, mammal species, and reptile/amphibian species habitat.	Removal of 2,266 acres (211 acres permanent) of avian nesting and foraging habitat, and insect species, mammal species, and reptile/amphibian species habitat.
Mule Deer (*Odocoileus hemionus*) Habitat	15 acres of surface disturbance would be reclaimed.	Surface disturbance to 2,136 acres (383 permanent) of year-round mule deer habitat.	Surface disturbance to 2,096 acres (211 permanent) of year-round mule deer habitat.
Desert Bighorn Sheep (*Ovis canadensis nelsoni*) Habitat	15 acres of surface disturbance would be reclaimed.	Surface disturbance to 2,129 acres (383 permanent) of year-round desert bighorn sheep habitat.	Surface disturbance to 2,089 acres (211 permanent) of year-round desert bighorn sheep habitat.
Black-throated Gray Warbler (*Setophaga nigrescens*) Habitat	15 acres of surface disturbance would be reclaimed.	Permanent surface disturbance to one acre of habitat.	Surface disturbance to 120 acres (eight permanent) of habitat.
Brewer's Sparrow (*Spizella breweri*) Habitat	15 acres of surface disturbance would be reclaimed.	Surface disturbance to 2,209 acres (381 permanent) of habitat.	Surface disturbance to 2,011 acres (203 permanent).
Pinyon Jay (*Gymnorhinus cyanocephalus*) Habitat	15 acres of surface disturbance would be reclaimed.	Surface disturbance to 1,065 acres (281 permanent) of habitat.	Surface disturbance to 896 acres (140 permanent).
Golden Eagle Nests	No impacts would occur.	Two nesting territories are within one mile of surface disturbance and/or two miles of quarry blasting.	Same as the Proposed Action.
Golden Eagle Habitat	15 acres of surface disturbance would be reclaimed.	Removal of 2,306 acres (383 acres permanent) of potential foraging habitat.	Removal of 2,266 acres (211 acres permanent) of potential foraging habitat.
Cassin's Finch (*Haemorhous cassinii*), Common Nighthawk (*Chordeiles minor*), Loggerhead Shrike (*Lanius ludovicianus*), Ferruginous Hawk (*Buteo regalis*), and Western Burrowing Owl (*Athene cunicularia*) Habitat	15 acres of surface disturbance would be reclaimed.	Surface disturbance to 2,306 acres (383 permanent) of potential habitat.	Surface disturbance to 2,266 acres (211 permanent) of potential habitat.

Potential Impact	No Action Alternative	Proposed Action	North and South OSF Alternative
Botta's Pocket Gopher (*Thomomys bottae*) and Desert Kangaroo Rat (*Dipodomys deserti*) Habitat	15 acres of surface disturbance would be reclaimed.	Surface disturbance to 980 acres (96 acres permanent) of suitable soils.	Surface disturbance to 1,050 acres (66 acres permanent) of suitable soils.
Pale Kangaroo Mouse (*Microdipodops pallidus*) Habitat	15 acres of surface disturbance would be reclaimed.	Impacts to 1,039 acres (104 permanent) of suitable habitat in the Access Road and Infrastructure Corridor. Potential for direct injuries or mortalities	Surface disturbance to 1,106 acres (62 acres permanent) of suitable soils.
Bat Habitat and Foraging	No additional impacts would occur.	Disturbance to three acres (one permanent) of cliff and canyon habitat and one acre (permanent) of pinyon-juniper habitat for forage and roosting; creation of quarry lake may attract foraging bats; creation of potential roosting habitat from quarry walls; removal of one adit.	Same as the Proposed Action except disturbance to 10 acres (none permanent) of cliff and canyon habitat and 120 acres (eight permanent) of pinyon-juniper habitat for forage and roosting.
Wong's Springsnail (*Pyrgulopsis wongi*) Habitat	No additional impacts would occur.	Potential impacts to water supply at 32 surface water sites (including Cave Spring) if sourced from the aquifer proposed for dewatering.	Same as the Proposed Action.
Fish Lake Valley Tui Chub (*Siphateles bicolor* ssp. 4) and Fish Lake Valley Pyrg (*Pyrgulopsis ruinosa*) Habitat	No additional impacts would occur.	Potential impacts to habitat from sedimentation and fugitive dust.	Same as the Proposed Action.
California Toad (*Anaxyrus boreas halophilus*) and Western Toad (*Anaxyrus boreas*) Habitat	No additional impacts would occur.	Disturbance to eight acres of potential habitat. Potential impacts to habitat from sedimentation and fugitive dust.	Same as the Proposed Action.
Wild Horses and Burros			
Habitat and Forage Loss	15 acres of surface disturbance would be reclaimed.	Disturbance to 2,286 acres (383 acres permanent) of the Silver Peak Herd Management Area (HMA); however, the appropriate management level (AML) land for the Silver Peak HMA is zero. 559 acres of Tiehm's buckwheat designated critical habitat would be fenced.	Disturbance to 2,164 acres (211 acres permanent) Silver Peak HMA. 719 acres of Tiehm's buckwheat designated critical habitat would be fenced.
Vehicle Strikes	No additional impacts would occur.	Increased traffic on the access road could lead to fatalities or injuries to wild horses or burros from collisions.	Same as the Proposed Action.
HMA Use	No additional impacts would occur.	Effects from human disturbance and noise could reduce the areas in the HMA utilized, causing an increased use in other portions of the HMA.	Same as the Proposed Action.

3.0 Affected Environment

This chapter describes the existing conditions of the physical, biological, cultural, and socioeconomic resources that have the potential to be affected by activities related to the Proposed Action, the North and South OSF Alternative, and the No Action Alternative described in **Chapter 2**. To comply with NEPA, the BLM is required to address specific elements of the environment that are subject to requirements specified in statutes, regulations, or by Executive Order. **Table 3-1** lists the supplemental authorities and other resources addressed in this Draft EIS. Supplemental authorities and other resources that may be affected by the Proposed Action and alternatives are discussed further in **Chapters 3** and **4** and in the SERs for each resource (BLM 2024c through 2024u). Those elements listed under the supplemental authorities that are not present in the proposed Plan boundary or resource-specific study area or are present but would not be affected are not carried through in this EIS. The areas of analysis for resources analyzed are shown on **Figures 3-1**, **3-2**, **3-3**, and **3-4**.

Table 3-1 Supplemental Authorities and Other Resources

Supplemental Authority and Other Resources	Not Present	Present/Not Affected	Present/May be Affected	Rationale/Section Reference
Air Quality and Climate Change			X	Sections 3.1, 4.1 and 4.20.1; Air Quality SER (BLM 2024c)
Areas of Critical Environmental Concern	X			Resource not present.
Cultural Resources			X	Sections 3.2, 4.2 and 4.20.2; Cultural Resources SER (BLM 2024d)
Environmental Justice			X	Sections 3.3, 4.3 and 4.20.3; Environmental Justice SER (BLM 2024e)
Farmlands (Prime or Unique)	X			Resource not present.
Fire Management		X		Fire Prevention and Response is described in Appendix G of the Plan (Ioneer 2022)
Fisheries	X			Resource not present.
Floodplains			X	Sections 3.16, 4.16 and 4.20.16; Water Resources and Geochemistry SER (BLM 2024r)
Forest and Rangelands			X	Sections 3.14, 4.14 and 4.20.14; Vegetation Resources SER (BLM 2024p)
Geology and Minerals			X	Sections 3.4, 4.4, and 4.20.4; Geology and Minerals SER (BLM 2024f)
Hazardous Materials/Solid Waste			X	Sections 3.5, 4.5, and 4.20.5; Hazardous Materials and Solid Waste SER (BLM 2024g)
Land Use and Realty Resources			X	Sections 3.6, 4.6, and 4.20.6; Land Use and Realty SER (BLM 2024h)
Livestock and Grazing Resources			X	Sections 3.7, 4.7, and 4.20.7; Livestock and Grazing Resource SER (BLM 2024i)
Migratory Birds			X	Sections 3.18, 4.18, and 4.20.18; Wildlife Resources SER (BLM 2024t)
National Historic Trails	X			Resource not present.
Native American Traditional Values			X	Sections 3.8, 4.8, and 4.20.8; Native American Traditional Values SER (BLM 2024j)
Noise			X	Sections 3.3, 3.9, 3.18, 4.3, 4.9, 4.18, 4.20.3, 4.20.9, and 4.20.18; Environmental Justice SER (BLM 2024e), Recreation SER (BLM 2024k), and Wildlife Resources SER (BLM 2024t)
Noxious Weeds/Invasive Non-native Species			X	Sections 3.14, 4.14, and 4.20.14; Vegetation Resources SER (BLM 2024p)
Paleontological Resources	X			Resource not present

Supplemental Authority and Other Resources	Not Present	Present/Not Affected	Present/May be Affected	Rationale/Section Reference
Recreation			X	Sections 3.9, 4.9, and 4.20.9; Recreation SER (BLM 2024k)
Social and Economic Values			X	Sections 3.10, 4.10, and 4.20.10; Social and Economic Values SER (BLM 2024l)
Soils			X	Sections 3.11, 4.11, and 4.20.11; Soil Resource SER (BLM 2024m)
Special Status Species			X	Sections 3.14, 3.18, 4.14, 4.18, 4.20.14, and 4.20.18; Vegetation Resources SER (BLM 2024q) and Wildlife Resources SER (BLM 2024t)
Threatened and Endangered Species			X	Sections 3.12, 4.12, and 4.20.12; Threatened and Endangered Species SER (BLM 2024n)
Transportation and Access			X	Sections 3.13, 4.13, and 4.20.13; Transportation and Access SER (BLM 2024o)
Vegetation Resources			X	Sections 3.14, 4.14, and 4.20.14; Vegetation Resources SER (BLM 2024p)
Visual Resources			X	Sections 3.15, 4.15, 4.20.15; Visual Resources SER (BLM 2024q)
Water Resources and Geochemistry			X	Sections 3.16, 4.16, and 4.20.16; Water Resources and Geochemistry SER (BLM 2024r)
Wetland and Riparian Areas			X	Sections 3.17, 4.17, and 4.20.17; Wetland and Riparian Resources SER (BLM 2024s)
Wild and Scenic Rivers	X			Resource not present.
Wild Horses and Burros			X	Sections 3.19, 4.19, and 4.20.19; Wild Horses and Burros SER (BLM 2024u)
Wilderness, Lands with Wilderness Characteristics, and Wilderness Study Area			X	Sections 3.9, 4.9, and 4.20.9; Recreation SER (BLM 2024k)
Wildlife Resources			X	Sections 3.18, 4.18, and 4.20.18; Wildlife Resources SER (BLM 2024t)

3.1 Air Quality and Climate Change

The area of analysis for air quality includes the local airshed, which is defined as a 50-kilometer (km) (31-mile) radius buffer of the OPA (**Figure 3-3**) and includes portions of Esmeralda and Mineral counties in Nevada and Inyo and Mono counties in California and encompasses all or parts of 12 air quality planning areas as defined by the Nevada Bureau of Air Quality Planning. The nearest Class I area is the Ansel Adams Wilderness Area, located approximately 82 miles west. The Project is located in the Fish Lake Valley hydrographic area (HA) (HA 117). The area of analysis is located within an Air Quality Management Area that is in "unclassifiable/attainment" for all pollutants having an air quality standard.

The Project is located in rural southwestern Nevada with few nearby stationary air pollution sources. Several small, permitted emission sources exist throughout the area of analysis. Background pollutant concentrations are expected to be generally low. Elevated particulate concentrations occur from natural sources due to occasional strong winds in the area that cause exposed surface soils to become airborne.

The background concentrations account for existing natural and anthropogenic pollutant emissions. The Project would be in a rural area, distant from roads that support high levels of traffic and active industrial operations. For rural areas, NDEP approves the use of zero background concentrations for gaseous pollutants like CO, nitrogen dioxide (NO_2), and SO_2 and non-zero background concentrations for PM less than 10 microns in diameter (PM_{10}) and PM less than 2.5 microns in diameter ($PM_{2.5}$). Table 3-2 provides the background pollutant concentrations used for the area of analysis.

Table 3-2 Background Air Pollutant Concentrations

Pollutant	Averaging Period	Concentration Format	µg/m3 or ppb	Data Year(s)	Monitoring Site	Reference
NO_2	1-Hour	98th Percentile	3.3	2019-2021	Trona-Athol Seares Valley, California	USEPA Air Data
	Annual	Arithmetic Mean	33.2			
SO_2	1-Hour	99th Percentile	0.5[1]	2019-2021	Owens Valley, California	
	3-Hour	2nd high				
	24-Hour	2nd high				
	Annual	Arithmetic mean				
CO	1-Hour	2nd high	1.7	2019-2021	Owens Valley, California	
	8-Hour	2nd high	2.2			
PM_{10}	24-Hour	6th high	10.2	N/A	Great Basin National Park, Nevada	NDEP
$PM_{2.5}$	24-Hour	98th Percentile	8.0	N/A	Jarbidge Wilderness, Nevada	NDEP
	Annual	Arithmetic Mean	2.3	N/A		
Pb	3-Month	Rolling 3-Month	0	N/A	N/A	N/A

Sources: Trinity 2022a, 2023
[1] The 1-hour SO_2 background was applied for all averaging as a conservative measure.
$\mu g/m^3$ = micrograms per cubic meters
N/A = Not applicable

The air quality in the region is determined by the magnitude and distribution of pollutant emissions and the meteorological conditions that affect pollutant transport, dispersion, and deposition. Air quality in the area of analysis is governed by both pollutant emissions and meteorological conditions. Precipitation in the region averages between approximately four and six inches per year and is distributed fairly evenly throughout the year. The area receives about 16 inches of snow per year. The area of analysis experiences cool winters and warm summers with large diurnal and seasonal temperature variations that are typical for arid continental climates. Temperature inversions are common due to the local topography that consists of mountain ranges and low-lying basins. During inversions when wind speeds are low, air pollution can become trapped near the ground and dilution is minimized. Inversions are strongest during winter months when daytime hours are the shortest. There is a dominant north component to the wind (i.e., wind blowing from the south to the north). A similar localized wind direction regime is expected throughout the area of analysis due to orientation of mountainous terrain in the region.

The primary GHGs in the atmosphere include CO_2, methane, and nitrous oxide. These GHGs are referred to as “heat-trapping” gases that absorb heat and trap it in the atmosphere. The USEPA has implemented regulations and guidelines regarding evaluation of GHG emissions, and the manner in which NEPA documents should address these issues. The USEPA has formed a correlation of the various gases with CO_2 so that any particular GHG can be shown as a carbon dioxide equivalent (CO_2e). This methodology allows gaseous emissions to be reduced to CO_2e and compared with area wide GHG emissions on a local, state-wide, country-wide, or global level.

Mercury is a naturally occurring element that exists in the environment in its elemental form as well as mercury compounds. Small amounts of mercury emissions are generated by fuel-burning equipment, such as boilers and blasting. The Project is not considered a precious metals mining facility and therefore would not be subject to the Nevada Mercury Control Program.

3.2 Cultural Resources

The area of analysis for cultural resources is referred to as the area of potential effects (APE). To take into account different types of impacts, several zones of analysis (ZoA) that make up the APE have been identified (**Figure 3-1**). The Physical APE (PAPE) encompasses the Plan boundary where physical disturbance would occur. The BLM has defined the Vibratory, Auditory, and Visual portions of the APE for the Project as a set of overlapping ZoA for those discrete types of effects anticipated for the undertaking. The BLM does not anticipate a change in air quality or particulate inclusions, and any increase in dust or

emissions resulting from the Project's initial facility construction and blasting would be temporary and negligible; thus, an Atmospheric ZoA was not established.

Several Class III inventories have been conducted within the PAPE (Giambastiani and Moore 2012; Jamaldin et al. 2020; Ross-Hauer 2020; Vicari et al. 2020; Harmon 2022; Seymore and Harmon 2022; Richey and Felling 2023). Additionally, new data from field visits conducted by the BLM, Tribes, and Westland in 2024 has also been incorporated (Westland 2024c). As a result of these inventories, a total of 225 cultural resources within the PAPE were identified, of which 138 are prehistoric, 61 are historic, and 26 are multi-component containing both prehistoric and historic components. Within the PAPE, 25 cultural resources and one architectural resource are eligible for the NRHP and 13 remain unevaluated.

The 39 NRHP-eligible (i.e., historic properties) or unevaluated cultural resources include seven prehistoric rock shelters, two rock shelters with lithic scatters, seven prehistoric habitations, eight lithic scatters, three prehistoric campsites, one prehistoric habitation/mining site, seven prehistoric habitat/historic refuse deposits, one rock shelter/cabin with its associated cabin also recorded individually, a multi-component habitation site, and one historic mining/borates works. An architectural inventory identified three historic architectural elements within the PAPE, including the Cave Spring Cabin (B12947/26ES1566), a corral (S2431/26ES2937), which is part of a larger historic site, and a modified water tank (S2430/26ES2935) (Ross-Hauer 2020). The Cave Spring Cabin (B12947) is individually eligible for the NRHP while the other two structures are not eligible.

A Class I inventory of the Vibratory, Auditory, and Visual APE was conducted to determine which NRHP-eligible cultural resources (i.e., historic properties) had the potential to be affected by the Project (Felling and Richey 2023). The Class I inventory identified 359 previously recorded cultural resources and four potential undocumented sites within these APEs (visual, auditory, vibrational). There were 187 removed from consideration because they were determined not eligible for listing on the NRHP. The remaining 176 NRHP-eligible or unevaluated cultural resources were then further scrutinized for the potential to be impacted, with 28 cultural resources having the potential to be indirectly impacted by the Project, including 26 sites, one archaeological district, and one architectural resource (Felling and Richey 2023; Westland 2024c).

Unevaluated cultural resources would be treated as eligible while consultation continues with the Tribes for determination of eligibility.

3.3 Environmental Justice

The area of analysis for environmental justice includes Census Block Groups 320099501001 (Esmeralda County, Nevada), 320219707001, 320219707002, 320219707003, 320219708001, 320219708002 (Mineral County, Nevada), 320239601001, 320239602001, 320239602002 (Nye County, Nevada), 60270001001, 60270001002, 60270002001, 60270002002, 60270003001, 60270003002, 60270004001, 60270004002, 60270004003, 60270005001 (Inyo County, California), and 60510001011 (Mono County, California) (**Figure 3-4**). It is anticipated that most of the work force would live in these Census Block Groups and commute to the OPA due to proximity to the Project, availability of commercial and public facilities, services, and housing. Project-related impacts to air quality, visual, noise, water, traffic, and social and economic values are not anticipated to affect environmental justice communities beyond this area of analysis. The hazardous materials and solid waste area of analysis (Section 3.5) was assessed for environmental justice, which includes the Plan boundary and the main transportation and access routes on which materials would be transported. The reference area for minority, low-income, and American Indian or Alaska Native communities is the State of Nevada non-metropolitan (metro) population, which is defined as the State of Nevada population excluding the Reno Metro Area (including Sparks) and Las Vegas-Henderson-Paradise Metro Area. Within the hazardous material transportation route, Census Block Group 320219708001 in Mineral County has a demographic index and environmental indexes above the 80th percentile compared to the state of Nevada. Other demographic indexes and environmental justice indexes above the 80th percentiles are primarily located in the metropolitan areas of Reno and Las Vegas (USEPA 2024).

Approximately 30 percent of the area of analysis is low-income. The reference area low-income population is approximately 26 percent. The Census Block Group within Esmeralda County that encompasses the

Project has a low-income population of 44 percent which is higher than the reference population. There are 12 Census Block Groups within the area of analysis having low-income populations, with the Census Block Group in Mineral County having the highest percentage of low-income populations within the area of analysis, which includes Hawthorne, Mina, and Luning. The USEPA's EJ Screen provides data on health disparities within areas and compares the data to United States health disparity data. Identified low-income Census Block Groups within the area of analysis ranks populations with disabilities in the 80th percentile and above. The Proposed Action is located in Esmeralda County Census Block Group 320099501001 which has an identified low-income population and ranks above 90th percentile for persons with disabilities and cancer populations compared to state of Nevada data. Several other census block groups that overlap identified low-income populations within the area of analysis rank above the 90th percentile for health disparities including persons with disabilities, cancer risk, and asthma.

Approximately 38 percent of the area of analysis population is identified as belonging to a minority population. The reference area has a minority percentage of approximately 40 percent. There are four Census Block Groups within the area of analysis that have a minority population that is meaningfully greater than the reference population or equal to or greater than 50 percent of the population (320219707001, 320219707003, 320219708001, and 320219708002). The Census Block Groups with the highest percentage of minority residents are 320219708001 in Mineral County and 60270004001 in Inyo County. Census Block Group 60270004001 overlaps the Bishop Paiute Tribe Reservation. Census Block Group 320219708001 is located in Hawthorne near Walker Lake and overlaps the Walker River Paiute Tribe Reservation. Mineral County Census Block Groups with identified minority populations overlapping populations with health disparities including cancer, persons with disabilities, and asthma ranking above the 80th percentiles include Census Block Groups 320219708001 and 320219708002. Inyo County Census Block Groups minority populations overlapping with persons with disability rankings above the 80th percentiles include 60270004001 (84th percentile). Other Census Block Groups with minority populations may have health disparities ranking below the 60th percentile or do not have data available (USEPA 2024).

According to the 2022 Census of Agriculture, there were eight farms identified as owned by farmers of Hispanic, Latino, or Spanish origin in Esmeralda County. There were 235 farms in the state of Nevada identified as being owned by farmers of Hispanic, Latino, and Spanish origin (USDA 2024).

It is estimated that 14 percent of the area of analysis population is identified as belonging to an American Indian or Alaska Native population. The reference area has an American Indian or Alaska Native population percentage of six percent. There are eight Census Block Groups that have been identified within the area of analysis that have an American Indian or Alaska Native population equal to or greater than reference population (320219708001, 320219708002, 320239601001, 60270002001, 60270002002, 60270004001, 60270005001, and 60510001011). The Census Block Groups with the highest percentage of American Indian or Alaska Native residents are Census Block Group 320219708001 (Mineral County) and Census Block Group 60270004001 (Inyo County). Census Block Group 60270004001 is located in the city of Bishop and has an American Indian or Alaska Native population of 74 percent and overlaps the Bishop Paiute Tribe. Census Block Group 320219708001 is located in the town of Schurz and has an American Indian or Alaska Native population of 86 percent and overlaps the Walker River Paiute Tribe Reservation. Mineral County Census Block Groups that overlap American Indian or Alaska Native populations with health disparities including cancer, persons with disabilities, and asthma ranking above the 80th percentile include Census Block Groups 320219708001 and 320219708002. Census block groups in Inyo County with identified American Indian and Alaska Native populations overlap populations with disparities over the 80th percentile including cancer and persons with disabilities.

3.4 Geology and Minerals

The area of analysis for geology and mineral resources is the Plan boundary (**Figure 3-1**). The regional landscape is comprised of moderately to strongly dissected high desert mountains broken up by playa basins, low relief foothills, and arroyos. Basement rocks consist of Cambrian to Ordovician marine rocks and late Precambrian metamorphic rocks which were uplifted and intermittently eroded through the Tertiary. A late Miocene basin formed during extension adjacent to the northern margin of the nascent Silver Peak caldera. The proximity of the basin at this site permitted the hosting of a small alkaline lake with intermittent (ephemeral) life over a period of an estimated one to two million years (Albers and Stewart 1972; Reynolds and Chafetz 2020). The lacustrine basin sediments became the host of the Rhyolite Ridge lithium-boron

deposit. The stratigraphic column for the OPA consists of Quaternary alluvium and other Quaternary sediments, Miocene-Pliocene lacustrine sediments, and Miocene volcanics (Robinson et al. 1976).

The Project host rocks are lakebed (lacustrine) strata of the late Miocene age Cave Spring Formation, hosted within a north to south oriented basin (South Basin). The Cave Spring Formation overlies the 6.0 Mega-annum-age Rhyolite Ridge Tuff and Argentite Canyon Formations (Albers and Stewart 1972; Robinson et al. 1976). The Cave Spring Formation consists primarily of marl and lesser amounts of claystones. Minor gritstone beds are comprised primarily of pumice clasts and lapilli tuff clasts which form distinctive marker horizons in the marl. The stratigraphy of the area of analysis consists of basal Rhyolite Ridge tuff, Argentite Canyon latite, and Cave Spring Formation (Reynolds and Chafetz 2020). Although primarily a “layer-cake” geology, the stratigraphy has minor folds subparallel to adjacent faults, and dips northerly and easterly (Robinson et al. 1976). The ore zone is in outcrop on the western part of the deposit, and dips easterly to depths greater than 700 feet below ground surface.

Boron mineralization occurs as the mineral searlesite, a hydrous sodium borosilicate, within marl horizons interbedded with claystones. The ore zone occurs within one marl bed averaging 65 feet in thickness over approximately four square miles (Reynolds and Chafetz 2020). Grades (concentrations) of searlesite range up to 50 percent within the marl unit in association with lithium bearing clays (illite–smectite group) that contribute significantly in value to the Project.

Estimated ore reserves for the Project deposit consist of total proven and probable reserves of 67.4 Mt averaging 0.18 percent lithium and 1.54 percent boron. The estimated mineral resource outlier to the estimated reserve contains measured, indicated, and inferred estimated resources totaling 164 Mt averaging 0.16 percent lithium and 1.42 percent boron (Fluor 2020). The Rhyolite Ridge deposit is the only known economically viable deposit of searlesite in the world (Mineral Data Publishing 2001).

Representative materials of Project lithologies were analyzed to determine their makeup and potential behavior when exposed to the weathering environment. Samples, 125 total, were subjected to acid-base accounting analyses to determine whether they were acid generating or neutralizing. Additional samples, 26 total, were subjected to meteoric water mobility procedure testing to examine the mobility of toxic metal and other elements. An additional 19 samples were selected for kinetic testing and humidity cell testing for longer term chemical behavior assessment. Samples were examined to identify mineralogical components. The acid-base accounting testing showed that the average of the samples of overburden materials were acid neutralizing, with net neutralizing potential of 204. The meteoric water mobility procedure testing indicated that certain metals, e.g., arsenic, antimony, and aluminum, would exceed regulatory reference values for water standards in neutral to alkaline oxidizing conditions. Total dissolved solids (TDS) and fluorine would also exceed those standards. Other elements exhibited variable responses during testing (HydroGeoLogica 2020a).

There are three Holocene Active faults near the OPA. These faults are the Emigrant Peak Fault Zone (EPFZ) bounding the east side of Fish Lake Valley; the McAfee Canyon Fault (MCF); and segments of the Fish Lake Valley Fault Zone (FLVFZ). A fourth fault, the Silver Peak Range Fault located 3.3 miles southeast of the OPA, is inferred to be inactive (Pliocene) or at least it has been Early Quaternary since its last seismic event; it does not cross the OPA and is not considered hazardous to occupied infrastructure. Segmented splays of the EPFZ occur within the OPA but appear not to have been active since the mid to early Quaternary time. The faults at the quarry and facilities are considered inactive for planning and design purposes. The FLVFZ extends north from the North Death Valley Fault Zone into Nevada. It extends along the west side of Fish Lake Valley approximately 4.5 miles west of the OPA where it crosses the access road but does not impact any proposed occupied structures. The FLVFZ is considered Holocene Active. It displays as ruptures in Holocene lithologies, with an estimated recurrence interval of 500 to 1,500 years. It is considered one of the most active faults regionally. The MCF in its northern segment is located approximately 7.5 miles south-southwest of the OPA. It is considered to be Holocene Active along its entire extent. It does not cross the Plan boundary and is not considered hazardous to the site (NewFields 2019a).

In assessing risks in the event of seismic activity near or at the Plan boundary, for seismic events that occur once every 475 years, there is a 10 percent probability of that seismic event causing ground acceleration of 0.28 of gravity within the next 50 years. If such an event did occur, the ground acceleration on the most

intense of these (return period of 2,475 years) is nearly double that experienced during the 475-year event. Based on modeling, applying the calculated probabilistic peak ground acceleration data for the Plan boundary, the shaking at the site could range from very strong to severe, resulting in moderate to heavy potential damage to infrastructure. In Esmeralda County, no damage to infrastructure has resulted from seismic events during historic times. The likelihood of such damage occurring has been assessed as being not anticipated by Esmeralda County Hazard Mitigation Steering Committee (NewFields 2019a).

3.5 Hazardous Materials and Solid Waste

The area of analysis for hazardous materials and solid waste includes the Plan boundary and the main transportation routes and access roads on which materials would be transported. These routes include: 1) the roads from the Plan boundary north on SR 264 to SR 773, then east on U.S. 6, then northeast on U.S. 95 to Fallon, then northwest on U.S. 50A to Fernley, then continuing west on Interstate 80 (I-80) to Reno; and 2) the roads from the Plan boundary south and east on SR 264/266 through Dyer, Oasis, and Lida, then southeast on U.S. 95 to Beatty, and continuing southeast on U.S. 95 to Las Vegas (**Figure 3-4**). The affected environment for hazardous materials includes air, water, soil, and biological resources that may be impacted by an accidental release of hazardous materials during transportation to and from the OPA, and during storage and use within the quarry area. Both transportation routes utilize the access road to the OPA and are approximately 230 miles long. Sensitive receptors along the transportation routes include the Amargosa River, an intermittent stream that flows through Beatty, and Chiatovich Creek, on the route from Las Vegas. The route from Reno would pass within 200 feet of Walker Lake and cross two streams draining to the lake, Dry Creek, and Cottonwood Creek. The Carson River, Truckee River, and Walker River would also be crossed on the route from Reno.

Previous exploration has occurred periodically in the OPA since 1962 in the form of boreholes and trenches. Although not in operation, the Mineral Ridge Mine, located east of the area of analysis, is authorized for mining. If the Mineral Ridge Mine goes into operation, there would be additional truck traffic (e.g., hazardous materials or waste) on the access road in the area of analysis (BLM 2014). Historical records for the OPA indicate that activity has been strictly exploration with no active mining or processing operations, resulting in limited potential for release of hazardous materials.

3.6 Land Use and Realty

The area of analysis for land use and realty includes the Plan boundary (**Figure 3-1**). The area of analysis is located within the administrative boundaries of the BLM Battle Mountain District, TFO. Land in the Project vicinity currently are managed under the guidance of the Tonopah RMP (BLM 1997).

The area of analysis encompasses approximately 7,166 acres within Esmeralda County. Esmeralda County has a land area of approximately 3,582 square miles, nearly all of which is land (water accounts for less than 0.5 square mile). Approximately 94.3 percent of the county is federal land administered by the BLM (Esmeralda County 2011). The Access Road and Infrastructure Corridor crosses a portion of private land at the intersection with SR 264, and then crosses BLM-managed land. The access road (Hot Ditch Road and Cave Springs Road-Coyote Summit) is currently maintained by Esmeralda County under a Title V ROW grant (NVN-062084). The Esmeralda County ROW extends through the OPA to Silver Peak.

There are numerous land use authorizations and mining claims not controlled by Ioneer within the area of analysis, primarily around the Access Road and Infrastructure Corridor. The primary land uses within the area of analysis are mineral exploration, livestock grazing, dispersed recreation, agricultural operations, and wildlife habitat. Recreation activities are primarily dispersed, and include hunting, hiking, ATV use, and sightseeing. The Silver Peak WSA is located approximately 1,200 feet southwest of the OPA (Ioneer 2022). There are two named hot springs (Fish Lake Valley Hot Springs [known as the Hot Box] and Silver Peak Hot Springs) located near the area of analysis.

3.7 Livestock Grazing

The area of analysis for livestock grazing is the grazing allotments that overlap the Plan boundary and the one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour (**Figure 3-2**). The area of analysis includes the Ice House, Red Spring, Silver Peak, and Fish Lake Valley allotments.

The Ice House Allotment is 41,695 acres of BLM-administered land with a total permitted use of 229 AUMs. There are 114 active AUMs and 115 temporarily suspended AUMs, all associated with cattle grazing. There is one permittee utilizing the allotment with a season of use from May 1 to September 28. The allotment is classified under the maintain category, meaning that the objective is to maintain current satisfactory conditions (BLM 2023b). There are seven seeps or springs that occur within this allotment (USGS 2022), and three stock watering points of diversion (NDWR 2022). There is one range improvement, a stockwater well, on the west side of the allotment.

The Red Spring Allotment is 149,150 acres of BLM-administered land with a total permitted use of 2,643 AUMs. There are 2,520 active AUMs and 123 temporarily suspended AUMs, all associated with cattle grazing (BLM 2023b). There are two permittees utilizing this allotment; one permitted to graze from May 15 to June 30 and October 1 to February 28, the other permitted to graze from July 1 to September 15. The allotment is classified under the improve category, meaning that it is managed as a high priority to improve the current resource condition (BLM 2023b). There are 29 seeps or springs that occur within this allotment (USGS 2022), and eight stock watering points of diversion (NDWR 2022). There are 13 range improvement projects in the allotment, and all are water-related, spring developments, pipelines, wells, and supplemental troughs for water hauling. The Access Road and Infrastructure Corridor encompasses approximately 555 acres (0.4 percent) of this allotment.

The Silver Peak Allotment is 281,489 acres of BLM-administered land with a total permitted use of 3,165 AUMs. There are 1,530 active AUMs and 1,635 temporarily suspended AUMs (BLM 2023b). Suspended AUMs can be reinstated with each water range improvement repair (Truax 2020). There is one permittee utilizing the allotment permitted for year-round use by cattle. The allotment is classified under the maintain category, meaning the objective is to maintain current satisfactory conditions (BLM 2023b). There are 75 seeps or springs that occur within this allotment (USGS 2022), and 35 stock watering points of diversion (NDWR 2022). There are 48 range improvement projects within the allotment, of which eight are within the Plan boundary. There is one corral near the bottom of the proposed West OSF, a spring-associated water development above the proposed West OSF, and a drift fence across an access road below the Project. The remaining five improvements are in the avoidance area around Cave Spring. The OPA and Access Road and Infrastructure Corridor would encompass approximately 6,532 acres of rangeland (2.3 percent of the allotment) located in the central portion of the Silver Peak Allotment.

The Fish Lake Valley Allotment is 8,965 acres of BLM-administered land with a total permitted use of 144 AUMs. All 144 AUMs are active and associated with cattle grazing. There is one permittee utilizing the allotment with a year-round season of use. The allotment is classified under the custodial category, meaning that the objective is to custodially manage the existing resource values (BLM 2023b). There are no seeps or springs that occur within this allotment (USGS 2022), and one stock watering point of diversion (NDWR 2022). Leidy Creek, Perry Aiken Creek, and McAfee Creek provide water in the allotment. Range improvements are limited to fences.

3.8 Native American Traditional Values

Federal agencies are required by law (NHPA of 1966 and Archaeological Resources Protection Act of 1979) to consult with Native Americans on actions that may affect their traditions or uses of public lands. Specifically, the agencies are required to follow the Section 106 process as recorded in 36 CFR 800 - Subpart B, as amended January 11, 2001. The goal of the BLM as stated in Policy Manual Section 8160 is to “assure that tribal governments, Native American communities, and individuals whose interests might be affected have a sufficient opportunity for productive participation in BLM planning and resource management decision making.”

The area of analysis for Native American traditional values encompasses the Plan boundary, Fish Lake Valley, and Clayton Valley (**Figure 3-3**). This area includes the extent of potential effects to prehistoric cultural resources and other identified areas of concern to the Tribes.

The Project region is within the territory of the Northern Paiute, who occupied an expansive area prior to Euro-American contact that spanned parts of Nevada, Oregon, and California. The Project is also within the territory of the Western Shoshone who historically resided in parts of Nevada, Utah, and Idaho. The linguistic boundary between the Northern Paiute and Western Shoshone has been documented running

north/south through the Silver Peak Range and the current area of analysis (Steward 1933, 1938). The Silver Peak Range was inhabited seasonally by both groups during the ethnohistoric period, and both often shifted between established seasonal camps in the vicinity based on the availability of plant and animal resources and social events (Steward 1938; Jamaldin et al. 2020). Ethnographic groups in the vicinity of the area of analysis include the Paiute of Fish Lake Valley, Deep Springs Valley, and Owens Valley, along with Shoshone groups near Lida.

The Fish Lake Valley Paiute lifeway has been described as semi-nomadic, noting that they maintained valley floor residences of primary use during the winter but attachment to such villages was impermanent (Steward 1933, 1938). In 1870, the Fish Lake Valley population was estimated to be around 100 people, who lived between eight villages that each had multiple satellite camps (Steward 1938). Men hunted deer, antelope, and mountain sheep year-round individually and communally in the Silver Peak Range and the White Mountains, although large game was of secondary importance to plant resources including seeds, roots, and Joshua Tree buds along with small game such as rabbits, fish, lizards, rodents, and caterpillars. Women traveled between established camps during the early spring and summer for the gathering of roots, seeds, and berries, and in the fall entire villages moved to the Silver Peak Range for pinyon nut harvesting (Steward 1938). Community activities included communal hunts, rabbit dives with Paiute and Shoshone from neighboring valleys, and fall festivals after pinyon harvesting (Steward 1938).

The Deep Springs Valley and Fish Lake Valley Paiutes' socio-political system was enmeshed (Steward 1938). Census data indicates that 23 persons lived in Deep Springs Valley in 1870. Because of the low population, interactions with groups to the west in Owens Valley and east in Fish Lake Valley for rabbit drives, dances, and marriage were common. Deep Springs Valley Paiute subsistence relied on seeds as primary resources, but pinyon and animal resources such as deer, antelope, mountain sheep, ducks, and rabbits were also of value (Steward 1938). Fish Lake Valley was a common destination for Deep Springs Valley Paiute to gather seeds and pinyon (Steward 1938).

The Owens Valley Paiute primarily occupied land within Owens Valley and the adjacent Inyo and Coso ranges along with the White Mountains in California. Census records for 1870 reveal that 1,000 Paiutes resided in Owens Valley. Paiute groups in Owens Valley did not need to travel great distances to gather food resources (Steward 1933, 1938). Subsistence and settlement in Owens Valley were based on seasonal resources. Valley floor villages were established along water sources and seasonal camps in upland locations were utilized during the fall for the purpose of procuring acorn, pinyon, and large and small game. Unlike the Fish Lake Valley and Deep Springs Valley Paiutes, specific seed, pinyon, and hunting plots and harvesting rights were owned by Owens Valley nuclear families and bands, or communities comprised of both nuclear families and immediate relatives along with unrelated persons (Steward 1933, 1938). In addition, Owens Valley groups enacted communal hunts in the valley and mountain ranges, and constructed ditches to irrigate seed plots (Steward 1933).

The Lida Shoshone were distributed around present day Lida Valley, southeast of Fish Lake Valley. The Lida Shoshone were described as a small population of five families linked to additional interrelated Western Shoshone villages in the vicinity near Montezuma, Tule Canyon, and Stonewall Mountain (Steward 1938). Although Steward (1938) references the Clayton Valley Shoshone, it appears no groups actually resided in the valley but instead the area was used temporarily by groups from outside of the valley to gather seeds and berries. The Lida Shoshone often met with Paiute groups from Fish Lake Valley for pinyon harvests, rabbit drives, and festivals. The groups sometimes camped together for autumn pinyon gathering in the Silver Peak Mountains, but the Lida Shoshone also gathered pinyon independently in the mountains along the western rim of Lida Valley (Steward 1938). Steward (1933) makes mention of the Fish Lake Valley Shoshone, but it is likely that he is referring to Shoshone that intermarried with the Fish Lake Valley Paiute and resided in Paiute villages there. Little additional information for the Lida Shoshone are available outside of Steward (1938), but their ethnographic subsistence emphases on seeds, roots, pinyon, deer, mountain sheep, antelope, and small game was noted.

The introduction of Euro-Americans to the region during the transition between the ethnohistoric and historic periods had numerous effects on *in situ* Northern Paiute and Western Shoshone groups. In 1874, Pyramid Lake and Walker River became formal reservations for the Northern Paiute. Additional Paiute colonies and reservations were established in the early twentieth century, including the Stillwater Reservation, Lovelock

Colony, Fallon Colony, Reno-Sparks Colony, Yerington Colony, Susanville Reservation, Yerington Reservation, Benton Reservation, and Big Pine Reservation (Fowler 1989).

Cave Spring has been described as culturally significant to local tribes, and the site has been discussed during consultation with tribal representatives. Cave Spring is located in the eastern portion of the OPA and south of the Cave Springs Road. The area has existing rock structures and a corral present. The spring has had previous water developments installed (Newfields 2020b). Cave Spring is located near KOP 2, and the existing viewshed from KOP 2 is described in detail in the Visual Resources SER (BLM 2024q). The view from Cave Spring is likely similar to the view from KOP 2, if not more blocked by existing topography due to the Cave Spring being set back further from the Cave Springs Road. Anthropogenic sounds that can be heard from the site include vehicles traveling on the existing road, occasional road maintenance vehicles, OHV recreationalists, or campers that use the cleared area near the site.

3.9 Recreation

The area of analysis for recreation is the Plan boundary (**Figure 3-3**). Specific recreation uses in and around the area of analysis consist of hot spring use, sightseeing, rockhounding, exploring, horseback riding, OHV use, fishing, and hunting. Recreation use in the area of analysis is generally dispersed with few areas receiving regular visitor use.

Lands administered by the BLM TFO designated for recreational opportunities are categorized as “primitive,” “semi-primitive nonmotorized,” “semi-primitive motorized,” “roaded natural,” and “rural” (BLM 1997). The area of analysis includes 1,679 acres of lands designated as semi-primitive motorized, which have a setting characterized by an essentially unmodified natural environment with a relatively low concentration of users but often with evidence of other area users. Land use restrictions generally are limited, and OHV use is permitted (BLM 1997). The remaining 5,487 acres of the area of analysis do not have a recreational designation. While OHV use is permitted in the area of analysis, there are 1,814 acres in the area of analysis that are limited to existing roads and trails and closed to competition events, 4,227 acres that are limited to existing roads and trails, and 1,125 acres where no restrictions exist (BLM 1997). Two Special Recreation Permit holders use areas are proximal to the area of analysis: (1) Zero1 Offroad leads OHV tours on Cave Springs Road; and (2) an annual OHV event, the Rebelle Rally, used Cave Springs Road as a route in 2018.

Within the OPA, both sides of Cave Springs Road are classified as LWCs including LWC338 to the south and LWC328 to the north, totaling 4,922 acres. LWC327 is within the Access Road and Infrastructure Corridor and overlaps 32 acres of the corridor on the north side of the access road. Per BLM Manual 6320, these three LWCs were determined to possess wilderness characteristics, be of manageable size, and provide opportunity for solitude and primitive recreation.

There are two named hot springs near the area of analysis including: Fish Lake Valley Hot Springs; and Silver Peak Hot Springs. Fish Lake Valley Hot Springs is the closest hot springs to the area of analysis, located immediately north of the Access Road and Infrastructure Corridor and approximately four miles to the west of the OPA. Silver Peak Hot Springs is located approximately 12 miles east of the area of analysis near the town of Silver Peak. There are no state parks or designated wilderness areas in the area of analysis. The Silver Peak WSA is located approximately 1,200 feet south of the area of analysis. There are two Recreation Management Areas (RMAs) including the Sump Extensive RMA (located approximately five air miles north of the area of analysis) and Clayton Valley Sand Dunes Special RMA (located approximately 15 air miles southeast of the area of analysis).

The area of analysis is within NDOW Hunt Unit 211 and offers hunting opportunities for mule deer, desert bighorn sheep, pronghorn (*Antilocapra americana*), and upland game birds, such as chukar (*Alectoris chukar*).

3.10 Social and Economic Values

The area of analysis for social and economic values includes Esmeralda, Nye, and Mineral counties in Nevada and Inyo County in California (**Figure 3-4**). Esmeralda County had a population of 729 people in 2020, a decrease of 6.9 percent from 2010. Nye County had an estimated population of 51,591 people in

2020, approximately 86 percent of which live in Pahrump. Nye County grew by approximately 17 percent between 2010 and 2020. Tonopah, which is the largest community near the Project, had a population of 1,942 people in 2020, a decrease of 19 percent from 2010. Mineral County had a population of 4,554 in 2020, a decrease of 4.6 percent from 2010. Inyo County had a population of 19,016 people, an increase of 2.5 percent from 2010. However, the population of Bishop decreased by approximately 1.6 percent over the same period. The four counties in the area of analysis have similar demographics as the non-metro Nevada population. Demographics in Nye and Inyo counties are driven by a higher percentage of multiracial individuals and individuals in the 'Some Other Race' category similar to the Nevada non-metro population. Mineral County's diversity is primarily driven by a large Native American population (15.6 percent). Inyo County also has a large Hispanic or Latino population of 23 percent of residents (USCB 2020).

Average weekly mining wages and salaries are among the highest for any industry in the Nevada non-metro counties, with an average weekly wage ranging from $693 for Lincoln County to $2,235 for Elko County in the fourth quarter of 2021. Wages in the natural resources and mining sector were higher than other sectors in Nye and Mineral counties. In Nye County, wages in the professional and business services sector were higher than other sectors, with average weekly wages of $1,895 and in Inyo County the construction sector had the highest average weekly wages of $1,484. The exception in Nye County is likely due to the economic activity in the southern portion of the county in and around Pahrump, located in the southern portion of Nye County 60 miles west of Las Vegas and approximately 180 miles southeast of the OPA. Pahrump is the largest population center and Tonopah is the county seat. Within the area of analysis, Inyo County has the highest per capita personal income ($60,124), followed by Esmeralda County ($47,507), Mineral County ($47,029), and Nye County ($39,534) (USBEA 2020). Since 2000, per capita incomes in the area of analysis increased by 27.4 percent. In the Nevada non-metro counties, per capita income increased during the same period by a range of 53 percent to 83 percent, in Pershing County and Douglas County, respectively. At the same time, average earnings per job increased overall in the area of analysis from $53,756 in 2000 to $67,568 in 2020 (Headwaters Economics 2020). Individual counties in the area of analysis and Nevada as a whole each saw growth in the average earnings per job from 2000 to 2020 except for Esmeralda County, which saw a decrease of 13.2 percent (Headwaters Economics 2022).

The median household income for the Nevada non-metro counties ranged from $31,500 in Mineral County to $79,375 in Elko County in 2020. The median household income for Nye ($47,308), Esmeralda ($31,845), and Mineral ($31,500) counties ranked 15th, 16th, and 17th of 17 counties in Nevada, respectively. Inyo County's estimated median household income was $59,296 (USCB 2020).

As of November 2022, the combined labor force in the three Nevada counties is estimated at 19,819, approximately 18,687 of whom are employed. The remaining 1,132 unemployed individuals represent a 5.7 percent unemployment rate (NDETR 2022). As of November 2022, the labor force in Inyo County is estimated at 8,260, approximately 7,980 of whom are employed. The remaining 280 unemployed individuals represent a 3.3 percent unemployment rate (CEDD 2022). The three combined Nevada counties unemployment rate is greater than both the 4.9 percent statewide unemployment rate and the 3.7 percent national rate (seasonally adjusted data); the Inyo County unemployment rate is lower than both the state of Nevada and national unemployment rates (NDETR 2022). Estimates for the individual county unemployment rates in November 2022 were estimated at 3.6 percent for Esmeralda County, 3.8 percent for Mineral County, 6.0 percent for Nye County (NDETR 2022), and 3.3 percent for Inyo County (CEDD 2022). The four counties combined natural resources and mining sector employment comprises approximately 11.2 percent (1,863 jobs) of the total Nevada non-metro county employment in that sector, a large majority of which is devoted to metal mining in the State. This sector includes the sub-categories of agriculture, forestry, fishing, and hunting, in addition to mining, quarrying, and oil and gas extraction.

The majority of housing units in the area of analysis are located in Nye County with 24,793 units followed by Inyo County with 9,457 units, Mineral County with 2,367 units, and Esmeralda County with 768 units. U.S. Census Bureau American Community Survey estimates for 2021 reported that the town of Tonopah had 1,475 units in Nye County. Vacancy rates for both rental and homeowner units combined were highest in Esmeralda County at 37 percent (approximately 284 units) and Mineral County at 26.6 percent (approximately 630 units). However, overall vacancy rates for rental units was lower than overall total vacant housing units being approximately 12.7 percent vacancy for Esmeralda County and approximately 4.7 percent for Mineral County. The town of Tonopah had approximately 410 vacant housing (homeowner

and rental) units with a rental unit vacancy rate of approximately 4.9 percent; Hawthorne had approximately 391 vacant housing units with a rental unit vacancy rate of approximately 12.0 percent; Bishop had approximately 190 vacant housing units with a rental vacancy rate of 3.4 percent. Overall vacancy rates for rental housing in the area of analysis is limited. Actual vacancy rates vary as this data is based on a sample. There is some short-term housing available in Tonopah, which has 12 hotels/motels and recreational vehicle (RV) spaces with over 400 rooms and 50 RV spaces. Goldfield has one hotel with nine rooms and an RV park with 20 units. Dyer also has an RV park with 23 units as well as three cabins. Hawthorne has three hotels with a combined 180 rooms and an RV park with 19 units. Bishop has 36 hotels/motels of which a survey of nine of these had a combined total of 580 rooms (NewFields 2019b).

In Esmeralda County, most of Fish Lake Valley residents rely on private wells for water. Goldfield and Silver Peak rely on community water supply systems. Nye County, Mineral County, and Inyo County have municipal water systems that serve their communities. Per the Esmeralda County Master Plan, "any significant increase in population will further reduce the limited water resources and impose additional burdens on the county taxpayers to provide new or expanded services by the county" (Esmeralda County 2011). Much of the wastewater generated in the area of analysis is treated and disposed of in private on-site septic tanks and drain fields. Goldfield (Esmeralda County), Tonopah (Nye County), Hawthorne (Mineral County), and Bishop (Inyo County) have community wastewater treatment systems. Landfills are located in all four counties within the area of analysis (NewFields 2019b). Waste from Fish Lake Valley and Silver Peak are transferred from drop box locations to the municipal landfill in Goldfield (Esmeralda County 2006).

Sheriff offices are located in Goldfield (Esmeralda County) (approximately 90 minutes from the Project); Tonopah (approximately 80 minutes from the Project), Beatty (approximately 130 minutes from the Project), and Pahrump (approximately 210 minutes from the Project) (Nye County); Hawthorne (approximately 115 minutes from the Project) (Mineral County); and Bishop (approximately 140 minutes from the Project) (Inyo County). The Nevada Highway Patrol has a substation in Tonopah. Crime in the area of analysis was lower as compared to Nevada's crime rates. The jail in Goldfield has been identified as needing potential improvements due to outdated design. Some concerns include lacking sufficient medical care, access to legal materials, inmate safety, understaffing, and separation of inmates of different genders (Esmeralda County 2012). Esmeralda County commissioned an engineering cost study in 2013 to assess costs for construction of a new jail. At that time, the cost of the new jail construction was $6,500,000 (approximately $10,777,000 in 2024 with inflation) (Boland 2024). The BLM, NDF, and California Department of Forestry and Fire Protection have the primary responsibility for fighting wildfires on public lands. Local volunteer fire departments are in Dyer, Tonopah, Goldfield, Bishop, Silver Peak, and Hawthorne, as well as other various locations. Departments are staffed by volunteers who provide fire suppression and emergency medical services and either provide ambulance service or work with other ground and air ambulance services and hospitals. Closest to the Plan boundary, the Fish Lake Valley Fire Protection District (Esmeralda County) is a volunteer fire department based out of Dyer. The fire barn is 16.4 miles from the junction of the Project access road and SR 264. The community of Dyer has an ambulance service and coordinator. The ambulance barn is located approximately 11 miles from the junction of the Project access road and SR 264. Residents in the Dyer area generally receive emergency medical services in the hospital in Bishop, while those in Silver Peak, Tonopah, or Goldfield go to the emergency room in Hawthorne (BLM 2024l).

There are no medical facilities in Esmeralda County, thus sick or injured persons are typically transported to a medical facility in Bishop, Hawthorne, or Tonopah. The medical care in Tonopah is Frontier Medical Group, LLC (urgent care clinic) and Tonopah Primary Care, LLC (family medicine). Critical emergencies would be transported to hospitals in Las Vegas (250 miles southeast of the OPA) or the hospital in Bishop (76 miles southwest of the OPA). There is one hospital in Hawthorne (109 miles northwest of the OPA) that serves Mineral County, the Mount Grant General Hospital (BLM 2024l).

Schools closest to the Plan boundary are located in Tonopah, Goldfield, Dyer, Silver Peak, Hawthorne, and Bishop. Students in Goldfield, Dyer, and Silver Peak attend kindergarten through eighth grade locally and commute to Tonopah for high school. Students in all other towns attend kindergarten through high school in their respective communities. For pre-school through high school 2020 enrollment, Esmeralda County had approximately 110 students enrolled, Mineral County had approximately 626 enrolled (313 enrolled in Hawthorne), Nye County had approximately 5,449 enrolled (164 enrolled in Tonopah), and Inyo County

had approximately 3,241 enrolled (650 enrolled in Bishop). Per pupil expenditure for the 2021-2022 school year was $29,329.08 total in Esmeralda County ($26,306.01 state/local spending), $15,781.34 total in Mineral County ($14,199.81 in state/local spending), and $12,855.57 total in Nye County ($11,970.83 in state/local spending) (BLM 2024l). The percentage of persons that attained a high school degree ranged from 37.6 percent in Mineral County to 27 percent in Esmeralda County. Completion of a bachelor's degree was highest in Inyo County (16.4 percent) and lowest in Nye County (7.5 percent). Student to teacher ratios in Esmeralda County (9:1) and Mineral County (19:1) are lower than the State average of 20:1, while Nye County is equal at 20:1. Student to teacher ratios for 2021 for Inyo County were not available (BLM 2024l).

Local government entities that would be most closely associated with the Project are Esmeralda and Nye counties. Esmeralda County operates a Board of Commissioners that represent three districts and oversees the county, as well as the communities of Dyer, Silver Peak, and Goldfield. Nye County operates with a five-member Board of Commissioners and a full-time county manager in Tonopah. Tonopah is governed by the Tonopah Town Board, a five-member town board and a full-time town manager (Nye County 2022a, 2022b). Mineral County has a three-member Board of Commissioners and a Public Administrator in Hawthorne. Inyo County operates with a five-member Board of Supervisors charged with representing both the interests of their individual districts and those of the county as a whole (Inyo County 2022). The city of Bishop in Inyo County is governed by a five-member City Council and includes a mayor (BLM 2024l).

Esmeralda, Nye, and Mineral counties approved operating deficit budgets for 2021 expecting that annual revenues would fall short of annual expenses (Esmeralda County 2021; Nye County 2021; Mineral County 2021; Inyo County 2021). The net proceeds of the minerals tax rate are dependent on the ratio of the net proceeds of a mining operation to the gross proceeds, with a maximum tax rate of five percent and a minimum tax rate of two percent. Local government finance in Nevada is an admixture of locally derived and state-shared revenues. Local revenues primarily are derived from ad valorem property taxes on real and personal property (e.g., business equipment, agricultural equipment, etc.), and the net proceeds of mines in the jurisdiction. Local governments also collect revenues from fines, licenses and permits, and fees for services. State-shared revenues include sales, motor vehicle, fuel, and gaming taxes. State revenue sharing aims to help address economic disparities between the urban centers of Reno and Las Vegas and the rural agricultural and mining communities. Expenditure lines with the most spending allocated are public safety, public work, and government employee wages and services (BLM 2024l).

The area of analysis can be described as rural with large tracks of public lands that provide economic resources for mining, ranching, and energy development, as well as for recreation and tourism. The large amount of public open space contributes to the area's quality of life for residents. Seven groups were identified with interest in the management of public lands in portions of Esmeralda and Nye counties including ranchers and livestock grazing permittees, neighboring private landowners, minerals and oil and gas leaseholders, renewable energy leaseholders, ROW holders, recreation users, and resource protectionists (BLM 2011). The resident population ranges from "multigenerational families to seasonal retirees and weekend tourists to temporary residents that (sic) work in the agricultural and mining industry. Regardless of their longevity to the region, most residents have a strong connection to public lands that surround and encompass their community and view them as playing a significant role in their personal quality of life. For residents, these lands provide economic opportunities, recreation, open space, a connection to the western historic landscape, and other intangible benefits" (BLM 2011). Social issues related to the management of public lands include the continuing importance of mining and agriculture plus the potential for renewable energy development. Included among the social issues is the potential need for local culture and infrastructure to adapt, which "may be essential to accommodating more retirees and tourists" (BLM 2011).

3.11 Soil Resources

The area of analysis for soil resources is the Plan boundary (**Figure 3-1**). The area of analysis is within Major Land Resource Area 29 Southern Nevada Basin and Range in the Great Basin section of the Basin and Range province of the Intermontane Plateaus. The area's basins are bordered by sloping fans and terraces. Its mountains are uplifted fault blocks with steep side slopes. Most of the valleys in this Major Land Resource Area are closed basins containing sinks or playa lakes. The soils dominantly have a mesic temperature regime, an aridic or xeric moisture regime, and mixed mineralogy. They generally are very

shallow to very deep, well drained or somewhat excessively drained, and loamy-skeletal or sandy-skeletal (NRCS 2022a).

The OPA is in the Silver Peak Range, which is characterized by rugged mountains, rolling foothills, deep ravines, canyons, and dry washes. The Access Road and Infrastructure Corridor is located within an endorheic valley with a dry salt pan lake in the center, flanked by broad alluvial fans. These areas are dry with few springs and one perennial stream, Chiatovich Creek, in the vicinity. An ephemeral drainage referred to as Cave Springs wash is within the OPA. Water from this drainage originates from seasonal stormwater and snowmelt from the Silver Peak Range, which flows toward Fish Lake Valley and eventually evaporates from or infiltrates the dry salt pan lake (BLM 2024m).

There are 25 soil map units in the Plan boundary including: Blacktop-Rock Outcrop-Pintwater association; Blacktop-Rodad-Theriot association; Zadvar-Veet-Lyda association; Stewval-Downeyville-Rock Outcrop association; Stewval-Pintwater-Rock Outcrop association; Stewval-Bellehelen-Rock Outcrop association; Stewval-Bellehelen-Gabbvally association; Roic-Advokay-Blacktop association; Wardenot-Izo association; Wardenot-Stonell-Roic association; Stonell-Wardenot-Izo association (moist); Penelas-Weepah association; Penelas-Slatery-Rock Outcrop association; Lyda-Ardivey-Izo association; Gynelle-Cirac association; Gynelle-Oricto association, alkali; Zaba-Gynelle association; Zaba-Yomba-Slaw association; Rustigate-Kawich-Cirac association; Slaws-Playa complex; Slaw-Kawich-Nuyobe association; Cirac-Luning association; Cirac-Rustigate-Settlement association; Cirac-Kawich association; and Luning-Sodaspring association (NRCS 2022b).

Soils within the OPA are formed in place within residuum, and within colluvium and alluvium derived from limestone, mixed, sedimentary, and volcanic rocks. Landforms include drainageways, inset fans, fan remnants, hillsides, hills, mesas, piedmonts, playas, dunes, alluvial flats, and mountainsides. Soil profiles consist of deep, coarse-textured, gravelly soils; deep and shallow fine grained sandy, silty, loamy, and clayey soils over bedrock or cemented pan; and shallow, coarse-textured soils over weathered and unweathered bedrock (NRCS 2022b).

Soils within the Access Road and Infrastructure Corridor are formed in place from alluvium or lacustrine deposits or formed in eolian sands. Landforms include fan skirts, alluvial flats, lake plains, sand dunes, sand sheets, and playas. Soil profiles consist of deep gravelly, sandy, or loamy surfaces; deep, gravelly, sandy, and fine grained loamy for clayey subsoils; and silty loam, cemented pan, silty clay, bedrock, and gravelly sand bases (NRCS 2022b).

Biocrusts were not mapped during baseline surveys in the area of analysis; however, they likely occur. Hydric soils were identified in the Cirac-Rustigate-Settlement association which occurs on 31 acres in the Access Road and Infrastructure Corridor near SR 264. There are no soil map units classified as prime or unique farmland in the area of analysis. There are five map units classified as farmland of statewide importance which occur on 305 acres in the lower elevations of the Access Road and Infrastructure Corridor (BLM 2024m). Additionally, soils can contain bacteria and fungi that can cause lung diseases. Valley Fever is a lung infection caused by a fungus that has the potential to exist in the area of analysis and can affect humans from breathing in dust containing the fungus (CDC 2024).

3.12 Threatened and Endangered Species

The area of analysis for BSSG and monarch butterfly is the Plan boundary and the one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour (**Figure 3-1**). The area of analysis for Tiehm's buckwheat is the Plan boundary, including a 100-foot buffer for the access road (i.e., Hot Ditch Road and Cave Springs Road), and a 50-foot buffer of the portion of SR 264 within the Plan boundary. In addition, the area of analysis includes the predicted 10-foot groundwater drawdown contour associated with dewatering and groundwater pumping. This area of analysis encompasses all subpopulations of Tiehm's buckwheat, and Tiehm's buckwheat designated critical habitat (**Figure 3-1**).

3.12.1 Bi-State Sage-Grouse

In 2013, the USFWS proposed to list the BSSG as threatened under the ESA and designate 1.8 million acres of critical habitat. In 2015, USFWS determined that the BSSG was no longer warranted for listing

under the ESA. In 2018, the decision was challenged in federal court and BSSG was again considered for listing. In 2020, USFWS concluded that BSSG was no longer warranted for listing under the ESA because of the successful implementation of habitat conservation actions (USFWS 2020a). On May 16, 2022, the U.S. District Court for the Northern District of California overturned the 2020 decision. As a result, the 2013 proposed threatened status was reinstated and 1.8 million acres again considered proposed critical habitat. The USFWS will issue a new final listing decision.

The area of analysis is within the White Mountain population management unit (PMU) (Bi-State Action Plan 2012). Approximately 1,284 acres of proposed critical habitat for BSSG occurs within the area of analysis (**Figure 3-5**); however, no BSSG proposed critical habitat occurs in the Plan boundary (EM Strategies 2020a, 2020b, 2022a; NDOW 2020a, 2020b; USFWS 2013). There are approximately 400 acres of general BSSG habitat 2.1 miles north of the OPA, of which, 205 acres occurs within the area of analysis and 584 acres of general BSSG habitat 2.4 miles east of the OPA, of which, 125 acres occurs within the area of analysis (EM Strategies 2022a). Another area of general BSSG habitat is found 2.8 miles west of the Access Road and Infrastructure Corridor on the west side of SR 264 (EM Strategies 2020b; USFWS 2013).

No leks have been documented in the vicinity (four-mile radius) of the Plan boundary (EM Strategies 2020b, 2020c; NDOW 2020a, 2020b, 2022). A single BSSG was observed in the western portion of the OPA during 2022 baseline surveys (EM Strategies 2022a).

The BSSG area of analysis contains some of the habitat elements necessary for seasonal habitat for the species, including big sagebrush (*Artemisia tridentata*) dominated communities with perennial grasses and forbs (EM Strategies 2020b). Approximately, 16,222 acres of Great Basin Xeric Mixed Sagebrush Shrubland and Inter-Mountain Basins Big Sagebrush Shrubland are within the area of analysis (EM Strategies 2020b). However, wet meadow vegetation communities were not observed in the Plan boundary during baseline surveys. Thirty-two spring sites occur within the area of analysis. There is one spring located within the proposed critical habitat east of the OPA. This spring is inside the area of analysis and the maximum extent of the predicted 10-foot drawdown area.

3.12.2 Monarch Butterfly

The monarch butterfly is a federal Candidate species. In 2020, USFWS published a 12-month finding in which a determination was made that the species was warranted for listing under the ESA but precluded by work on higher priority listing actions and final listing determinations (USFWS 2020b). In May 2022, the USFWS published a Candidate Notice of Review in which the monarch butterfly was still classified as warranted for listing but precluded by work on higher priority actions (USFWS 2022b).

Adult females lay eggs on milkweed species, which the caterpillars rely upon for energy to derive protective toxins as individuals develop. Once an egg is laid, the development to adulthood lasts approximately 30 days. During the spring and summer, adult monarch butterflies spend their two-to-six-week lifespan mating and nectaring on flowers. Multiple generations are produced during this time, with the final fall generation migrating to overwintering sites and living for six to nine months (Jepson et al. 2015). Monarch butterflies require a diversity of blooming nectar resources within their breeding grounds and along their migration routes (USFWS 2020c). Data from monarch butterflies tagged in the southwestern states in the fall suggest that those in Nevada migrate to California to overwinter (Southwest Monarch Study 2023).

Desert milkweed (*Asclepias erosa*) was observed in several drainage areas throughout the western portions of the OPA and in the Access Road and Infrastructure Corridor. Milkweed in general are host plants for the monarch butterfly. Approximately 163 individual desert milkweed plants were observed, and no monarch butterflies were observed during baseline surveys (EM Strategies 2022a). Although monarch butterflies have been reported in the general vicinity of the Silver Peak Range, there have been no sightings reported in the monarch butterfly area of analysis.

3.12.3 Tiehm's Buckwheat

On October 7, 2019, the USFWS received a petition to list Tiehm's buckwheat under the ESA as an endangered or threatened species and to concurrently designate critical habitat. On June 4, 2021, the USFWS announced its 12-month finding that the petitioned action to list Tiehm's buckwheat was warranted.

On October 7, 2021, the USFWS issued a proposed rule to list Tiehm's buckwheat as endangered under the ESA. On February 3, 2022, the USFWS issued a proposed rule for Tiehm's buckwheat critical habitat, which encompasses a 500-meter area around species subpopulations. On December 16, 2022, USFWS published a final rule listing Tiehm's buckwheat as an endangered species and designating 910 acres of critical habitat, effective January 17, 2023 (USFWS 2022a). The NDF received a petition to add Tiehm's buckwheat to the State list of fully protected species of native flora in NAC 527.010, also on October 7, 2019. NDF is currently reviewing the species for listing under their regulations.

Tiehm's buckwheat is a narrow-ranging endemic plant known from only one population, comprising eight subpopulations, in the Rhyolite Ridge area of the Silver Peak Range in Esmeralda County (**Figure 3-6**). The single population is restricted to approximately 10 acres across a three-square-mile area, located entirely on public lands administered by BLM (USFWS 2022a). A habitat suitability model was developed to assist in identifying potential suitable habitat for additional populations (Ioneer 2020). Two new subpopulations, subpopulation 7 and 8, were identified in 2019 (EM Strategies 2020b). No additional populations were found within the ten-mile radius of the existing population (Ioneer 2020). In September 2020, an herbivory event from white-tailed antelope ground squirrels (*Ammospermophilus leucurus*) was reported in subpopulations 1 through 6 (Grant 2020; EM Strategies 2020d). Over 60 percent of the plants in subpopulations 1, 2, 3, 4, and 6, were damaged or killed from herbivory (EM Strategies 2020c). **Table 3-3** shows the population data and area occupied by Tiehm's buckwheat during 2021 and 2023 censuses. Based on the 2021 and 2023 population counts, there are a total of 15,757 plants and 24,916 plants on 9.98 acres, respectively (USFWS 2022a; Fraga 2021; EM Strategies 2020a; WestLand 2024b). The number of plants has increased between 2021 and 2023 in all subpopulations, which indicates that the population is recovering from the 2020 herbivory event. Surveys of Tiehm's buckwheat conducted between 1994 and 2010 did not document any occurrences of non-native, invasive species in its habitat (USFWS 2022a). The non-native, invasive species saltlover (*Halogeton glomerata*) has since become established in all subpopulations of Tiehm's buckwheat with relative cover ranging from 1.4 to 21.3 percent (WestLand 2021). Prickly Russian thistle (*Salsola tragus*) was documented within subpopulation 6 in 2021, with total cover estimated to be between one to five percent. In addition, a small population of tumbleweed (Amaranthus albus) was observed near subpopulations 1 and 2, with total cover estimated less than one percent (Fraga 2021; USFWS 2022c).

Table 3-3 Population and Area Occupied by Tiehm's Buckwheat

Subpopulation	2021 Direct Count of Tiehm's Buckwheat Plants[1,2]	2023 Direct Count of Tiehm's Buckwheat Plants[3]	Area Occupied by Tiehm's Buckwheat (acres)[3]
1	4,420	5,600	4.81
2	1,719	4,190	1.56
3	1,165	1,943	0.63
4	649	1,888	1.04
5	3	31	0.05
6a	7,787	7,784	1.22
6b		3,476	0.66
7	14	Count for Subpopulation 6a includes Subpopulation 7	0.01
8	No Data	4	<0.001
Total	**15,757**	**24,916**	**9.98**

Sources [1] USFWS 2022a; [2] Fraga 2021; [3] WestLand 2024b

Tiehm's buckwheat appear to be primarily dependent on occasional precipitation for its moisture supply (Morefield 1995). Research has shown Tiehm's buckwheat to be a soil specialist or edaphic endemic specifically adapted to grow on its preferred soil type (USFWS 2022c). WestLand (2023b) describes other research that shows potential overlap in soil chemistry between occupied and unoccupied sites; therefore, soil chemistry is likely not the only ecological feature distinguishing occupied and unoccupied sites. Surveys have been conducted since 1994 to understand the extent of occupied habitat. A habitat suitability model was developed to assist in identifying potential suitable habitats to help focus survey work for additional populations (Ioneer 2020). Surveys were conducted in 2018 and 2019 to confirm the status of known

populations, measure occupied areas, and identify any possible new populations. The 2018 survey verified the known six subpopulations. The 2019 survey located two new subpopulations: subpopulation 7 included 50 individuals; and subpopulation 8 included one individual (EM Strategies 2020a). The 2023 census confirmed four individuals in subpopulation 8 (WestLand 2024b*)*. No additional populations were found within the ten-mile radius of the existing population (Ioneer 2020).

Additional information was collected in 2019 to assess the viability of the population. Results from this effort indicated a stable demographic structure across the species and that recruitment is occurring in all subpopulations. Tiehm's buckwheat seeds were collected and sent to the Nevada Department of Agriculture for testing and were found to be 16 percent viable, which is slightly lower than an average 20 percent for native buckwheat. Leaf tissue samples were taken for genetic analysis. Genetic analysis confirmed Tiehm's buckwheat is a distinct species and is most genetically similar to Shockley's buckwheat (*Eriogonum shockleyi* var. *shockleyi*) (EM Strategies 2020a).

Pollinator interactions with Tiehm's buckwheat were studied in 2020 within and outside of occupied Tiehm's buckwheat habitat (McClinton et al. 2020). Similar overall abundance and diversity was found between site types. In 2022, sampling was conducted with specimens collected within and outside of Tiehm's buckwheat population areas. Species richness did not differ between site types; however, diversity was found to be greater in Tiehm's buckwheat sites than surrounding areas (WestLand 2023b). Scientific information does not indicate any specialist pollinators of Tiehm's buckwheat (USFWS 2022a). Tiehm's buckwheat contributes to arthropod abundance and diversity because Tiehm's buckwheat is the dominant insect-pollinated plant species in its habitat where it occurs. In 2022, the Hill-Shannon and Hill-Simpson diversity indices were found to be higher within the Tiehm's buckwheat populations areas indicating potential pollinator community in the Tiehm's buckwheat population is composed of species that are rarer, on average, than species in the surrounding area (WestLand 2023b). An abundant insect pollinator community is important for Tiehm's buckwheat for seed production and maintaining the species, as it was found that seed production significantly increased when Tiehm's buckwheat plants were exposed to insect pollinators (McClinton et al. 2020; McClinton et al. 2022; USFWS 2022b). Overall, based on the sampling survey conducted in 2022 (WestLand 2023b, 2024b), pollinator communities within designated critical habitat had a median Sørensen dissimilarity index of 0.59, which equates to 41 percent shared species. Across all subpopulations there was a minimum of 0.44 and a maximum of 0.80 Sørensen dissimilarity in the species community composition between a Tiehm's buckwheat subpopulation and another survey location. These differences between sample locations were driven mostly by species turnover. Dissimilarity of pollinators observed between Tiehm's buckwheat subpopulations and critical habitat using the Bray-Curtis index, which considers species composition and abundance, ranged from 0.27 to 0.94, with an overall median of 0.62 (WestLand 2024b).

3.13 Transportation and Access

The area of analysis for transportation and access is the Plan boundary and the main transportation routes and access roads on which materials would be transported (**Figure 3-4**). These routes are described as: From Rhyolite Ridge north on SR 264 to SR 773, then east on US 6, then northeast on US 95 to Fallon, then northwest on US 50A to Fernley, then continuing west on I-80 to Reno; and from Rhyolite Ridge south and east on SR 264/266 through Dyer, Oasis, and Lida, then southeast on US 95 to Beatty, and continuing southeast on US 95 to Las Vegas.

Public access to the OPA from US 6, a two-lane arterial highway that provides the east-west connection between US 95 in Nevada and US 395 in California, is to turn south onto SR 264 or SR 773. US 6, SR 264, and SR 773 are paved roads. Continue traveling southward on SR 773 to SR 264 or continue traveling southward on SR 264 for approximately 13 miles to the intersection with Hot Ditch Road. Hot Ditch Road is the beginning of the access road and continues for eight miles before becoming Cave Springs Road. Continue on Cave Springs Road for five miles until the OPA is reached. The access road is unpaved from SR 264 through the OPA. The access road crosses BLM-managed land and is currently maintained by Esmeralda County under a Title V ROW grant (case NVN-062084) (BLM 1976a). The ROW extends through the OPA and on to Silver Peak. A separate ROW grant has also been issued to Mineral Ridge Mine coincident with Cave Springs Road from the Mineral Ridge Mine operations on Coyote Summit to SR 264. This ROW passes through the OPA and includes the access road (case NVN-060661) (BLM 1976b).

Esmeralda County maintains the Hot Ditch Road and Cave Springs Road and conducts regular maintenance and repair to keep the unpaved roads open. Precipitation or snowmelt events can cause certain segments to wash out, resulting in both erosion and deposition. Historically, this has required grading and rerouting of portions of the roads to maintain public access. NDOT maintains SR 264 (Category 5 Major Collector) and U.S. 6 at the junction with SR 264 (Category 4 Minor Arterial).

Based on 2021 data, highway traffic in the area of analysis has been steadily increasing for the last 15 years. Traffic levels in the immediate vicinity of the Project are the lowest in the area of analysis. Average annual daily traffic (AADT) counts on U.S. 6 west of the intersection with SR 264 recorded 520 vehicles and 470 vehicles were recorded on U.S. 6 east of the intersection with SR 264. On SR 264, the AADT count was 220 vehicles (NDOT 2022). County-wide traffic safety data indicate that crash rates range from 54.9 crashes per 100 million vehicle miles traveled in Esmeralda County to 203.4 crashes per 100 million vehicle miles traveled in Storey County. In general, counties with urban areas and higher populations have a higher crash rate than those counties that are primarily rural (NDOT 2021; CalTrans 2020).

Manual traffic counts were taken in 2019 at four locations along the access road between October 6 and 12, 2019 (NewFields 2020a). Traffic through the OPA on Cave Springs Road ranged from approximately 14 vehicles per day on weekdays to 23 vehicles per day on weekends. On Hot Ditch Road, the traffic volume was 37 vehicles per day on weekdays and 50 vehicles per day on the weekend, likely due to recreational visits to the Hot Box (Fish Lake Valley Hot Springs), hunting, and off highway vehicle use. These traffic counts include 12 to 14 vehicles per day (weekday and weekend) associated with the existing authorizations and baseline data collection supporting the Project as the OPA was being accessed at the time of the traffic counts. The data collected in October 2019 provide an estimated range of traffic volumes along the access road; however, average daily traffic can vary substantially along rural roads such as the Hot Ditch Road and Cave Springs Road, with holiday weekends in particular seeing a substantial increase in recreational-related traffic associated with the use of Fish Lake Valley Hot Springs and the general area (e.g., camping, and as a staging area for OHV use) (NewFields 2020a). The traffic from the authorized, but not currently operational, Mineral Ridge Project were not included in the traffic counts. Once operational, Mineral Ridge Mine traffic would use the Cave Springs Road through the OPA for access to the Mineral Ridge Mine for truck traffic and light vehicles would utilize Coyote Road (BLM 2014). When operational, the Mineral Ridge Mine estimates 16 to 18 commuter vehicles (for two operating shifts), and two to four semi tractor-trailers for freight and chemical delivery and product shipment, for a total daily average (round-trip) traffic count of 40 vehicles per day, seven days per week (NewFields 2020a).

3.14 Vegetation Resources

The area of analysis for vegetation resources is the Plan boundary and one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour (**Figure 3-1**).

A total of 19 United States Geological Survey National Southwest Regional Gap Analysis Project vegetation communities occur in the area of analysis (EM Strategies 2020b, 2020c, 2022a; USGS 2005). Five vegetation communities comprise 96 percent of the area of analysis: Inter-Mountain Basins Mixed Salt Desert Scrub (17,076 acres); Great Basin Pinyon-Juniper Woodland (16,506 acres); Great Basin Xeric Mixed Sagebrush Shrubland (15,266 acres); Inter-Mountain Basins Cliff and Canyon (3,281 acres); and agriculture (1,941 acres). There are 20 ecological sites within the area of analysis. The dominant ecological sites include shallow calcareous loam 8-12” P.Z. (11,559 acres); shallow calcareous slope 8-12” P.Z. (10,350 acres); loamy 5-8 P.Z. (6,057 acres); loamy slope 3-5” P.Z. (5,177 acres); and cobbly loam 5-8” P.Z. (5,090 acres). These five ecological sites comprise 68 percent of the area of analysis.

One noxious weed, saltcedar (*Tamarix ramosissima*), was observed within the Access Road and Infrastructure Corridor. The following non-native species that are not considered noxious in the State of Nevada were also observed: red brome (*Bromus rubens*); cheatgrass (*Bromus tectorum*); saltlover (*Halogeton glomeratus*); prickly Russian thistle (*Salsola tragus*); bristly fiddleneck (*Amsinckia tessellata*); flixweed (*Descurainia sophia*); Russian olive (*Elaeagnus angustifolia*); yellow sweetclover (*Melilotus officinalis*); rabbitsfoot grass (*Polypogon monspeliensis*); and yellow salsify (*Tragopogon dubius*) (EM Strategies 2020b, 2020c, and 2022a).

Tiehm's buckwheat (discussed in Section 3.12.3), sagebrush cholla (*Opuntia pulchella*), and Mojave fishhook cactus were identified in the area of analysis (EM Strategies 2020b, 2022a). Candelaria blazingstar (*Mentzelia candelariae*), Tecopa birdbeak, and an additional occurrence of sagebrush cholla were identified south of the Access Road and Infrastructure Corridor (EM Strategies 2020b, 2020c). Inyo blazingstar (*Mentzelia inyoensis*) was identified as having potential to occur in the area of analysis and Sodaville milkvetch (*Astragalus lentiginosus* var. *sesquimetralis*) was identified as being present within five kilometers of the Plan boundary (NDNH 2024).

Two occurrences of sagebrush cholla were observed in the area of analysis (EM Strategies 2020c, 2022a). One was found in the southern portion of the OPA in an inset alluvial fan, at 6,581 feet AMSL, on a west-southwest aspect. The second was found south of the Access Road and Infrastructure Corridor in a gravelly wash. The location and number of individual Mojave fishhook cactus was not documented (EM Strategies 2022a). It is known to occur on rocky alluvial, often alkaline soils within Mojave Desert scrub habitats between 1,500 and 7,500 feet of elevation (FNAA 2023). The Mojave fishhook cactus was added to the BLM special status species list in November 2023 after baseline surveys were completed; therefore, species specific surveys for the Mojave fishhook cactus were not conducted, and data on population and distribution of this species within the Plan boundary is unknown. The Nevada Division of Natural Heritage reported a known population of Candelaria blazingstar approximately one mile north of the OPA. Suitable habitat includes barren gravelly and clay soils on volcanic ash deposits, scree slopes, washes, and areas recovering from disturbance. No new occurrences of the plant were found (EM Strategies 2020b, 2020c, 2022a). Inyo blazingstar suitable habitat includes washes, limestone soils, talus slopes, creosote bush scrub, Joshua tree and pinyon-juniper woodland, Clark Mountains, and mountains of northern Mojave Desert (BLM 2023c). No occurrences of the plant were found during baseline surveys (EM Strategies 2020a, 2020b, 2022). Suitable habitat for Sodaville milkvetch includes moist, open, alkaline hummocks and drainages near cool springs with saltgrass, black greasewood (*Sarcobatus vermiculatus*), and alkali sacaton (*Sporobolus airoides*) (BLM 2023c). No occurrences of the plant were found during baseline surveys (EM Strategies 2020a, 2020b, 2022).

Tecopa birdbeak is known to occur on open, moist, alkali crusted clay soils of seeps, springs, outflow drainages, and meadows at elevations between 2,100 and 4,900 feet AMSL. Potential habitat was surveyed within the Access Road and Infrastructure Corridor, but no plants were found (EM Strategies 2020c). However, Tecopa birdbeak was identified approximately 700 feet south of the access road in the wetland area created from the Fish Lake Valley Hot Springs (NDNH 2020).

A variety of plants occur in the area of analysis that are of ethnobotanical importance to native American Tribes. A study published in 1990 interviewed Southern Nevada Tribes and documented 75 plant species of cultural significance to the Tribes (Stoffle et al. 1990). Within the area of analysis, 37 plant species occur that were identified as of cultural importance to the Tribes. Singleleaf pinyon (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), narrowleaf willow (*Salix exigua*), desert bitterbrush (*Purshia glandulosa*), and skunkbush sumac (*Rhus trilobata*), were identified as some of the most important species for the Tribes.

3.15 Visual Resources

The area of analysis for visual resources is the Plan boundary and the range of possible viewpoints as seen from the KOPs associated with the Project (**Figure 3-2**).

Four KOPs were selected for the Project at locations that represent the characteristic landscape viewable by the general public at points where the general public has access (NewFields 2023). KOP 1 is located approximately 1.5 miles northwest of the OPA along Cave Springs Road. This KOP faces southeast and represents views seen by motorists heading east along the road. KOP 2 is located at the eastern edge of the OPA on Cave Springs Road, about one mile from the quarry area. This KOP faces west-northwest and represents views seen by west-bound motorists along Cave Springs Road or visitors to Cave Spring. KOP 3 is located approximately 15 road miles west of the OPA on SR 264. This KOP faces east as seen by motorists along SR 264. This KOP was selected as it represents the broad landscape views from SR 264 looking towards the area of analysis. KOP 4 is located at the Fish Lake Valley Hot Springs, known as the "Hot Box," approximately five miles northwest of the OPA. This KOP faces southeast as seen by visitors at the Hot Box, a partially developed hot springs area. This KOP was selected to represent views of the area

of analysis from a commonly visited recreation area. Visitors are noted to enjoy the panoramic views to the east and south at the hot springs area.

3.16 Water Resources

The area of analysis for water resources is the groundwater model domain (**Figure 3-3**).

3.16.1 Surface Water Resources

On the eastern margins of the White Mountains, there are mapped stream segments that contain perennial flow, principally Chiatovich Creek, Indian Creek, Leidy Creek, Perry Aiken Creek, McAfee Creek, and Cottonwood Creek. There are no perennial or intermittent streams or ponds located within the OPA. Drainages in the OPA originate in the Silver Peak Range with 131 mapped ephemeral tributaries combining to form one primary channel, Cave Springs wash, bisects the OPA and exits toward Fish Lake Valley.

Seeps and springs are surface expressions of subsurface waters (i.e., regional groundwater or localized perched groundwater). There are 73 springs within five miles of the proposed quarrying and groundwater pumping activities, of which 32 are within the one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour (NewFields 2020b; Piteau 2023b). There are seven perennial drainages, 140 ephemeral drainages, and three wetlands in proximity to the OPA. The results of the investigations concluded that all drainage features terminate prior to reaching a jurisdictional drainage; therefore, are not subject to federal jurisdiction (Stantec 2019; USACE 2020).

There are no Federal Emergency Management Agency Flood Insurance Rate Maps available to depict the flood threat extent for the Esmeralda County (NewFields 2020b). A floodplain is defined as “an area of low-lying ground adjacent to a stream or river, formed mainly of stream or river sediments and subject to flooding.” Areas in the Plan boundary are prone to wash outs, which typically occur in the vicinity of the access road. Ioneer would implement an Access Road Improvement and Maintenance Plan (NewFields 2020c), which includes strategies for managing wash out prone areas.

3.16.2 Groundwater Resources

Field investigations to characterize the hydrogeology of the OPA and its immediate vicinity were conducted to establish the baseline hydrogeologic conditions for groundwater at the Project. These investigations included drilling of 117 exploration holes, installing three test production wells, collecting readings from three monitoring wells and 12 multi-level VWP clusters (35 total VWP instruments), collecting water level measurements from the monitoring wells and piezometers, taking water quality samples from the six test wells and monitoring wells, slug and/or air lift testing of boreholes within selected geologic units, and aquifer pumping and recovery testing using production wells. Within the groundwater model boundary, there are 40 additional groundwater wells with water level data tracked by NDWR and 77 locations with static water level data reported to NDWR (HydroGeoLogica 2020b; NewFields 2020b; Piteau 2023b).

The hydrogeology consists of basement Paleozoic rocks overlain by Lower Volcanics (collectively the lower plate), plus interbedded sedimentary rocks of the Cave Spring Formation and Upper Volcanics (collectively the upper plate), Basin Fill Alluvium, and Modern Alluvium. Hydrologic testing of these hydrogeologic units included two long-term pump tests (TW-01 and TW-02) with monitoring at multiple wells, and short-term single well tests conducted in open boreholes and monitoring wells (HydroGeoLogica 2020b).

Under predevelopment conditions for Fish Lake Valley, the predominant inflow component for the groundwater system is recharge from precipitation. Under predevelopment conditions, the principal groundwater outflow component is loss of groundwater through the ET process. Under the existing conditions, subsurface outflow and consumption of groundwater by agriculture represent the principal components of groundwater outflow. The Maxey-Eakin recharge estimate for the area of analysis is 30,770 acre-feet annually with 30,000 acre-feet of recharge estimated in Fish Lake Valley, 710 acre-feet within the portion of Clayton Valley and 60 acre-feet within the portion of Big Smoky Valley included in the groundwater flow model. The perennial yield of Fish Lake Valley hydrographic basin HA 117 is estimated to be 30,000 acre-feet annually, with most of the recharge in the basin due to recharge from the White Mountains. Measured groundwater discharges via seep and spring flows in the area of analysis totaled approximately

690 gpm (1,100 acre-feet) on an annual average basis and interbasin subsurface flows from Fish Lake Valley are estimated to be 360 gpm (600 acre-feet). The remainder of the groundwater outflow is attributed to loss via the ET process from the valley alluvium, the Fish Lake, and its playa area. Conceptual agricultural pumping outflow under existing conditions, estimated from the last five years of pumping, is estimated at 29,700 acre-feet annually (Piteau 2023b).

Groundwater elevations range from approximately 8,000 feet AMSL in the mountain ridgetop areas east and south of the OPA to approximately 4,800 feet AMSL at the valley floor alluvium northwest of the OPA. The general direction for groundwater flow is southeast to northwest across the OPA. Current piezometric levels in Fish Lake Valley range from approximately 4,700 feet AMSL to approximately 4,860 feet AMSL. Piezometric levels are highest (approximately 4,820 feet AMSL) in the northwest and decline towards the north. Within HA 117, the Fish Lake Valley alluvium has experienced drawdown on the order of 20 to 200 feet over the past 50 years, attributable to groundwater pumping for agricultural usage in the basin. However, groundwater levels in the OPA have exhibited a near steady-state condition during the available monitoring period (2018-2020) except when influenced by hydrologic testing conducted to characterize the hydrogeologic units in the OPA (HydroGeoLogica 2020b).

3.16.3 Water Rights

There are 91 active water rights including 52 groundwater rights, 29 surface water rights, and 10 geothermal rights within a five mile radius of the Plan boundary. No federally reserved water rights or Public Water Reserves were identified at the time of the review of the NDWR database; however, federally reserved water rights or Public Water Reserves could be filed in the future. The water rights are utilized for stock water, power production, mining and milling, commercial supply, recreation, quasi-municipal, and domestic supply purposes with a total authorized diversion of 51,004 acre-feet annually (Piteau 2023b).

3.16.4 Water Quality

Surface Water Quality: Spring discharge generally met Nevada water quality standards with the exception of arsenic in the springs sampled nearest to the OPA, which ranged from 0.013 to 0.15 milligrams per liter (mg/L). One spring also exhibited a pH value above 9 standard units, while another spring had nitrate concentrations above the Nevada standard (Confluence 2019; HydroGeoLogica 2020a).

Groundwater Quality: Water chemistry samples collected from four wells in the OPA had relatively consistent water chemistry with neutral to alkaline pH and TDS between 250 and 550 mg/L. The dominant major ions were sodium and bicarbonate alkalinity. Arsenic concentrations in all the samples exceeded the Nevada standard for arsenic with concentrations ranging from 0.055 to 0.18 mg/L. Antimony in two wells and aluminum in two wells have been observed at concentrations above their respective Nevada standards in one individual sampling event each (HydroGeoLogica 2020a).

3.16.5 Mineralogy

The geologic units within the OPA are alluvium; Cave Spring Formation, which is a mixture of lacustrine, gritstone, carbonate/marl, high-lithium clay, lithium/boron ore searlesite, barren siltstone, marls, and silicified units; Rhyolite Ridge tuff breccia; and Silver Peak Formation. Mineralization includes lithium-only type enrichment of clay-rich layers and lithium-boron enrichment of clay-poor layers. Lithium-boron mineralization includes the mineral phase searlesite, and typically has higher silica, sodium and potassium and lower calcium and magnesium contents than zones without searlesite. Pyrite is the most common sulfide mineral present. Acid-generation from quarried materials is governed by pyrite oxidation kinetics with some or all the generated acid neutralized in situ (HydroGeoLogica 2020a).

3.16.6 Geochemical Testing

Geochemical tests evaluate the potential for overburden, post-quarrying quarry walls, ore stockpiles, and ore processing residuals to generate acidic metal-laden effluents that may impact surface water and groundwater quality. It was determined that most alluvial and bedrock overburden material is acid-neutralizing but has the potential to leach some metals and metalloids at neutral pH conditions. Approximately 20 percent of the overburden material is classified as acid-generating with acid-generation from longer-term leaching tests generally consistent with static test results. Acid leachate contains sulfate,

metals, metalloid oxyanions, and fluoride above reference values. While analyte concentrations in acidic leachate decrease over time, aluminum, iron, and manganese tend to persist above reference levels along with the acidic conditions. Prior to processing, ore materials are acid-neutralizing and have leaching characteristics similar to acid-neutralizing overburden except they yield higher concentrations of metalloid oxyanions, boron, and lithium, when leached. These higher leachate concentrations are attributable to the higher concentrations of these analytes in the ore zone. Process residuals such as spent ore and sulfide salts behave as acid-generating materials that release sulfate, sodium, magnesium, fluoride, metals, and metalloids when leached. While concentrations of acidic leachate decrease over time, sulfate, aluminum, and iron associated with the acidic conditions tend to remain above reference levels. The neutralized filter cake, which is a residual from the ore processing, behaves as an acid-neutralizing material but can release residual sulfate, fluoride, and boron when leached (HydroGeoLogica 2020a).

3.17 Wetland and Riparian Resources

The area of analysis for wetland and riparian resources is the Plan boundary and the one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour (**Figure 3-1**).

An aquatic resources survey was conducted on a portion, approximately 7,191 acres, of the area of analysis. Three wetlands were documented (Stantec 2019). Of these, one wetland, Wetland 3, occurs within a portion of the Access Road and Infrastructure Corridor, and is an emergent wetland supported by water output from the Fish Lake Valley Hot Springs. There are 0.16 acres of wetland in the area of analysis associated with Wetland 3. The remaining two are located outside of the area of analysis, south of the access road. The aquatic resources surveyed were isolated to the isolated Fish Lake Valley basin and are not regulated by the U.S. Army Corps of Engineers and Section 404 of the Federal Clean Water Act (USACE 2020).

Approximately 46,599 acres within the area of analysis were not delineated during the 2019 aquatic resources survey. Publicly available data (i.e., NWI) were used to determine wetlands that may be present in the unsurveyed area. There are 762.0 acres of riverine, 5.5 acres of freshwater forested/shrub, 5.0 acres of freshwater pond, and 1.3 acres of freshwater emergent wetlands in the area of analysis. It is likely the NWI mapping overestimates the amount of riverine wetlands since the 2019 field surveys identified all but one feature in the field surveyed portions to be ephemeral drainages. Chiatovich Creek is a perennial stream supporting riparian habitat that flows east from the White Mountains and crosses the Access Road and Infrastructure Corridor near where the access road meets SR 264. Approximately 212 feet of Chiatovich Creek is within the area of analysis with an ordinary high-water mark width of seven feet and riparian shrub community width of approximately 30 feet (Stantec 2019).

3.18 Wildlife Resources

The area of analysis for general wildlife, special status species (excluding golden eagles), and migratory birds, is the Plan boundary and the one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour (**Figure 3-1**). The area of analysis for golden eagles is the Plan boundary and the 10-mile buffer of the OPA (**Figure 3-3**).

3.18.1 General Wildlife

3.18.1.1 Aquatic Species

Potential habitat exists at surface water sites within the area of analysis. Springs within the area of analysis provide habitat for amphipods (*Hyalella* sp.), bladder snails (*Physidae* sp.), gyro snails (*Gyraulus* sp.), leeches (Haemopidae), worms (Dugesiidae), and aquatic insects including giant water bug (*Belostoma bakeri*), stoneflies (Pelocoptera), mayflies (Baetidae), predacious diving beetles (*Agabus* sp. and *Laccophilus* sp.), and water fleas (*Daphnia* sp.).

3.18.1.2 Avian Species

The area of analysis supports a multitude of avian species, such as game birds, passerines, raptors, and special status species. Thirty-seven non-special status, non-raptor avian species were observed within the area of analysis (Enviroscientists 2011; EM Strategies 2020b, 2020c, 2022a). Of these, 36 are protected

under the Migratory Bird Treaty Act. Chukar are a State of Nevada gamebird and are not protected under the Migratory Bird Treaty Act. Five non-special status raptor species have been observed in the area of analysis including Cooper's hawk (*Accipiter cooperii*), great horned owl (*Bubo virginianus*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*). The total of all avian species documented, including special status species, is 53. One small raptor nest and one common raven (*Corvus corax*) nest were observed within the OPA in 2022 and 2023, and six large raptor nests (not golden eagle) were observed within one mile of the OPA in 2023 (Ioneer 2023b).

3.18.1.3 Insect and Arachnid Species

Two insect species were observed in the western portion of the area of analysis, including the house fly (*Musca domestica*) and common checkered skipper (*Pyrgus communis*) (Enviroscientists 2011). Various species of arachnids, including tarantulas, could occur within the area of analysis. Two pollinator studies were conducted in and near Tiehm's buckwheat subpopulations. One study identified invertebrates from 14 orders, 90 families, and 177 morphospecies (McClinton et al. 2022). A morphospecies is a group of biological organisms whose members differ from all other groups in some aspect of their form and structure but are so similar among themselves that they are lumped together for the purposes of analysis. The second study identified 293 morphospecies from nine families of beetles (Coleoptera), 22 families of flies (Diptera), 21 families of bees, wasps, or ants (Hymenoptera), and eight families of butterflies and moths (Lepidoptera) (WestLand 2023b).

3.18.1.4 Mammal Species

Twenty-two non-special status mammal species have been observed in the area of analysis, or its four-mile radius (Enviroscientists 2011; EM Strategies 2020b, 2020c, 2022a; NDOW 2020a). Non-special status big game species include mule deer and pronghorn. There are 48,034 acres of year-round mule deer habitat in the area of analysis, and no mapped pronghorn habitat (NDOW 2020b). Wild horses (*Equus ferus*) and wild burros (*Equus asinus*) were observed during baseline surveys (EM Strategies 2020b, 2020c), and are discussed in the Wild Horses and Burros SER for the Rhyolite Ridge Lithium-Boron Project (BLM 2024t). Small mammal species documented include badger (*Taxidea taxus*), black-tailed jackrabbit (*Lepus californicus*), bobcat (*Lynx rufus*), chipmunk (*Tamias* sp.), chisel-toothed kangaroo rat (*Dipodomys microps*), coyote (*Canis latrans*), deer mouse (*Peromyscus maniculatus*), desert cottontail (*Sylvilagus audubonii*), gray fox (*Urocyon cinereoargenteus*), kit fox (*Vulpes macrotis*), little pocket mouse (*Perognathus longimembris*), Merriam's kangaroo rat (*Dipodomys merriami*), mountain cottontail (*Sylvilagus nuttallii*), skunk (*Mephitis* sp.), white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), and woodrat (*Neotoma* sp.).

3.18.1.5 Reptile and Amphibian Species

Fifteen reptile species were documented in area of analysis, including coachwhip (*Masticophis flagellum*), common side-blotched lizard (*Uta stansburiana*), desert horned lizard (*Phrynosoma platyrhinos*), desert whiptail (*Aspidoscelis tigris*), Great Basin collared lizard (*Crotaphytus bicinctores*), Great Basin fence lizard (*Sceloporus occidentalis* ssp*. longipes*), long-nosed leopard lizard (*Gambelia wislizenii*), panamint rattlesnake (*Crotalus stephensi*), sagebrush lizard (*Sceloporus graciosus*), southwestern speckled rattlesnake (*Crotalus mitchellii* ssp. *pyrrhus*), spiny lizard (*Sceloporus magister*), western fence lizard (*Sceloporus occidentalis*), western whiptail (*Cnemidophorus tigris*), yellow-backed spiny lizard (*Sceloporus uniformis*), and zebra-tailed lizard (*Callisaurus draconoides*) (Enviroscientists 2011; EM Strategies 2020b, 2022a; NDOW 2020a). The Fish Lake Valley toad (*Anaxyrus* sp. 2) has been documented in the wetland approximately 2,200 feet south of the Access Road and Infrastructure Corridor (NDNH 2024).

3.18.2 Special Status Species

3.18.2.1 Aquatic Species

The Fish Lake Valley tui chub has been documented approximately 2,200 feet south of the Access Road and Infrastructure Corridor portion of the area of analysis (NDNH 2020; NDNH 2024), the Fish Lake Valley pyrg has been documented approximately 1,300 feet outside the Access Road and Infrastructure Corridor of the area of analysis (NDNH 2020; NDNH 2024), and the Wong's springsnail has been documented approximately 150 feet outside the Access Road and Infrastructure Corridor of the area of analysis and at Cave Spring within the area of analysis (NDNH 2020; NDNH 2024).

3.18.2.2 Avian Species, Including Golden Eagles

Special status avian species within the area of analysis include black-throated gray warbler, Brewer's sparrow, Cassin's finch, common nighthawk, ferruginous hawk, golden eagle, loggerhead shrike, pinyon jay, and western burrowing owl (Enviroscientists 2011; EM Strategies 2020b; NDOW 2020a). Golden eagles are protected under the Bald and Golden Eagle Protection Act of 1940, as amended. BSSG are discussed in Section 3.12.1.

3.18.2.3 Insect and Arachnid Species

No special status insect or arachnid species have been identified in the area of analysis. Monarch butterfly is discussed in Section 3.12.2.

3.18.2.4 Mammal Species

Special status mammal species known to occur within the area of analysis of its four-mile radius include Botta's pocket gopher, desert kangaroo rat, pale kangaroo mouse, and desert bighorn sheep (EM Strategies 2020b, 2020c, 2022a; NDOW 2020a, 2020b). The western water shrew (*Sorex navigator*) was also identified as having potential to occur (NDNH 2024). Special status bat species in the area of analysis include Mexican free-tailed bat (*Tadarida brasiliensis*), California myotis (*Myotis californicus*), canyon bat (*Parastrellus hesperus*), hoary bat (*Lasiurus cinereus*), little brown bat (*Myotis lucifugus*), long-legged myotis (*Myotis volans*), Townsend's big-eared bat (*Corynorhinus townsendii*), and western small-footed myotis (*Myotis ciliolabrum*). In addition, a call was collected potentially from a pallid bat (*Antrozous pallidus*) or big brown bat (*Eptesicus fuscus*) during the acoustic bat surveys (EM Strategies 2020b). Silver-haired bats (*Lasionycteris noctivagans*) and spotted bats (*Euderma maculatum*) have potential to occur in the area of analysis; therefore, have been included.

3.18.2.5 Reptile and Amphibian Species

Special status amphibian species observed within the area of analysis or its vicinity include the western toad and a subspecies of the western toad, the California toad. The western toad has been observed in the wetland approximately 2,200 feet south of the access road (NDOW 2020a), and the California toad has been observed either in the area of analysis or its four-mile radius (NDOW 2020a).

3.19 Wild Horses and Burros

The area of analysis for wild horses and burros is the extent of the Silver Peak HMA and one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour (**Figure 3-2**). The Silver Peak HMA encompasses approximately 239,801 acres of public lands administered by the BLM and 2,661 acres of private land for a total of 242,462 acres. The HMA is dominated by the salt desert scrub vegetation type, which is found in the alluvial fans and lower foothills, while the sagebrush vegetation type occurs in the mountains and hills with a mixture of pinyon-juniper woodlands. Water sources in the HMA include 66 seeps and springs, five troughs from range improvement projects, and Chiatovich Creek. Of the 31 seeps and springs that were surveyed in the area of analysis, 12 were documented as dry (HydroGeoLogica 2020b); therefore, not considered reliable for wild horse or burro use.

An AML is the number of wild horses or burros that can be sustained in a designated HMA that achieves and maintains a thriving natural ecological balance in keeping with the multiple-use management concept. The AML for the Silver Peak HMA in the portion that overlaps the Magruder Mountain grazing allotment is four to six burros (BLM 2004), and zero wild horses and burros for the remaining areas in the HMA (BLM 2006). The current population estimates for the Silver Peak HMA are 16 horses and zero burros (BLM 2023d), with all horses being in excess of the zero AML and burros below the low end of the AML. The Plan boundary occurs outside of the portion of the Silver Peak HMA that overlaps the Magruder Mountain grazing allotment; therefore, any wild horses or burros observed in the Plan boundary are in excess of the zero AML for that portion of the HMA. Wild horses and evidence of grazing has been documented in the OPA (EM Strategies 2020b, 2020c).

4.0 Environmental Consequences

The Proposed Action and alternatives outlined in Chapter 2.0 may cause changes in the human environment. This document assesses and analyzes these potential changes and discloses the effects to the decision-makers and public. This process of disclosure is one of the fundamental aims of NEPA. There are many concepts and terms used when discussing impacts assessment that may not be familiar to the average reader, and these are discussed below.

Effects or impacts means changes to the human environment from the Proposed Action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the Proposed Action or alternatives, including those effects that occur at the same time and place as the Proposed Action or alternatives and may include effects that are later in time or farther removed in distance from the Proposed Action or alternatives. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic (such as the effects on employment), social, or health effects. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect would be beneficial (40 CFR 1508.1).

Intensity refers to the severity or level of magnitude of impact. Public health and safety, proximity to sensitive areas, level of controversy, unique risks, or potentially precedent-setting effects are all factors to be considered in determining intensity of effect. This document primarily uses the terms major, moderate, minor, or negligible in describing the intensity of effects.

Context means that the effect(s) of an action must be analyzed within a framework, or within physical or conceptual limits. Resource disciplines: location, type, or size of area affected (e.g., local or regional); and affected interests are all elements of context that ultimately determine significance. Both long- and short-term effects are relevant. For impact definitions specific to each resource, see **Appendix F** and the resource SERs for the Rhyolite Ridge Lithium-Boron Project (BLM 2024c through 2024u).

The impacts described below for the Proposed Action are for the implementation of the Plan as described in Section 2.1. The North and South OSF Alternative is similar to the Proposed Action, primarily differing in the location of facilities and is described in Section 2.2. The No Action Alternative is described in Section 2.3 and, if selected, the Project would not be approved and existing disturbance would be reclaimed.

4.1 Air Quality and Climate Change

4.1.1 Proposed Action

The Proposed Action activities would be a source of fugitive and point source emissions of particulate and gaseous air pollutants. Fugitive emissions would be generated by blasting, drilling, overburden and ore material handling, vehicle traffic, and wind erosion from disturbed areas. Point source emissions would be generated from the sulfuric acid plant, silos and bins, the sulfur unloading and receiving pit and acid tanks, water pumps, lab baghouse, cooling towers, dryers, start-up burner, auxiliary boiler, diesel generators, diesel emergency generator, storage tanks, conveying and crushing ore, ore processing operations, and fire-water pump. Gaseous and particulate air emissions would be emitted from operation of mobile diesel equipment. The conversion of existing agricultural wells in Fish Lake Valley from agricultural use to mining and milling may result in additional fugitive emissions from agricultural fields no longer being irrigated.

Ioneer has obtained a Class II Air Quality Operating Permit (AP 1099-4256) for the Project which authorizes the emissions from all Project-related construction and operation activities and includes annual emissions reporting requirements. Within the general provisions of the permit, or on a source-by-source basis, the NDEP air quality permit requires testing and recordkeeping, as determined by the agency. Additionally, if there are any non-compliance issues, NDEP has the ability to review each situation that may be deemed a short-term excess emissions event with documented corrective actions and procedures. Lastly, appropriate monetary violations may be issued to the facility, as applicable and depending on the violation, and modifications to a permit may be required. Ioneer would work with NDEP to update their Class II permit, including any potential increases to the megawatt production from the sulfuric acid plant.

Based on maximum estimated emissions of criteria pollutants and HAPs, the Project would be considered a Class II minor source of air pollution as defined by NDEP (NAC 445B.037). A Class II minor source is one that emits less than 100 tpy of any regulated criteria pollutant (not including fugitive and mobile source emissions), less than 25 tpy of total HAPs, and less than 10 tpy of any single HAP.

Direct annual GHG emissions generated from the Proposed Action are anticipated to be 471,425 tpy CO_2, 2.957 tpy CH_4, 0.297 tpy N_2O, and 471,589 tpy CO_2e. Direct GHG emissions are derived from three general sources which include fugitive, mobile/tailpipe, and non-fugitive. Specific fugitive emissions are derived from two sources, the vat leaching tanks and blasting. Lithium and boron would be transported from the Project domestically via truck freight and internationally via ocean freight. Ocean freight is incorporated in both Asia and Germany, each with 24,024,097 and 126,561,927 miles, respectively. Truck freight for each international site assumed 51,000 gallons consumed and 373,828 miles traveled. Domestic transportation will be routed to a Tesla Gigafactory, the midwestern United States or the southeastern United States. Aggregated total of gallons of diesel consumed via truck freight is 195,673 and miles traveled is 1,525,680. Total annual direct and indirect transportation GHG emissions are estimated to be approximately 511,259 tpy CO_2, 15.676 tpy CH_4, 1.367 tpy N_2O, and 512,060 tpy CO_2e. There is a potential for indirect reduction of GHG emissions from the use of EVs produced as a result of the material quarried and transported from the Project. The U.S. Department of Energy indicates that the Project may reduce annual gasoline consumption by approximately 145 million gallons due to EV usage (USDOE 2023). A Battery Life Cycle Analysis was performed by Argonne National Laboratory in 2010 comparing GHG emissions from lithium-ion batteries to internal combustion engine lead batteries. The analysis evaluated both lithium carbonate and lithium hydroxide batteries, which are likely to be similar to the lithium generated by the Project.

Overall GHG emissions were also determined to assess the potential future use of EVs and comparison to standard internal combustion engines using factors for gasoline combustion, average fuel economy and 12,000 miles traveled per vehicle per year. This assessment provides potential reductions in GHG emissions due to the production and use of EVs. However, the entire life cycle of battery production and EV production are unknown, so definitive GHG reduction estimates are not available.

The USEPA instituted updated methodology for determining the social cost of GHG to a discounting module that reduces the stream of potential figure net climate damages back to the year of emissions using a set of dynamic discount rates. The Proposed Action analysis applied maximum transportation-related direct and indirect GHG emissions beginning in 2024 for the expected 17 years of operation (through 2040). Estimated totals were assumed for all 17 years but converted from short tons to metric tons. The Present Value Year was set to 2024 as the expected start date of the Project and the dollar year set to 2023 (the most recent available). The social cost of GHG estimates for the Project in 2024 would range from $1,123 million to $3,194 million depending on the level of discount.

Calculated air pollutant emissions due to quarrying and processing under the Proposed Action are provided in **Table 4-1**. Dispersion modeling analyses were conducted to assess potential air quality impacts resulting from full-scale quarrying and processing. **Table 4-2** details the modeling results for the Project.

Off-site road impacts were modeled by evaluating seven most used road segments within the 50-km boundary surrounding the Project. Each segment incorporated commuter and delivery vehicle routes. These segments include Segment A: Paved travel on US 95, Segment B: Paved travel on US 95, Segment C: Paved travel US 6 and SR 773, Segment D: Paved travel US 6 and SR 264, Segment E: Paved travel SR 264, and Segment F: Unpaved travel along Project access road (Trinity 2023). Segment G: Paved travel SR 264 off-site sources were evaluated in two ways. First, all Segments A through G, except for Segment F were modeled. A portion of Segment F was excluded as it was included in the initial “onsite” sources. This analysis included all receptors that exceeded the Significant Impact Levels (SIL) for each criteria pollutant. Modeled impacts by segment were aggregated and conservatively combined with the on-site impacts irrespective of time and location (**Table 4-3**).

Table 4-1 Projected Air Emissions Due to the Proposed Action Quarrying and Processing

Emission Source	Annual Air Emissions (tpy)										
	Total PM_{30}	PM_{10}	$PM_{2.5}$	NO_X	CO	SO_2	VOC	H_2S	H_2SO_4	HAPs	CO_2e
Fugitive Emissions	2,625.08	1,181.09	173.66	3.27	76.18	0.01	0.00	0.00	0.00	0.00	420,856
Non-Fugitive Emissions	75.78	55.48	43.66	93.80	28.11	82.35	4.92	2.84	24.41	0.16	30,301
Mobile/Tailpipe Emissions	199.11	41.29	10.61	59.62	26.55	0.06	3.00	0.00	0.00	0.65	20,431
Total	**2,899.97**	**1,277.86**	**227.92**	**156.69**	**130.84**	**82.42**	**7.92**	**2.84**	**24.41**	**0.81**	**471,589**

Source: Trinity 2022a, 2023
NOx = nitrogen oxides; VOC = volatile organic compound; H_2SO_4 = sulfuric acid

Table 4-2 Proposed Action Air Modeling Results (On-site Sources)

Pollutant	Averaging Period	Modeled Concentration (µg/m³)	Background Concentration (µg/m³)	Total Concentration (µg/m³)	NAAQS (µg/m³)	NVAAQS (µg/m³)	Compliance
CO	1-hour	5,418.88	1,717	7,135.88	40,000	40,500	Yes
	8-hour	834.21	1,374	2,208.21	10,000	10,500	Yes
NO_2	1-hour[1]	172.81	OLM	172.81	188	188	Yes
	Annual[1]	69.99	-	69.99	100	100	Yes
$PM_{2.5}$	24-hour	10.89	8.0	18.89	35	35	Yes
	Annual	5.62	2.3	7.92	9[2]	12	Yes
PM_{10}	24-hour[3]	77.19/94.56	10.2	87.39/104.76	150	150	Yes
	Annual	26.27	9.0	35.27	-	50	Yes
SO_2	1-hour	146.58	7.9	154.48	196	196	Yes
	3-hour	107.45	7.9	115.35	1,300	1,300	Yes
	24-hour	15.35	7.9	23.25	-	365	Yes
	Annual	3.50	7.9	11.40	-	80	Yes
H_2S	1-hour	28.13	-	28.13	-	112	Yes

Source: Trinity 2023 (See Table 6-1 in Trinity 2023 for further detail)
µg/m³ = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standards; NVAAQS = Nevada Ambient Air Quality Standards
[1] Background hourly NO_2 concentrations are incorporated directly into the model; OLM – Ozone Limiting Method also applied.
[2] The Environmental Protection Agency promulgated the lower NAAQS for annual $PM_{2.5}$ on February 7, 2024, and is expected to be in force in April 2024.
[3] The form of the NAAQS is the high 6th high and the NVAAQS is the high first high.

Table 4-3 Proposed Action Air Modeling Results (SIL Exceedance Receptor Impacts)

Averaging Period	CO		NO_2		$PM_{2.5}$		PM_{10}		SO_2			
	1-hour	8-hour	1-hour	Annual	24-hour	Annual	24-hour	Annual	1-hour	3-hour	24-hour	Annual
A	0.41	0.05	0.08	1.30E-03	1.92E-03	6.10E-04	0.03	2.88E-03	5.10E-04	2.50E-04	4.00E-05	0
B	0.02	2.64E-03	5.49E-03	2.90E-04	4.70E-04	1.90E-04	5.47E-03	1.31E-03	2.00E-05	1.00E-05	0	0
C	0.12	0.02	0.06	3.46E-03	4.61E-03	2.06E-03	0.07	0.02	1.60E-04	1.10E-04	3.00E-05	1.00E-05
D	0.03	4.86E-03	3.99E-03	5.00E-05	5.70E-04	1.20E-04	7.60E-03	5.30E-04	5.00E-05	4.00E-05	0	0
E	0.06	8.70E-03	0.03	3.80E-04	1.72E-03	2.80E-04	0.03	2.19E-03	1.80E-04	8.00E-05	1.00E-05	0
F	0.81	0.11	6.25	0.61	1.53E-03	2.30E-04	0.57	0.2	2.52E-02	1.44E-02	5.29E-03	1.95E-05
G	1.17E-03	1.60E-04	5.00E-05	0	0	0	1.20E-04	1.00E-05	0	0	0	0
Total Off-site Conc. (µg/m^3)	1.44	0.19	6.44	0.62	0.01	0	0.71	0.18	0.03	0.01	0.01	2.95E-05
Total On-site Conc. (µg/m^3)	7,135.88	2,208.21	172.81	69.99	18.89	7.92	104.76	35.27	154.48	115.35	23.25	11.4
Total Conc. (µg/m3)	7,137.32	2,208.40	179.25	70.61	18.9	7.92	105.47	35.49	154.51	115.36	23.26	11.4
NAAQS (µg/m^3)	40,000	10,000	188	100	35	91	150	-	196	1,300	-	-
NVAAQS (µg/m^3)	40,500	10,500	188	100	35	12	150	50	196	1,300	365	80
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Trinity 2023 (See Table 6-2 in Trinity 2023 for further detail)
[1] The USEPA promulgated the lower NAAQS for annual $PM_{2.5}$ on February 7, 2024, and is expected to be in force in April 2024.

Segment F contributes the largest portion of off-site impacts primarily because it is closest to the Plan boundary and the widest off-site road segment. The 5,000 meters of Segment F closest to the Plan boundary were modeled. A receptor grid was set to 1 km in all directions from Segment F. Additional receptors generated along the road at the boundary of the volume source exclusion zone were added at a spacing of 25 meters, to ensure the maximum impacts from the representative road section are captured (Trinity 2023).

Modeling results for the Proposed Action indicate that air quality impacts would be below the NAAQS/NVAAQS, and no substantial adverse impacts would occur. Modeling also indicates that impacts would be localized near the Project site and dissipate with distance from Project activity. Additionally, the refined analysis confirmed that commuter and deliver vehicle traffic would not cause any NAAQS/NVAAQS exceedances along any of the road segments (**Table 4-4**). The Proposed Action would be compliant with both primary and secondary NAAQ standards. These impacts would be local and short term in duration, primarily occurring during active quarrying and processing. Air pollutant concentrations would return to background levels after quarrying and processing cease and reclamation is completed.

Table 4-4 Proposed Action Air Modeling Results (Combined On-site/Off-site Sources)

Pollutant	Averaging Period	Patial Worst-Case Segment (µg/m^3)	Total On-site Impact (µg/m^3)	Total Concentration (µg/m^3)	NAAQS (µg/m^3)	NVAAQS (µg/m^3)	Compliance
CO	1-hour	37.16	7,136	7,173	40,000	40,500	Yes
	8-hour	14.84	2,208	2,223	10,000	10,500	Yes
NO_2	1-hour	6.24	172.81	179.05	188	188	Yes
	Annual	0.65	69.79	70.44	100	100	Yes
$PM_{2.5}$	24-hour	8.70E-02	19.43	19.52	35	35	Yes
	Annual	4.88E-02	8.21	8.26	9[1]	12	Yes
PM_{10}	24-hour[2]	0.84/1.10	102.4/121.96	103.24/123.06	150	150	Yes
	Annual	0.36	41.94	42.30	-	50	Yes
SO_2	1-hour	2.66E-02	154.48	154.51	196	196	Yes
	3-hour	1.79E-02	115.35	115.37	1,300	1,300	Yes
	24-hour	6.22E-03	23.25	23.26	-	365	Yes
	Annual	2.04E-03	11.40	11.40	-	80	Yes

Source: Trinity 2023 (See Table 6-3 in Trinity 2023 for further detail)
[1] The Environmental Protection Agency promulgated the lower NAAQS for annual $PM_{2.5}$ on February 7, 2024, and is expected to be in force in April 2024.
[2] The form of the 24-hr PM_{10} NAAQS is the high 1st high

Emission calculations indicate that total estimate HAP emissions from all sources associated with the Proposed Action would be up to 0.81 tpy, and mercury emissions would be about 4.7 x 10^{-4} tpy. Operations associated with the Proposed Action would result in approximately 471,589 tpy of direct GHG emissions and 40,471 tpy of indirect GHG emissions in terms of CO_2e. Indirect GHG emissions are related to transport and delivery of quarried materials (i.e., lithium and boron) (Trinity 2023). Per the USEPA Greenhouse Gas Equivalence Calculator, the Proposed Action would produce approximately the same amount of GHG emissions annually as that produced by 56,713 households (100,134 gasoline-powered passenger vehicles) annually due to energy consumption (USEPA 2022). Non-road mobile equipment GHG emissions were also estimated. The equipment consists of a series of cranes, telehandlers, light plants, forklifts off-highway haul trucks and dozers among others (Trinity 2022a). The emissions were established by a weighted average engine horsepower and load factor for each equipment type. Total annual GHG emissions for all aggregated non-road construction equipment were estimated at 14,333 tons CO_2e (Trinity 2022a). It is anticipated that emissions generated during reclamation would be less than those detailed during operations, as operations would no longer be occurring.

Off-site vehicle GHG emissions were established for each of the seven off-site road segments (**Table 4-3**). The number of vehicles for each segment were based on Federal Highway Administration calculation

methodology. In aggregate, the predicted GHG annual emissions was 5,447.20 tons CO_2e (Trinity 2023). The Proposed Action would be subject to the GHG Reporting Rule as the expected emissions would be greater than 25,000 tpy. Appropriate GHG emissions would need to be provided to the USEPA on an annual basis as appropriate (Trinity 2023).

An ozone impact analysis determined that the Proposed Action would result in maximum 8-hour modeled impact of 0.69 ppb of ozone. The Significant Impact Level for Precursor ozone is 1 ppb; therefore, the Proposed Action impacts would comply with the ozone NAAQS.

NOx and SO_2 are both precursors to secondary $PM_{2.5}$ formation. The proposed secondary $PM_{2.5}$ precursor emissions increase can be expressed as a percent of the lowest Modeled Emission Rates for Precursors (USEPA 2020) for each precursor and then summed to determine predicted secondary $PM_{2.5}$ impacts. A value of less than 100 percent indicates that the NAAQS and NVAAQS would not be exceeded when considering the combined impacts of the direct and secondary precursor emissions for the 24-hour and annual $PM_{2.5}$. The 24-hour and annual Secondary $PM_{2.5}$ impact calculations are 44.4 percent and 54.8 percent, respectively (Trinity 2022a). Because the calculation is less than 100 percent, the Proposed Action impacts would comply with the NAAQS and NVAAQS for $PM_{2.5}$.

Air pollutant emissions from the Proposed Action would occur; however, several air pollution control measures would be implemented by Ioneer, including the following. Diesel generators would use Tier 4 engines that are compliant with the appropriate New Source Performance Standards and National Emission Standards for HAPs requirements for Reciprocating Internal Combustion Engines. Diesel engines would be maintained and operated in accordance with the manufacturer's specifications and use ultra-low sulfur diesel fuel. The OSFs would be watered to reduce fugitive dust emissions. Disturbed areas would be seeded with an interim seed mix to minimize fugitive dust emissions. Particulate generated on the unpaved haul roads and operational areas would be controlled by applying water, polymer, and/or dust suppression reagents. Emissions from conveying, screening, and crushing operations associated with ore processing would be controlled by using fogging systems, or by fully/partially enclosing material transfer points. The sulfuric acid plant stack would use a tail gas scrubber to control SO_2 emissions, thereby complying with New Source Performance Standards. Good operating practices would be implemented to manage emissions of particulates, hydrogen sulfide, and sulfuric acid from the various processes at the sulfuric acid plant. Small amounts of volatile organic compound fugitive emissions from the on-site storage of petroleum-based fuels would be managed by using BMPs for fueling operations and using light-colored paint for tank exteriors. The lithium carbonate dryer stack would be controlled by a baghouse with a vendor guaranteed grain loading rate of 0.010 grain per cubic feet. The boric acid dryer would be controlled by a wet scrubbing system that uses process water for the scrubbing and recirculate the bleed to the Boric Acid Dissolution tank. PM, PM_{10}, and $PM_{2.5}$ emissions emitted when loading material into the silos and emissions would be controlled by the use of bin vents. Air emissions from the laboratory would be controlled with a baghouse (Ioneer 2022; NDEP 2022; Trinity 2022a). The Ioneer Class II Operating Permit requires several testing and recordkeeping elements for a variety of emission sources.

4.1.2 North and South OSF Alternative

The North and South OSF Alternative includes relocation of the haul road and other Project facilities to minimize surface disturbance to Tiehm's buckwheat designated critical habitat. Due to the relocation of the haul road, dispersion modeling was conducted. This alternative would last 17 years with haul road traffic constituting most of the PM_{10} 24-hour impacts. Based on maximum estimated emissions of criteria pollutants and HAPs, the Project would be considered a Class II minor source of air pollution as defined by NDEP (NAC 445B.037). Ioneer has obtained a Class II Air Quality Operating Permit (AP 1099-4256) for the Project which authorizes the emissions from all Project-related construction and operation activities and includes annual emissions reporting requirements. Ioneer would work with NDEP to update their Class II permit for this alternative.

Projected GHG emissions associated with the North and South OSF Alternative operations are estimated to be 545,445 tpy CO_2, 9.355 tpy CH_4, 0.522 tpy N_2O, and 545,834 tpy CO_2e. Social cost of GHG estimates under this alternative are estimated to range from $1,286 million to $3,657 million.

Onsite source modeling results for the alternative (Year 11 for particulate impacts) indicate that all modeled values are below the associated NAAQS and NVAAQS. Modeling also indicates that impacts would be localized near the Project and dissipate with distance from Project activity. Additionally, the refined analysis confirmed that commuter and delivery vehicle traffic would not cause any NAAQS/NVAAQS exceedances along any of the road segments. The North and South OSF Alternative would be compliant with both primary and secondary NAAQ standards. These impacts would be local and short term in duration, primarily occurring during active quarrying and processing operations. Air pollutant concentrations would return to background levels after quarrying and processing operations cease, and reclamation is completed (Trinity 2024).

4.1.3 No Action Alternative

Under the No Action Alternative, the Project would not be constructed or operated. The air quality impacts associated with the Proposed Action would not occur and existing air quality conditions would remain unchanged. The existing 15 acres of exploration disturbance under the relinquished Notices (NVN-97202 and NVN-97262), has occurred on public lands administered by the BLM and would be reclaimed. No emissions inventory has been prepared for the previously authorized explorations operations. However, it is reasonable to assume that the No Action Alternative would have less emission generation levels than the Proposed Action, and this alternative would be compliant with all NAAQS.

4.2 Cultural Resources

Unevaluated cultural resources are addressed the same way as eligible cultural resources for the assessment of Project impacts, as well as historic properties management and treatment, until such time that their eligibility is determined.

4.2.1 Proposed Action

Aside from the Cave Spring site, all unevaluated sites listed have been determined not eligible under criteria A, B, and C and these determinations have SHPO concurrence. The sites remain unevaluated under criterion D because the potential for subsurface deposits is unknown. Consultation occurred between tribal representatives (Timbisha Shoshone Tribe, Duckwater Shoshone Tribe of Duckwater Reservation, Nevada, and Fort Independence Paiute Tribe) and the BLM in August 2024 in the form of two site visits and a virtual meeting. During the virtual meeting on August 29, 2024, tribal representatives requested that certain prehistoric sites be left unevaluated since the sites may be of religious importance as they may be associated with sites identified as sacred. While these sites are listed as unevaluated under NHPA criterion D, out of an abundance of caution, they would be treated as eligible for purposes of NHPA compliance. Those sites that may be associated with sacred sites may in fact be eligible under criteria A, B or C and may also be subject to protection afforded by the American Indian Religious Freedom Act.

Of the 39 NRHP-eligible or unevaluated cultural resources within the PAPE, 12 would potentially be physically impacted by access road improvements, such as widening the road to 100 feet, as they are either on one side of the corridor or span the corridor. Road improvements are conceptual at this time, and road design would be modified to avoid or minimize adverse impacts to the 12 NRHP-eligible or unevaluated cultural resources along the road if possible. The Proposed Action would have an adverse effect on historic properties that would be permanent and localized. Four cultural resources are within 100 feet of surface disturbance: one adjacent to haul/service road construction, one adjacent to a diversion channel, one adjacent to the access road, and one adjacent to the Argentite Road realignment. These sites would be avoided. Additionally, disturbance associated with approximately 35 acres of exploration disturbance in the OPA, 30 acres of disturbance for dewatering facilities in the OPA, 20 acres of disturbance for water supply facilities in the Plan boundary, and Tiehm's buckwheat designated critical habitat and subpopulation fencing would be designed to avoid these sites. The Cave Spring Cabin (B12947) would be avoided by Project activities; therefore, there would be No Adverse Effect from physical activities to NRHP-eligible architectural resources (Ross-Hauer 2020).

A total of 28 NRHP-eligible or unevaluated cultural resources (22 prehistoric sites, three historic resources, and three multicomponent sites) have the potential to be affected by auditory, vibrational, and/or visual impacts. The prehistoric sites include 10 rock shelter sites, two complex habitation sites, three basic habitation sites, and seven lithic scatters with simple or complex flaked stone assemblages. The historic

resources consist of a segment of an underground pipeline, the Mineral Ridge Historic Mining District, and a stone cabin. The multicomponent sites include a prehistoric complex habitation component and a historic refuse deposit, a prehistoric complex habitation component, and a prehistoric rock shelter component and historic stone cabin with a corral (Ross-Hauer 2020). Of the 28 cultural resources, 15 would not be affected by auditory, vibrational, and/or visual impacts, while 13 cultural resources (12 cultural resources and one architectural resource) could be impacted by auditory, vibrational, and/visual impacts. Eight of the sites are located more than 100 feet from heavy machinery areas and more than 722 feet from the quarry.

As long as Project-related activities remain at least 100 feet (30 meters) away from the boundaries of these eight sites, this would prevent impacts to these historic properties from vibrations (Felling and Richey 2023). Of the remaining five cultural resources, site CrNV-64-7851/26ES1566 and its associated architectural resource (B12947) would be 1,014 feet from the quarry; therefore, they would not be susceptible to vibratory impacts from blasting, but instead would be vulnerable to auditory and visual impacts (Felling and Richey 2023). The remaining three cultural resources (CrNV-64-6245/26ES1000, CrNV-64-19981/26ES2958, and CrNV-64-19986/26ES2963) could be adversely affected by vibration from heavy machinery and/or blasting.

Of the 186 cultural resources that are not eligible for the NRHP, 100 are within the Project disturbance footprint, 39 are within 100 feet (30 meters), and the remaining 47 are greater than 100 feet away. The 100 sites would be destroyed, 39 may be disturbed or destroyed, and the remaining 47 would likely be avoided. Sites that are not eligible for the NRHP require no further management under Section 106.

A MOA between the BLM, SHPO, Ioneer, and other consulting parties is being prepared and would be executed before the BLM issues a ROD. The MOA would lay out the steps that the agency and other parties take to consider and resolve any adverse effects that the Project would have on historic properties. Unavoidable adverse impacts to historic properties would be minimized and/or mitigated through implementation of an HPTP, which would be required by the MOA and is currently being prepared.

4.2.2 North and South OSF Alternative

Impacts would be similar to the Proposed Action, except that of the 39 NRHP-eligible or unevaluated cultural resources within the PAPE, 16 would potentially be physically impacted. Of these, 12 could be disturbed by access road improvements, one from the Argentite Road realignment, two from the North, South, and Quarry Infill OSFs, and one from diversion channels. Project design would be modified to avoid NRHP-eligible or unevaluated cultural resources along the roads and diversion channels if possible. If cultural resources cannot be avoided, the alternative would have an adverse effect on historic properties that would be permanent and localized. Three cultural resources are within 100 feet of surface disturbance and would be avoided: one cultural resource adjacent to haul/service road construction, one site adjacent to the Argentite Road realignment, and one site adjacent to the access road. Additionally, disturbance within the OPA associated with approximately 35 acres of exploration, 30 acres for dewatering facilities, 30 acres for general surface disturbance, and Tiehm's buckwheat designated critical habitat fencing, and disturbance within the Plan boundary associated with approximately 20 acres for water supply facilities would be designed to avoid these sites.

Of the 186 cultural resources that are not eligible for the NRHP, 106 are within the Project disturbance footprint, 33 are within 100 feet (30 meters), and the remaining 47 are greater than 100 feet away. The 106 sites would be destroyed, 33 may be disturbed or destroyed, and the remaining 47 would likely be avoided. Sites that are not eligible for the NRHP require no further management under Section 106.

4.2.3 No Action Alternative

Under the No Action Alternative, the Project would not be developed and associated impacts to cultural resources would not occur. The existing 15 acres of exploration disturbance on public lands administered by the BLM would be reclaimed. There would be no impacts from the No Action Alternative to NRHP-eligible cultural resources.

4.3 Environmental Justice

Environmental justice seeks to address if there would be any minority, low-income, and/ or tribal populations that would be disproportionately affected by the Project. Mineral and Inyo counties were found to have a minority population. All counties within the area of analysis were found to have a low-income population. Mineral, Nye, Inyo, and Mono counties had American Indian or Alaska Native populations.

The Project is located in Census Block Group 320099501001 in Esmeralda County. Census Block Group 320099501001 has an identified low-income population with health disparities including asthma, cancer, and persons with disabilities ranking above the 80th percentile compared to the United States. Several of the Census Block Groups within the area of analysis that include populations with environmental justice concerns overlap populations with health disparities. Currently, the BLM has not received formal guidance from the CEQ to implement Executive Order 14096 to analyze impacts from the Proposed Action and action alternatives related to health disparities. BLM has engaged in environmental justice outreach and has completed an Environmental Justice Outreach Plan for the Project with the intention of proactively providing opportunities for meaningful involvement of communities with environmental justice concerns. Ioneer has provided Esmeralda County with a letter of commitment for completion of a Development Agreement to address matters such as impacts on solid waste operations, emergency services, law enforcement, and road services (Ioneer 2024).

4.3.1 Proposed Action

Potential impacts to environmental justice populations may include impacts to air quality, visual, noise, water, traffic, hazardous material transportation, and social and economic values. Effects to air quality, visual, and noise would be expected to lessen with increasing distance from the Project as these impacts tend to occur around a general proximity to disturbance and attenuate the further from disturbance. Impacts to air quality are not anticipated to exceed NAAQS (Section 4.1). It is estimated the direct Project GHG emissions would be 471,425 tpy of carbon dioxide, 2.957 tpy of methane, and 0.297 tpy of nitrous oxide. The estimated indirect GHG emissions from the transport of Lithium and Boron would be 40,471 tpy of carbon dioxide equivalent. The Proposed Action would be subject to the GHG Reporting Rule as the expected emissions would be greater than 25,000 tpy. Appropriate GHG emissions would need to be provided to the USEPA on an annual basis as appropriate. Executive Order 14096 Section 1 states that "cumulative impacts of exposure to those types of burdens and other stressors, including those related to climate change and the environment, further disadvantage communities with environmental justice concerns." Historically, environmental justice communities are the first to experience the burdens associated with climate change and are likely to have the least resilience to mitigate impacts compared to the larger population. As a result of the Project being compliant with NAAQS, compliance reporting required for the Class II Air Quality Permit for the Project, and the maximum modeled impacts occurring within or close proximity to the OPA, disproportionate impacts to communities with environmental justice concerns are not anticipated.

Visual impacts would not occur in populated areas of conflict with the established interim BLM VRM Class Objectives (Section 4.15). Visual impacts would primarily occur around Cave Springs Road, and those utilizing that route would see visually apparent modifications to the landscape associated with the quarry, OSFs, SOSF, and associated infrastructure including the at-grade pipeline mounded at approximately 50-foot increments, the booster station, and powerline utility poles. Communities with environmental justice concerns may use the surrounding area for recreational purposes, and increased noise and human activity may reduce the recreation experience in proximity to the Project, primarily reducing the feeling of solitude.

Ioneer has acquired all necessary water rights for construction and quarrying and processing. During quarrying and processing, water from quarry dewatering wells would be supplemented with water from new or existing wells on private land in Fish Lake Valley. The annual basis groundwater pumping would be equal to the agricultural pumping, less the NDWR adjustment. The analysis of effects on water rights assumes that existing consumptive uses in Fish Lake Valley would continue at their current rate which are near the Fish Lake Vally basin's perennial yield. There are 10 perennial surface waters and five surface stock water rights within the projected 10-foot drawdown contour. In addition, the one-mile buffer of the projected 10-foot drawdown contour includes 13 additional surface water locations, two additional stock water rights, and six irrigation water rights. Spring flow in the area may be dependent on groundwater flow and decreased

groundwater levels may reduce the discharge of water via springs. The amount of spring flow reduction would be dependent on the actual increase in the horizontal groundwater gradient and could result in a cessation of groundwater sourced flow unless water levels recovered, which is predicted to occur over a period of approximately 200 years (Piteau 2023b). Given Esmeralda County has a low-income population of approximately 44 percent, which is greater than the reference population, impacts to groundwater levels may affect a population with environmental justice concerns.

Groundwater pumping would reduce the total quantity of groundwater available for other consumptive use within the Fish Lake Valley basin. Depending on the specific nature of the water rights transferred to the Project, those rights would represent 13 percent of the basin's perennial yield. When utilized for agriculture, this volume of water would be equivalent to alfalfa hay irrigation by up to eight quarter-section irrigation pivots. Due to anticipated impacts associated with groundwater drawdown and changes to historical agricultural water use, groundwater pumping for the Proposed Action may disproportionately affect populations with environmental justice concerns including in Esmeralda County, which has a low-income population of approximately 44 percent, which is greater than the reference population.

Groundwater quality is not anticipated to be affected downgradient of the quarry lake due to being predicted to be a terminal sink. The ERA determined a low probability of risks to wildlife from the quarry lake. Concentrations of arsenic, boron, fluoride, and molybdenum could be expected to exceed secondary enforceable and non-enforceable standards as well as NDEP Profile III reference values (Piteau 2024b). Given Esmeralda County has a low-income population of approximately 44 percent, which is greater than the reference population, potential impacts from the quarry lake may affect a population with environmental justice concerns. Additionally, the underdrain and contact water collection systems would minimize the volume of leachate contacting the environment. Therefore, potential for degradation of water quality by overburden leaching is limited (HydroGeoLogica 2020b) and monitoring of materials placed in the facility and nearby water chemistry would be established per NDEP WPCP requirements to verify that the facility is not contributing to water quality degradation.

There would be a noticeable increase in traffic on roadways. A Transportation and Access Plan (Ioneer 2022) has been prepared which includes discussion of public safety and maintenance measures that would be implemented. The Proposed Action would increase traffic on area roadways from bus traffic, truck traffic, and light vehicle traffic for a total of approximately 248 total trips per day for construction and 288 total trips per day for the quarrying and processing phase (Section 4.13). Given Esmeralda County has a low-income population of approximately 44 percent, which is greater than the reference population, and there are low-income, minority, and Native American populations that meet the environmental justice screening requirements within Census Block Groups along the transportation route, transportation-related impacts may disproportionately affect populations with environmental justice concerns.

Trucks would be used to transport hazardous materials both ways between Las Vegas or Reno. Hazardous material transportation would increase daily traffic along these routes during the life of the quarry. These routes pass through areas with low-income, minority, and Native American populations. The probability of release of hazardous material was determined to be the same between the Las Vegas and Reno routes. Diesel fuel had the highest probability of release, followed by corrosion inhibitor, and liquid phosphate. The Project is anticipated to be a Small Quantity Generator of hazardous material, so impacts from hazardous material transportation from the OPA are anticipated to be low. Implementation of the Emergency Response and Spill Contingency Plan and ACEPMs would reduce the risk of potential impacts should a spill or release occur. In the potential case of transportation spills to water bodies, there could be long-term, major, and regional impacts that may affect communities with environmental justice concerns. There is a low probability of hazardous material transportation incidents (Section 4.5). Given Esmeralda County has a low-income population present of approximately 44 percent, which is greater than the reference population, and there are low-income, minority, and Native American populations that meet the environmental justice screening requirements within Census Block Groups along the hazardous material transportation route, hazardous material transportation-related impacts may affect populations with environmental justice concerns.

The Proposed Action would increase the population within the area of analysis from direct, indirect, and induced employment. Whereas this may have beneficial socioeconomic effects due to additional, good paying employment opportunities, the potential population increase would also have impacts to housing

availability, public facilities and infrastructure, local government finances, and the overall social and cultural landscape that could disproportionately and adversely impact environmental justice populations identified in the area of analysis. It is assumed Project-related population would reside in communities like Tonopah, Hawthorne, and Bishop due to proximity to the Project. Total non-local population increase, when accounting for single households without children and married households with children, is anticipated to be 1,273 people with approximately 976 being adults of working age. This is a relatively large increase in population within the area of analysis that has relatively low rental vacancy rates and public services may not currently be at sufficient capacities to appropriately accommodate this population increase. Since some of these impacts may run through reclamation and closure, these impacts would occur over the long term. Even though it is anticipated that construction and operations would generate annual calendar year taxes of approximately $15,413,110 in county and sub-county special district taxes, this tax revenue would be generated over the course of the Project operations and may not provide immediate tax revenue relief relative to when the population increases occur. These impacts may result in local government budget shortfalls if counties in the area of analysis have to hire additional staff, or public services/infrastructure capacity improvements are needed to accommodate increased demand for these services. Impacts to county budgets may affect capacity to increase services and infrastructure to accommodate Project-related population. This could disproportionately and adversely impact environmental justice populations in the area of analysis by potentially decreasing access to public social services including health care, food banks, and education. Given Esmeralda County has a low-income population of approximately 44 percent, which is greater than the reference population, and other Census Block Groups within the area of analysis have low-income, minority, and Native American populations meeting the environmental justice screening requirement, potential social and economic impacts may affect a population with environmental justice concerns. Overall impacts to communities with environmental justice concerns within the area of analysis are anticipated to be moderate to major, long-term, and regional.

4.3.2 North and South OSF Alternative

Impacts of the North and South OSF Alternative on environmental justice would be the same as described for the Proposed Action.

4.3.3 No Action Alternative

Under the No Action Alternative, the Project would not be developed and impacts to the resources discussed under the Proposed Action would not occur, including the potential increased employment opportunities. Impacts are anticipated to be minor, short-term, and regional.

4.4 Geology and Minerals

4.4.1 Proposed Action

The Proposed Action would disturb 2,306 acres, including the quarry, the West, North, and Quarry Infill OSFs, and the SOSF. The majority of surface disturbance associated with these facilities would be reclaimed. Because these areas would be available in the future after Project completion, impacts would be minor to moderate, long-term, and localized.

Local bedrock geology and mineral resources would be affected by the removal of approximately 25 Mt of ore and 406 Mt of overburden from the quarry (Ioneer 2022). Quarrying would disrupt the natural geology and mineral resource within the quarry boundaries, approximately 472 acres and backfilled with the Quarry Infill OSF to 201 acres of remnant open quarry at closure but would not remove the geology and mineral resources outside of those limits. During quarrying and processing, the anticipated level of impacts to mineral resources under the quarry would be major, permanent, and localized to the local geology. The Proposed Action mineable quantities of searlesite with thin interbeds of lithium-bearing ilite/smectite, is unique as to this type of mineralization. The removal and processing of the mineral resource would be a minor to moderate, permanent, and localized impact.

Lowering of a water table by dewatering or water production has the potential to result in subsidence within water-bearing lithologies when the hydrostatic pressure that partially supports the lithologic matrix is removed. Little subsidence would be expected to occur in the consolidated, highly-silicified bedrock units, but subsidence may occur in the interbedded epiclastic ash-flows, air-fall tuffs and sedimentary units of the

Cave Spring Formation or in any unconsolidated fill present below the groundwater table. The subsidence analysis prepared by HydroGeoLogica in 2020 predicted up to 10 inches of localized subsidence based on subsidence rates at other dewatering operations in Nevada (HydroGeoLogica 2020c). However, an updated subsidence analysis prepared by WestLand in 2024 predicts less subsidence than predicted under a different groundwater pumping scenario in HydroGeoLogica 2020c due to the different locations of the quarry and dewatering pumping proposed under the Project. Less subsidence is predicted due to the clay content of the Cave Spring Formation where the Project is located and distribution of the volcanic baseline rocks (where subsidence would not be expected) (WestLand 2024b). Because the saturated thickness of the lithologies in the OPA exceed 600 feet, this subsidence would have a negligible, long-term, localized impact on the groundwater storage properties of the lithologies.

Based on the review of local faults and seismicity, and guidance by Esmeralda County Hazard Mitigation Steering Committee, it is anticipated no significant infrastructure damage would occur to facilities within the Plan boundary during the life of the Project. The access road crosses the EPFZ at the mouth of Cave Springs wash; therefore, there is potential that it could be impacted by activity on the EPFZ. Impacts due to geologic hazards would be negligible, long-term, and localized.

4.4.2 North and South OSF Alternative

Under the North and South OSF Alternative the impacts to geology and mineral resources would be the same as described for the Proposed Action except placement of the South OSF, containing a maximum of 120 Mt, would occur south of the quarry. There would be approximately 2,266 acres of surface disturbance (40 acres less than the Proposed Action). Because the South OSF area would be available in the future after Project completion, impacts would be minor to moderate, long-term, and localized.

4.4.3 No Action Alternative

Under the No Action Alternative, the Project would not be approved. The existing 15 acres of exploration disturbance has occurred on public lands administered by the BLM and would be reclaimed. No additional surface disturbance would occur.

4.5 Hazardous Materials and Solid Waste

4.5.1 Proposed Action

Hazardous materials and fuels could be accidentally released within the OPA during quarrying or as a result of leakage from storage facilities or equipment. The OPA is dissected by a Cave Springs wash, which is predominately dry, Cave Spring is within the OPA and has avoidance buffer around it where no surface disturbance or Project activity would occur, and groundwater is at least 100 feet below ground surface (NDWR 2014). Thus, any fuel spill or release of a hazardous material would be limited to impacts to the soil. In the event of a spill in the OPA, Ioneer's Emergency Response and Spill Contingency Plan would be implemented, which includes procedures for the prevention, response, containment, and safe cleanup of any spills or discharges of substances that potentially may degrade the environment (Ioneer 2022). The Proposed Action would be conducted in accordance with this plan so that impacts from spills or releases would be minimized and the spill materials would be contained and removed. A hazardous material spill or accidental release in the OPA would be a negligible to minor, short-term, and localized impact.

Per- and poly-fluoroalkyl substances (PFAS) may be present due to the use of aqueous film-forming foams (AFFFs) for firefighting, but also through inclusion in surfactants, ore-floating processes, and other performance chemicals such as hydraulic fluids and fuel additives (WSP 2019). Based on the Plan, ore processing will not require the use of ore-floating products and surfactants are not listed for proposed use. However, the use of AFFFs in firefighting equipment may be a potential issue within the OPA. Due to engineered fire suppression plans for the OPA, the likelihood of fires and the use of AFFFs would be negligible to minor, short term, and localized for PFAS.

The Project is anticipated to qualify as a Small Quantity Generator that produces up to two loads of hazardous materials per year; therefore, impacts from hazardous waste generated within the OPA and transported from the OPA are not anticipated. The Proposed Action would require transport of hazardous materials to the OPA via the two travel routes (one from Reno to the OPA and one from Las Vegas to the

OPA). The probability of a release was estimated for the two travel routes assuming up to 33 truckloads of 12,000 gallons of diesel fuel per month, five truckloads of two tons of corrosion inhibitor 3DT129 per month, and eight deliveries of one ton of liquid phosphate per year would be required for the Proposed Action for the 17-year Project life. The probability of a release would be the same for either transportation route, as the travel distance is approximately the same (230 miles). Release probability for the chemicals evaluated were calculated for both travel routes. The release probability is calculated by the life of Project truck deliveries multiplied by distance (miles) multiplied by accident rate/mile for the chemical analyzed.

Diesel fuel would have a release probability of 760 in 1,000 miles and 174.8 for each 230-mile transportation route. Corrosion inhibitor 3DT129 would have a release probability of 30.5 in 1,000 miles and 7.0 for each 230-mile transportation route. Liquid phosphate would have a release probability of 25 in 1,000 miles and 5.8 for each 230-mile transportation route. A spill of hazardous materials or fuels along either route that does not impact a water body or stream channel would impact soil adjacent to the highway. A spill of this type would be a minor to moderate, short-term, and localized impact, as the spill could be contained and remediated. A spill or release into a water body would be a moderate to major, long-term, and regional impact, as remediation within one year may not be possible and the spread of the spill could result in impacts over a large area.

In the event of a release during transport, the commercial transportation company would be responsible for first response and cleanup. Each transportation company is required to have an emergency response plan to address spills and accidental releases of hazardous materials. Local and regional law enforcement and fire protection agencies also may be involved to secure the site and protect public safety. Title 49 of the CFR requires that the carrier notify local emergency response personnel, the National Response Center (for discharge of reportable quantities of hazardous substances), and the U.S. Department of Transportation (USDOT) in the event of an accident involving hazardous materials.

4.5.2 North and South OSF Alternative

Under the North and South OSF Alternative, impacts of hazardous materials and solid waste would be the same as the Proposed Action.

4.5.3 No Action Alternative

Under the No Action Alternative, the Project would not be approved and developed; thus, Project-related spills would not occur. The existing 15 acres of exploration disturbance has occurred on public lands administered by the BLM and would be reclaimed. No additional potential for release of hazardous materials would occur following reclamation.

4.6 Land Use and Realty

4.6.1 Proposed Action

The Project is consistent with BLM plans and policies that designate land use within the area of analysis as open for mineral exploration and development, as described in the Tonopah RMP (BLM 1997), and is consistent with the multiple use designations in the Esmeralda County Public Lands Policy Plan (Esmeralda County 2013). The Project would be expected to comply with adopted plans and policies of potentially affected governmental entities, so any possible conflicts would be negligible, short-term, and localized.

The Proposed Action would require realignment of a section of Cave Springs Road (NVN-062084) and a section of Argentite Canyon Road (N 54404). The realignments are proposed to remain post closure and would be transferred to Esmeralda County at closure, presumably by way of an amendment to the county's existing ROW grant with BLM (Ioneer 2022). The portion of Cave Springs Road that travels through the OPA would remain open to the public. Road delays and limited ATV access may occur during construction. During quarrying and processing, road delays may occur as the public would be escorted by a pilot car through the OPA along Cave Springs Road for safety. Traffic would be subject to a traffic control system which would include two railroad style crossing gates until the pilot car arrived. Hot Ditch Road provides access to numerous geothermal leases. It is anticipated that Ioneer would coordinate with ROW holders, and geothermal lessees that may be impacted to ensure continued access is maintained to these authorizations during the life of the quarry. There are four mining claims located in the OPA. No surface

facilities are proposed to occur on these claims. There are numerous claims along the access road that Ioneer does not control. Ioneer would coordinate with mining claim holders to allow continued access to claims. Impacts to land use authorizations would be minor to moderate, short-term, and localized.

Surface disturbance from the Proposed Action (2,306 acres or 32 percent of the area of analysis) would reduce the amount of land available for livestock grazing, dispersed recreation, and other multiple use authorizations. The loss of land within the area of analysis for multiple use authorizations would be a minor, short-term, and localized impact since there are other areas of public land within the vicinity of the Project that offer opportunities for similar activities.

During quarrying and processing, the Project's water supply would be from new or existing wells on private land in Fish Lake Valley, which would be pumped from two new booster stations via pipelines to the OPA. Ioneer has acquired or leased all necessary water rights, for which the points of use and/or diversion would be transferred to the appropriate locations within the Plan boundary. As part of the water rights acquisition, an equivalent amount of agricultural pumping would cease, resulting in the Project having no "net change" in the amount of groundwater pumped in Fish Lake Valley (WestLand 2023a). This would reduce agricultural operations within the area of analysis, as the manner of use would change from agricultural to mining and milling use. It is assumed at the end of the Project the leased water rights would be returned to an agricultural manner of use. As such, this would result in a long-term, moderate, localized impact.

Most of the disturbance associated with the Proposed Action would be returned to open space, grazing, dispersed recreation, and wildlife habitat following successful reclamation. Post-reclamation disturbance (383 acres or five percent of the area of analysis) would not be reclaimed. These areas, such as the quarry and quarry lake, would be restricted from public access for safety reasons. Impacts would be permanent, minor to moderate, and localized.

Fencing and signage would be implemented along the limits of proposed disturbance at the quarry and West and Quarry Infill OSFs, around designated critical habitat, and exclusion fencing would be constructed around the Tiehm's buckwheat subpopulations. The fencing would be for the protection of Tiehm's buckwheat subpopulations and designated critical habitat. The designated critical habitat fencing is anticipated to restrict the available area within the area of analysis by approximately 559 acres. Fencing would include locked gates in certain areas to control access to designated critical habitat (BLM 2024). The Tiehm's buckwheat exclusion area fencing would be contained fully within the designated critical habitat fenced area, or fencing around the limits of proposed disturbance, and would amount to approximately 51 acres. Impacts would be minor to moderate, long-term, and localized.

4.6.2 North and South OSF Alternative

Impacts on land use and realty would be the similar to those described under the Proposed Action, except there would be 2,266 acres of surface disturbance (32 percent of the area of analysis) and 211 acres (three percent of the area of analysis) of permanent, post-reclamation disturbance. Up to 719 acres of Tiehm's buckwheat designated critical habitat would be fenced, removing some multiple uses in that area. No exclusion fencing around subpopulations would be constructed under this alternative. Impacts would be minor, long-term, and localized.

4.6.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be approved. The existing 15 acres of exploration disturbance has occurred on public lands administered by the BLM and would be reclaimed. No additional surface disturbance would occur.

4.7 Livestock Grazing

4.7.1 Proposed Action

The Proposed Action would disturb 140 acres of the Red Spring Allotment, 2,145 acres of the Silver Peak Allotment, 21 acres of the Fish Lake Valley Allotment, and no acres of the Ice House Allotment. Rangelands available for livestock grazing were determined to be areas within two miles of water sources and with less than 30 percent slopes (Holechek 1988). This results in a stocking rate of 21 acres per AUM for the Red

Spring Allotment and 24 acres per AUM for the Silver Peak Allotment. The portion of the Fish Lake Valley Allotment affected by the Proposed Action is greater than two miles from water; therefore, there would be no impact to permitted AUMs. There would be no impact to permitted AUMs in the Ice House Allotment because there is no surface disturbance proposed there.

Disturbance within the Access Road and Infrastructure Corridor would impact up to 83 acres of rangeland that provides forage for livestock in the Red Spring Allotment. The Proposed Action would impact four AUMs which is less than one percent of permitted use. The surface disturbance in the Red Spring Allotment would be reclaimed, therefore, impacts would be negligible, long-term, and localized.

Of the 2,145 acres proposed for surface disturbance in the Silver Peak Allotment, there would be 1,726 acres within two miles of water sources and on slopes less than 30 percent. All 85 acres of proposed conceptual disturbance associated with exploration, water supply, and dewatering, were assumed to occur in areas available to livestock for forage. In total, 72 AUMs would be affected which is two percent of permitted use. This would be a moderate, long-term, and localized impact. Of the 72 AUMs impacted, 15 AUMs would be permanently impacted by disturbance associated with the quarry and its lake, stormwater controls, roads, and Communication Tower 3. Impacts would be minor, permanent, and localized.

The Proposed Action includes construction of fences to prevent access by wildlife, livestock, and wild horses and wild burros around certain facilities. The fenced areas would be within the disturbance footprint of the Proposed Action facilities; thus, would not impact additional AUMs. The fences around the processing facility, explosives storage area, contact water ponds, and quarry would exclude livestock access to approximately 302 acres within the Silver Peak Allotment. These facility fences would remain until reclamation and revegetation is deemed successful. If necessary, cattle guards or gates would be installed along roadways to maintain existing access to public areas. All sub-populations of Tiehm's buckwheat and designated critical habitat would be fenced to prevent disturbance, encompassing 559 acres. Of those 559 acres, 469 acres of designated critical habitat provide forage for livestock. Fencing associated with the Proposed Action would impact 20 AUMs. Therefore, impacts to livestock grazing resources from fences would be minor, long-term, and localized.

Reductions to permitted AUMs must be made in accordance with the BLM's grazing regulations, including the requirement for a grazing decision as set forth in 43 CFR Subpart 4160. While the Project would result in a reduction of AUMs, the BLM may adjust permitted AUMs, if appropriate, based on forage made available for livestock following reclamation. Factors considered by the BLM for permitting AUMs made available following reclamation are the ability for livestock to access forage, production in the reclaimed areas, and if mining facilities require long-term vegetative cover for success.

Economic impacts from a reduction of 96 BLM-permitted AUMs would equate to $9,639 in annual impacts to the permittee(s). The 2018 economic output of the food and agriculture sector in Esmeralda County was $12.9 million, of which beef cattle ranching and farming comprised $656,555 (NDA 2021). This economic impact would be minor, long-term to permanent, and regional, affecting the permittees of the Red Spring and Silver Peak allotments and the food and agriculture sector of Esmeralda County's economy.

Cave Springs Road and Argentite Canyon Road provide access to the Silver Peak Allotment. Under the Proposed Action, both roads would be re-routed, though the roads would continue to provide public and permittee access. The increased activity in the OPA, traffic control systems on the Cave Springs Road, and construction of facilities may exclude or deter cattle from traveling up the Cave Springs Wash to areas of the Silver Peak Allotment. However, these areas of Argentite Canyon and the upper end of Cave Springs Wash would continue to be accessible from the south and east. Therefore, Proposed Action impacts on accessibility to livestock grazing resources are anticipated to be minor, long-term, and localized.

There are eight range improvement projects within the Plan boundary in the Silver Peak Allotment. Improvement and maintenance of the Cave Springs Road would not impact the cattle guard and drift fence. One range improvement project, the Cave Canyon Corral, is directly adjacent to the proposed Cave Springs Wash Berm. The berm would be constructed between the corral and the realigned Cave Springs Road, and roads would be able to cross the berm (Ioneer 2022). The corral would still be accessible after construction

of the berm. The remaining range improvement projects would not be affected by surface disturbance associated with the Proposed Action.

An ERA was conducted for the water quality in the post-quarrying quarry lake, and the results indicate that the predicted constituent concentrations in the quarry lake would not cause an adverse effect to terrestrial wildlife (Cedar Creek 2024). No adverse effects to livestock are expected. Impacts from the post-quarrying quarry lake would be negligible to minor, permanent, and localized.

The one-mile buffer of the maximum extent of the predicted 10-foot groundwater drawdown contour overlaps 207 acres of the Fish Lake Valley Allotment, 2,095 acres of the Ice House Allotment, 29 acres of the Red Spring Allotment, and 27,778 acres of the Silver Peak Allotment. Within the buffered drawdown contour associated with quarry dewatering, there are 10 spring sites in the Ice House Allotment and 22 springs in the Silver Peak Allotment (HydroGeoLogica 2020b; Piteau 2023b). There are no springs or livestock water developments within the buffered drawdown contour associated with the supply wells in Fish Lake Valley. The groundwater drawdown effects associated with quarry dewatering activities would not be expected to affect water availability for livestock inside the one-mile buffer of the maximum extent of the predicted 10-foot groundwater drawdown contour (Piteau 2023b). Most of the springs within the drawdown contour are likely perched features as suggested by their elevated, hillside locations (HydroGeoLogica 2020b). Impacts to surface water availability from groundwater drawdown would depend on the source of groundwater at the springs. If these springs are perched, then groundwater drawdown from the Proposed Action would not affect discharge flows. If the springs are sourced from upwelling groundwater, the dewatering of the quarry may decrease the amount of water upwelling to discharge via the springs. The amount of spring flow reduction would be dependent on the actual increase in the horizontal groundwater gradient and could result in a cessation of groundwater sourced flow unless water levels recovered, which is predicted to occur over a period of more than 200 years (Piteau 2023b). Reduced flows or cessation of flows would limit the amount of area available to livestock for grazing. Although not anticipated, if impacts to spring sites are realized, then impacts to livestock grazing within the Ice House and Silver Peak allotments would be moderate, long-term to permanent, and localized

4.7.2 North and South OSF Alternative

Impacts would be similar to the Proposed Action except total surface disturbance would be approximately 2,266 acres. Impacts from surface disturbance within the Red Spring Allotment would be the same as those described for the Proposed Action and affect four AUMs. In the Silver Peak Allotment, 2,105 acres would be disturbed, of which 1,885 acres provide forage for livestock and 79 AUMs would be affected. All 118 acres of proposed conceptual disturbance associated with exploration, general surface disturbance, water supply, dewatering, and seeding and transplant plots, were assumed to occur in areas available to livestock for forage. There would be 198 acres of permanent disturbance which would permanently impact eight AUMs representing less than one percent of permitted use. The North and South OSF Alternative would include fencing of the outer extent of undisturbed Tiehm's buckwheat designated critical habitat, excluding 719 acres from livestock grazing within the Silver Peak Allotment. Approximately 591 acres of the designated critical habitat provides forage for livestock. Fencing associated with alternative would impact 25 AUMs. A total of 104 AUMs, or three percent of the permitted use of the Silver Peak Allotment, would be impacted. Impacts to AUMs would be moderate, long-term to permanent, and localized. Impacts to 108 BLM-permitted AUMs would equate to $10,844 in annual impacts to the permittee(s). This economic impact would be minor, long-term to permanent, and regional, affecting the permittees of the Red Spring and Silver Peak allotments and the food and agriculture sector of Esmeralda County's economy.

4.7.3 No Action Alternative

Under the No Action Alternative, impacts to livestock forage availability would continue to occur in the Silver Peak Allotment from 15 acres of existing disturbance until reclamation is complete. This equates to less than one AUM. Impacts would be negligible, long-term, and localized. No additional impacts to livestock grazing are anticipated to occur.

4.8 Native American Traditional Values

4.8.1 Proposed Action

Impacts to prehistoric cultural resources are described in Section 4.2. Multiple tribes expressed preference to avoid prehistoric cultural resources. Where avoidance is not reasonably feasible, the BLM would continue to consult with the appropriate Native American tribe(s) and individuals to obtain information about the identified concerns and what mitigation measures might be appropriate. After consulting with the appropriate tribe(s), the BLM, in consultation with the Tribes and the Nevada SHPO, would then determine the appropriate course of action. Pursuant to the American Indian Religious Freedom Act and Executive Order 13007, access to areas of concern and sacred sites would be maintained for the Tribes; however, there would be traffic restrictions through the Plan boundary which include a pilot car on Cave Springs Road. Impacts to access would be negligible to major, long-term, and localized.

The Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada identified two areas as culturally significant and requested these two areas be avoided by Project activities; these areas would be avoided through Project design. The Western Shoshone Defense Project, a non-governmental organization, identified Cave Spring as culturally significant to local tribes; this area would also be avoided through Project design. During consultation, Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada, Timbisha Shoshone Tribe, and Fort Independence Paiute Tribe indicated that unevaluated sites in the general area may be associated with surrounding sacred sites identified by the tribes. Cave Spring is likely a perched feature as suggested by its elevated, hillside location (HydroGeoLogica 2020b); therefore, the groundwater drawdown from the Proposed Action would not affect discharge flows. However, if Cave Spring is sourced from upwelling, there could be a decrease in the amount of water upwelling to discharge via the spring. If impacts to Cave Spring cannot be avoided by Project design, impacts would be minor to major and localized. The Cave Spring prehistoric site is also expected to experience additional audible and visual impacts as a result of the Proposed Action. Project activities, such as the use of mining equipment and blasting, may be heard at Cave Spring. While Project activities are occurring and these sounds heard, there would be impacts to the auditory setting at Cave Spring. Impacts would be negligible to major depending on the activity occurring, long-term, and localized. Project activities visible from KOP 2, which are discussed under Section 4.15.1, would be anticipated to also be visible from Cave Spring. Because the Cave Spring site is set back from the Cave Springs Road, it is likely impacts would be less than described from the KOP 2 location on Cave Springs Road. With the implementation of the Proposed Action, the physical landscape would be permanently changed from its existing condition. Most disturbances visible from Cave Spring would be recontoured and reclaimed, with the exception of the quarry, Argentite Canyon Road realignment, and Cave Springs Road realignment. Overall, visual impacts to Cave Spring would be moderate, long-term to permanent, and localized.

During consultation, tribes have indicated that some unevaluated sites in the general vicinity of sacred sites identified by tribal representatives may be associated with those sacred sites. Unevaluated sites potentially associated with sacred sites that cannot be avoided would be mitigated under the HPTP. Other impacts such as illegal collecting and/or inadvertent damage to areas of tribal concern (if identified) potentially could occur as a result of increased human activity in the Plan boundary.

Aside from the Cave Spring site, all unevaluated sites listed have been determined not eligible under criteria A, B, and C and these determinations have SHPO concurrence. The sites remain unevaluated under criterion D because the potential for subsurface deposits is unknown. Ongoing consultation between tribal representatives (Timbisha Shoshone Tribe, Duckwater Shoshone of Duckwater Reservation, Nevada, and Fort Independence Paiute Tribe) and the BLM occurred in August 2024 and included two site visits and a virtual meeting, During the virtual meeting on August 29, 2024, tribal representatives requested that certain prehistoric sites be left unevaluated since the sites may be of religious importance as they may be associated with sites identified as sacred. While these sites are listed as unevaluated under NHPA criterion D, out of an abundance of caution, they would be treated as eligible for purposes of NHPA compliance. Those sites that may be associated with sacred sites may in fact be eligible under criteria A, B or C and also may be subject to protection afforded by the American Indian Religious Freedom Act. Tribal consultation/coordination is ongoing and would continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation/coordination with the affected Tribes to reduce or eliminate impacts.

The BLM would continue to consult on resources significant to the Tribes that do not meet the definition of a historic property under the NHPA. Tribal access to these resources would be maintained consistent with the American Indian Religious Freedom Act and Executive Order 13007.

The potential for the inadvertent discovery of human remains during construction activities exists within proposed disturbance areas and could result in adverse impacts. If construction or other Project personnel discover what is believed to be human remains, funerary objects, or items of cultural patrimony on federal land, construction would cease within 330 feet of the discovery and the BLM would be notified. The location of the find would not be publicly disclosed, and the remains would be secured and preserved in place. Any discovered Native American human remains, funerary objects, or items of cultural patrimony found on federal land would be handled in accordance with the Native American Graves Protection and Repatriation Act (43 CFR Part 10). Construction would not resume in the area of the discovery until the BLM has issued a Notice to Proceed.

If Native American human remains and associated funerary objects are discovered on private land during construction activities, construction would cease within 330 feet of the discovery and the Esmeralda County coroner or sheriff would be notified. The location of the find would not be publicly disclosed, and the remains would be secured and preserved in place. Treatment of any discovered Native American human remains and associated funerary objects found on private land would be handled in accordance with Nevada Revised Statute 383.150.

4.8.2 North and South OSF Alternative

Under the North and South OSF Alternative, impacts to tribal resources of concern would be similar to that described under the Proposed Action. Visual impacts at Cave Spring would be less than the Proposed Action because there would be additional reclamation of the quarry highwalls. Impacts would be moderate, long-term to permanent, and localized.

4.8.3 No Action Alternative

Under the No Action Alternative, the Project would not be developed and associated impacts to Native Americans concerns would not occur. Under this alternative, the existing 15 acres of exploration disturbance that has occurred on public lands administered by the BLM would be reclaimed. There would be no impacts from the No Action Alternative to Native American Traditional Values from existing conditions.

4.9 Recreation

4.9.1 Proposed Action

Dispersed recreational users would be unable to access areas of proposed disturbance, including those fenced for public safety. The outer extent of Tiehm's buckwheat designated critical habitat would be fenced with gates locked (approximately 559 acres) (BLM 2024b), which would restrict public access of the two existing two-track roads in the Tiehm's buckwheat designated critical habitat. Recreationists attempting to access the area within the fence should coordinate with Ioneer for safety and to comply with MSHA regulations. Impacts would be moderate, long-term, and localized. Surface disturbance would reduce the amount of land available for dispersed recreation. Of the 2,306 acres of surface disturbance, approximately 869 acres would occur to semi-primitive motorized recreational areas, of which 58 acres would be permanent and the remaining 811 acres would be reclaimed. The loss of recreational area would be a minor to moderate, long-term to permanent, and localized impact.

Surface disturbance would impact 426 acres of LWC328 (32 acres permanently) and 1,356 acres (224 acres permanently) of LWC338. Surface disturbance and noise from quarrying and increased human activity would reduce the amount of land available for recreationists that provide solitude or primitive and unconfined recreation. The LWC's would continue to meet the 5,000 roadless acre criteria for wilderness designation and continue to provide opportunities for solitude and primitive recreation. While no surface disturbance would occur within LWC327, recreationists could experience impacts from increased traffic, and road improvement and maintenance activities occurring in the Access and Infrastructure Corridor. These activities would occur in a discrete area along the southern boundary of LWC327. These activities are not expected to diminish the opportunity for solitude and primitive recreation within the majority of the

LWC. Impacts to LWCs from surface disturbance and increased human activity would be minor, long-term to permanent, and localized.

Existing roads or trails through the OPA currently open to OHV use would continue to be available for public use; however, there would be delays traveling through the OPA. Cave Springs Road would be rerouted for continued public access through the OPA and would have traffic control systems and a pilot car for public safety. Signage would also be used along the access road and within the OPA for safety. Surface disturbance would impact 1,975 acres of OHV use restricted land, including 945 acres (80 acres permanent) limited to existing roads and trails and closed to competitive events and 1,030 acres (286 acres permanent) limited to existing roads and trails. There would also be disturbance to 331 acres (17 permanent) of non-restricted areas. Approximately 383 acres would be permanently disturbed. While trails and roads through the OPA used by OHV recreationists would not be closed, additional traffic and delays may potentially cause OHV recreationists, including Special Recreation Permit holders, to use alternate routes to access areas they previously accessed. Impacts would be minor, long-term to permanent, and localized.

Cave Springs Road through the OPA would remain open to the public, and use of the access road from the Proposed Action would not restrict visitor access and associated recreation at the Fish Lake Valley Hot Springs (Hot Box). There would be an additional 186 to 248 vehicle trips per day during the construction phase and an additional 230 to 288 vehicle trips per day during quarrying and processing on the access road. Recreationists at the Fish Lake Valley Hot Springs would notice an increase in Project-related traffic. Recreationists may experience reduced quality of recreational opportunities (e.g., hot spring use, camping, hiking) at the hot springs because of increased noise, traffic congestion, fugitive emissions from vehicle traffic, and lighting from vehicles. ACEPMs would reduce fugitive emissions, but impacts would still occur from noise, traffic congestion, and lighting. These impacts would be moderate, long-term, and localized. The groundwater model does not predict impacts to the Fish Lake Valley Hot Springs (Piteau 2023b); therefore, impacts would be negligible.

The SOSF, processing facility, and booster station would be visible in the background from the Fish Lake Valley Hot Springs. Due to the distance and ACEPMs, the facilities would appear as small, dark gray to dark brown, low forms that would blend in with the existing mountain landscape. Impacts to recreationists from the view of the Proposed Action would be minor, long-term, and regional. Some Project components are anticipated to be visible from portions of the Silver Peak WSA, particularly from ridgetops and mountain peaks in the far northern part of the WSA. However, the overall quality of views from within the Silver Peak WSA are not anticipated to change substantially. Views would be blocked in most areas by trees and with appropriate ACEPMs, the facilities would not stand out in appearance or color. The Proposed Action would not impact the TFO's ability to administer the non-impairment standard if Congress were to designate the Silver Peak WSA as Wilderness. Impacts to recreationists utilizing the WSA would be minor, long-term to permanent, and regional.

Access for hunting would be restricted from areas of surface disturbance or security fencing. Big game species such as pronghorn, desert bighorn sheep, and mule deer may be displaced by Project activities. The Proposed Action would be constructed within 695 feet of the NDOW big game guzzler in the OPA which may cause big game to avoid using the water source. Ioneer would relocate and rebuild the guzzler based on NDOW recommendations to provide a water source away from the OPA. Hunters would also have to travel further and to different locations to be able to have the same hunting opportunities as those prior to the construction of the Proposed Action. Displaced big game species may resume using the area once operational activities are complete and quarrying has ended. Impacts to hunting would be moderate, long-term, and localized.

There would be an increase in the regional human population. Added residents could increase the demand for recreation resources and opportunities in the region, which may cause congestion in areas that previously provided solitude. Impacts would likely be realized at recreational areas, such as the Fish Lake Valley Hot Springs, parks, and other developed recreation facilities in the nearby communities of Tonopah and Dyer. Such impacts would be expected to be minor to moderate, long-term, and regional.

4.9.2 North and South OSF Alternative

Impacts to recreation would be the same as those described for the Proposed Action except there would be 2,266 acres of surface disturbance. Approximately 719 acres of disturbance would occur to semi-primitive motorized recreational areas with 22 acres being permanently impacted. Surface disturbance would impact 1,902 acres of OHV use restricted land, of which, 1,076 acres are limited to existing roads and trails and 826 acres that are limited to existing roads and trails and closed to competitive events. Permanent disturbance would affect 155 acres designated as limited to existing roads and trails and 48 acres that are limited to existing roads and trails and closed to competitive events. Impacts from surface disturbance to recreational areas would be minor, long-term to permanent, and localized. Surface disturbance would impact 531 acres (28 permanent) of LWC328 and 1,151 acres (114 permanent) of LWC338. This would reduce the amount of land available for recreationists that provide solitude or primitive and unconfined recreation. Impacts would be minor, long-term to permanent, and localized. Up to 719 acres of Tiehm's buckwheat designated critical habitat would be fenced with locked gates (BLM 2024b). To access the area within the fence, the public should coordinate with Ioneer for safety and to comply with MSHA regulations. Impacts would be moderate, long-term, and localized.

4.9.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be developed and associated impacts to recreation would not occur. The existing 15 acres of exploration disturbance on public lands administered by the BLM would be reclaimed and there would be no impacts to recreation.

4.10 Social and Economic Values

4.10.1 Proposed Action

Construction would include up to 500 positions for Years 1 through 4; operation (quarrying and processing) would include up to 350 positions for Years 4 through 17 (quarrying would overlap with construction activities); and closure and reclamation would include personnel as needed for six years.

While the non-local employees and their families would be dispersed throughout the communities within the area of analysis, it is reasonable to assume that the majority of the construction workforce would reside in Tonopah and Hawthorne, Nevada due to infrastructure, services, and proximity to the Project. All communities within the area of analysis could expect population growth resulting from the Proposed Action. Because of the nature of construction activities, it is likely the personnel needed would reside in temporary quarters, such as motels or RV parks, during the work week and return to permanent residences elsewhere. It is anticipated that the Project construction would result in 500 direct employment opportunities and would generate 113 indirect and induced jobs (IMPLAN 2023). It is anticipated that the induced and indirect jobs would be a higher percentage of local people, whereas the direct employment is anticipated to be a higher percentage of non-local people. It is assumed that some of the anticipated impacts from population increase from construction would remain during quarrying and processing, due to some overlap in timing. The increase in population from the construction phase would result in minor to major, long-term, and localized impacts, depending on where construction contractors choose to stay.

During quarrying and processing, it is estimated the employment of 350 workers would result in 79 indirect and induced jobs (IMPLAN 2023). It is anticipated that the indirect and induced jobs would come from a higher percentage of local people, whereas direct employment would include a higher percentage of non-local people. As anticipated during construction, non-local employees and their families would be dispersed throughout the communities within the area of analysis. The majority would likely reside in Tonopah and Hawthorne due to infrastructure, services, and proximity to the Project. However, all communities within the analysis area could expect population growth resulting from the Proposed Action. The impacts of the population increase from quarrying and processing would be major, long-term, and localized to regional. Post-quarrying, the 350 direct quarrying and processing workers would decrease to a minimal amount needed to conduct reclamation and closure. When quarrying and processing are finished, there is the potential that workers would move away from the area of analysis and find other jobs, as there are limited employment opportunities in the area of analysis; however, impacts from population increase including indirect and induced jobs may remain during reclamation and closure.

It is unknown what the race and ethnicity composition of the new population would be. It is likely that it would be similar to the current race and ethnic makeup of the region. If so, there would be no significant change in race and ethnicity in the area of analysis. Immigration into the area of analysis may increase the race and ethnic diversity, as new families become attracted by the relatively high paying jobs and economy of the region. Any changes to race and ethnicity would be a negligible, short-term, and localized impact.

The direct employment of 500 people during the construction phase (four years) would result in direct labor income of $54,141,401 per calendar year and indirect and induced labor income of $2,619,994 per calendar year The direct employment of 350 workers during quarrying and processing would result in a direct labor income of $37,898,981 per calendar year and indirect and induced labor income of $1,833,996 per calendar year. The total direct output that would be generated by employment from the construction phase (four years) is estimated to be $178,775,064 per calendar year, and total indirect and induced output is estimated to be $26,727,813 per calendar year. The total estimated direct value added from the construction phase would be $102,788,237 per calendar year, and total indirect and induced value quarrying would be $10,028,255 per calendar year. The total direct output that would be generated by employment for the quarrying and processing phase is estimated to be $125,142,545 per calendar year, and total indirect and induced output is estimated to be $18,709,469 per calendar year. Total estimated direct value added from quarrying and processing phase would be $71,951,766 per calendar year, and total indirect and induced value added would be $7,019,778 per calendar year. It is assumed that some effects from Project employment may remain post-reclamation and post-closure, impacts to the economy and employment in the area of would be moderate to major, long-term, regional.

Average annual earnings per job would likely increase, as mining provides a higher annual wage in comparison to other industries. Higher wages generated by the Project may also increase the pay expectation in the area of analysis over the long-term. The increase in income would be a major, long-term, and regional impact. Post-construction, there would a loss of 150 jobs (500 construction minus 350 operation), and at the end of quarrying and processing, the quarry would no longer be operating to support the 350 operation jobs. This may result in a long-term impact because workers would have to find another job, which may be outside of the area of analysis. Impacts from employment following closure would be moderate to major, long-term, and regional.

Construction would generate need for an estimated maximum of 328 housing units from the non-local labor (direct, indirect, and induced) from up to 574 new, non-local adults (includes single and married). Construction workers moving into the area would place a demand on temporary housing resources including motel/hotel rooms, RV sites, and campgrounds. In the area of analysis there are approximately 1,169 hotel rooms, 89 RV spaces, and three cabin units for temporary housing. Depending on the current economic conditions occurring and if there are multiple projects occurring within the area of analysis at the same time as the Proposed Action, there is the potential for housing shortages to accommodate construction-related population. Demand for housing during construction may place strain on the housing supply to support the influx of non-local labor. It is assumed the non-local labor would be the primary driver for housing. This could shift the existing housing market in communities, including changes to housing affordability and incur housing shortages in communities with already limited housing, specifically rental vacancies. Impacts to housing from the construction phase may remain through quarrying and processing. Impacts to housing during the construction phase are anticipated to be major, long-term, and regional.

Quarrying and processing would generate demand for 230 housing units from non-local labor (direct, indirect, and induced) from up to 402 new, non-local adults (includes single and married). Rental unit vacancy rates are generally low, at 12.7 percent in Esmeralda County, 7.6 percent in Nye County, 4.9 percent in Tonopah, 4.7 percent in Mineral County, and 9.4 percent in Inyo County. Homeowner units have a higher vacancy rate (average of about 16 percent) but may not be for rent or sale. Increased demand on housing from population associated with the Proposed Action could change the housing and rental market. Changes in the housing market could include impacts to housing affordability including fair market rents and wages within the area of analysis. Due to the overall limited housing options within the areas that workers would most likely reside, such as Tonopah, Hawthorne, and Bishop, potential housing shortages are likely to occur when combined with other concurrent projects in the area of analysis, and workers may have to find housing outside of the area of analysis. Impacts to housing from quarrying and processing may remain post-closure. Increase in demand for housing would be a major, long-term, and regional impact.

Construction and quarrying and processing may impact public utilities in the area of analysis due to the anticipated increase in population in communities such as Tonopah, Hawthorne, and Bishop. Impacts could include improvements or modifications to existing systems. The majority of people would likely locate in areas with existing infrastructure, which may need to be expanded to accommodate the increase in population. Areas not served by municipal systems would be served by private wells, and additional domestic wells may be required to accommodate the increased population. The existing wastewater facilities likely have additional capacity that could support the increased populations, and areas that are not served by utilities would require individual septic systems. All counties in the area of analysis have active landfills for solid waste. Impacts to public utilities would be a moderate, long-term, and localized impact.

The increase in population could require an increase in law enforcement to maintain a similar per capita coverage of officers per residents, as construction is anticipated to bring an additional approximately 574 non-local adults and quarrying and processing is anticipated to bring an additional 402 non-local adults to the area of analysis. This increase in population would likely place increased demand on existing law enforcement and emergency services. The additional tax revenue may allow law enforcement, fire protection, and emergency medical services to increase staffing if suitable candidates are found. However, Esmeralda County would have to hire approximately four additional deputies to provide adequate patrol coverage to Fish Lake Valley and the area abutting Tonopah. The annual salary cost with benefits for a deputy in Esmeralda County is approximately $97,500. Assuming that Esmeralda County would need to hire approximately four additional deputies and additional patrol vehicles, Esmeralda County would need to spend approximately $590,000 per year, a 133 percent increase in Esmeralda County's safety budget. It is assumed that additional costs needed for public safety would not offset revenue in Year 1 and increases in sales tax revenue would be limited, concurrent with early years of the Project. An increase in property tax revenue may occur during quarrying and processing to support these services (Boland 2023). Increased population from the Proposed Action could exacerbate current conditions of the jail in Goldfield, which may necessitate construction of a new jail to accommodate additional capacity and improved inmate conditions. The Project may require an Esmeralda County hire additional fire and ambulance services facility in the north end of Fish Lake Valley to position responders and volunteers near the main access road to the OPA to adequately respond to traffic-related incidences (Boland 2024). The increased population would increase these services through reclamation and closure; thus, impacts would be a major, long-term, and localized.

Sick or injured persons would be required to seek medical care in Bishop, Hawthorne, or Tonopah; life-threatening situations would be treated in Las Vegas, Reno, or Bishop. The increase in population from construction and quarrying and processing would likely increase the demand for health care services in the area of analysis. Access to healthcare facilities is somewhat limited in the area of analysis, so any increase in demand would be a potential strain on the existing facilities. Recruitment of qualified practitioners and service providers has historically been challenging, as individuals employed in these fields often practice in larger communities. Impacts to healthcare would be moderate to major, long-term, and regional.

School enrollment is anticipated to increase under both construction and quarrying and processing. Because of the nature of construction activities, and the short construction duration, it is not anticipated that most construction workers would permanently relocate with their families to the area of analysis. However, there is the potential for an additional 140 school-aged children to enroll in the area of analysis from construction-related population increase. During the quarrying and processing phase, there could potentially be up to 98 additional school age children enrolling in the area of analysis. If evenly distributed across 13 grade levels (kindergarten through 12), there is the potential for approximately seven new students per grade. Based on the student to teacher ratios, the school districts in the area of analysis could have the capacity to accept new students. However, a sudden influx of school-age children could put a burden on the student to teacher ratios. Over time, class sizes may decrease as the increases in enrollment may provide the tax revenues to hire additional teachers, particularly in rural schools (assuming empty classrooms can be found/built to house the additional students). While it is assumed that Esmeralda County would primarily benefit from tax revenues including net proceeds of mineral tax, Nye County, Mineral County, and Inyo County schools could experience delays in tax revenues to accommodate increased school enrollment from the Project population. Depending on where students enroll and what school districts are affected, impacts would be moderate to major, long-term, and localized.

The increases in population assumed would not be expected to change the style or system of local governments; therefore, impacts would be negligible, short-term, and localized. The local governments would be required to provide services to new residents. Esmeralda, Nye, and Mineral counties operated on deficit budgets in 2021. Per annum budget deficits may continue in these counties as a result of additional services anticipated to accommodate growing populations under the Proposed Action. Should budget deficits continue, Nevada Department of Taxation may decide to increase property taxes to balance county budgets (Boland 2023). Impacts would be moderate to major, long-term to permanent, and localized.

Several revenue streams would be realized by Esmeralda County through various taxes levied directly and indirectly by federal, state, and local governmental entities. The majority of the tax revenue to Esmeralda County would be associated with a Net Proceeds of Minerals tax (NewFields 2019b). Other nearby communities (e.g., Tonopah and Hawthorne) would also realize financial benefits through increased commerce and related tax revenues but would not receive tax revenue associated with a Net Proceeds of Minerals tax. Net proceeds from mineral tax revenues would also increase in the state of Nevada due to the increase of mineral production. Based on previous Net Proceeds of Minerals Bulletins published by the Nevada Department of Taxation, Esmeralda County would receive approximately 2.8 percent of net income of the Project. *Ad Valorem* (e.g., property) tax revenues would increase with the increase in property value from the construction of additional housing units for the new employees and their families. Sales tax revenue would also increase due to equipment and materials purchased for the Project, as well as with new employees spending money in the local economy. During the construction phase (four years), total tax generation would be $25,069,752 per calendar year (direct, indirect, and induced). This would include $11,819,628 in federal taxes per calendar year, $4,183,588 in state taxes per calendar year, $5,911,690 in county-level taxes per calendar year, and $3,154,846 in sub-county special district taxes per calendar year. During quarrying and processing, total tax generation would be $17,548,826 (direct, indirect, and induced) per calendar year. This would include $8,273,740 in federal taxes per calendar year, $2,928,511.46 in state taxes per calendar year, $4,138,183 in county-level taxes per calendar year, and $2,208,392 in sub-county special district taxes per calendar year. As some of these impacts from quarrying and processing would extend through reclamation and post-closure, changes in public finance would be a moderate to major, long-term, and localized impact.

The Project would provide stable, high paying jobs for up to 500 families during the construction phase, and 350 during the operation phase. The increase of additional direct employment in the rural area has the potential to change the social structure in the nearby communities. Dyer could expect to see increased use of the facilities (market, gas station, bar, etc.), and the public land in the area of analysis may be more utilized. Increased traffic at the only market in Dyer could impact product supply that locals depend on and overall enjoyment of the market. Water rights secured or leased from current agricultural water users in the Fish Lake Valley for the Project would reduce the level of agriculture in Fish Lake Valley, which has historically been an active agricultural area in Esmeralda County. Changes to agricultural practices in Fish Lake Valley would affect the social and cultural landscape of the area impacting low-income populations as described in Sections 3.3 and 4.3. After reclamation, non-local Project workers may choose to stay in the area of analysis depending on future projects that would continue to provide jobs. Closure of the Project could result in housing market decline and decreased ability to maintain infrastructure that would potentially be built or expanded to accommodate increased population from the Project and could become ‘ghost towns’ as historically seen after mine closures (Bainton 2018). However, future projects as described in Section 4.20 could potentially maintain the housing market and infrastructure and service costs in the area of analysis. It is unknown what economic conditions would impact the area of analysis after reclamation. Overall, impacts to social conditions from the Proposed Action would be moderate to major, long-term, and localized to regional.

4.10.2 North and South OSF Alternative

Impacts to social and economic values under this alternative would be the same as described for the Proposed Action.

4.10.3 No Action Alternative

Under the No Action Alternative, the Project would not be developed, and associated impacts to social and economic values in the area of analysis would not occur. Employment and other socioeconomic measures

would not increase due to the construction and/or operation positions proposed in the area of analysis. The social and economic impacts discussed for the Proposed Action would not occur. In terms of the loss of increased employment and revenues that would be realized under the Proposed Action, the No Action Alternative would have moderate to major, long-term, and localized impacts to social and economic values.

4.11 Soil Resources

4.11.1 Proposed Action

Up to 2,306 acres of soil would be disturbed. This includes approximately 35 acres of exploration disturbance in the OPA, 30 acres of disturbance for dewatering facilities in the OPA, and 20 acres of disturbance for water supply facilities in the Plan boundary. The exploration, water supply facilities, and dewatering facilities would be constructed outside the Tiehm's buckwheat designated critical habitat. Proposed, mapped disturbance to soil map units from the Proposed Action would include up to 2,221 acres associated with the following: Blacktop-Rock outcrop-Pintwater association (139 acres), Blacktop-Rodad-Theriot association (36 acres), Zadvar-Veet-Lyda association (117 acres), Stewval-Pintwater-Rock outcrop association (460 acres), Stewval-Bellehelen-Rock outcrop association (86 acres), Stewval-Bellehelen-Gabbvally association (two acres), Gynelle-Cirac association (two acres), Zaba-Gynelle association (55 acres), Zaba-Yomba-Slaw association (16 acres), Rustigate-Kawich-Cirac association (less than one acre), Slaw-Playas complex (one acre), Slaw-Kawich-Nuyobe association (three acres), Wardenot-Izo association (159 acres), Wardenot-Stonell-Roic association (less than one acre), Cirac-Luning association (four acres), Cirac-Rustigate-Settlement association (nine acres), Cirac-Kawich association (28 acres), Stonell-Wardenot-Izo association, moist (665 acres), Luning-Sodaspring association (38 acres), and Lyda-Ardivey-Izo (401 acres). Reclamation would be conducted as soon as practical, with concurrent reclamation implemented to the maximum extent possible. There would be approximately 383 acres of permanent surface disturbance. Impacts from permanent disturbance would be minor, permanent, and localized.

Removing native soil causes the mixing of soil horizons that can result in the degradation or loss of soil function. This disturbance, as well as long-term storage in stockpiles, can alter soil productivity by affecting its permeability, structure, and microbial activity. Growth media salvage, transport and storage, and redistribution would modify existing soil structure, which would affect aeration and permeability. It is likely that some mixing of textural zones would occur, as well as mixing of saline or alkaline materials with relatively salt-free materials, which may result in chemical effects to soil quality for seedbeds. In addition, microbial populations that currently exist in the growth media would likely decrease during stockpiling and storage. Other effects include dispersion and mobilization of soils via wind and water erosion. Soil associations with higher erosion potential would be impacted the greatest. Impacts from surface disturbance would be minor to moderate, long-term to permanent, and localized.

Disturbance of topsoil would remove any biocrusts that are present, although none were documented during surveys. Damage to biocrusts would change the soil structure and reduce soil quality; however, natural processes such as wind and water transport of soil particles from surrounding areas would incidentally reintroduce microorganisms. Effects to biocrusts, if present, would be moderate, long-term to permanent, and localized.

Soils can contain bacteria and fungi that can cause lung diseases, such as valley fever. Wind erosion of soils and generation of fugitive dust may transfer these bacteria and fungi, if present. Wind erosion and fugitive dust would be controlled on roadways and other areas of disturbance with water or NDEP/BLM-approved dust suppressants, where appropriate. Disturbed areas would be seeded with an interim seed mix developed in conjunction with the BLM to minimize fugitive dust emissions from exposed, unvegetated surfaces. Personal protective equipment required by MSHA, such as use of a fitted N95 respirator when working around dust, and other best management practices, such as working upwind from surface disturbance, changing dusty clothing and footwear after work, and operating machine HEPA-filtered cabs and windows closed, would limit exposure of employees to valley fever and other bacteria and fungi, if present (CDC 2024).

Soils could be impacted from spills or leaks of chemicals during transportation, storage, and use. Petroleum-contaminated soils resulting from spills or leaks would be addressed immediately and removed from the spill site and stored in appropriate secondary containment areas in accordance with NDEP

guidelines. Ioneer would excavate and transport any petroleum-contaminated soils to a licensed off-site disposal facility. Impacts from soil contamination would be negligible to minor, permanent, and localized.

Effects to soils would be reduced by Ioneer's commitment to reclaim Proposed Action facilities and successfully restore lands to pre-quarrying productivity and land uses. ACEPMs and BMPs would be implemented to limit erosion, trap sediment, and control stormwater from the effects of wind, precipitation, and stormwater run-off from Project facilities and on disturbed areas during construction, operation, and initial stages of reclamation. Reclamation efforts would involve soil stabilizing products. Results from soil analyses and revegetation tests conducted during quarrying would be used to determine what, if any, organic matter and nutrients will need to be added to the prepared surfaces prior to or at the time of seeding (Ioneer 2022). Additional organic matter and nutrients may increase soil water capacity and availability to plants. Soil quality on reclaimed and revegetated sites could resemble pre-quarrying conditions. Effects to soil quality from the Proposed Action would be minor to moderate, long-term to permanent, and localized. To reduce impacts of stormwater and snowmelt erosion, stormwater diversion barriers and channels would be constructed to divert water away from and downgradient of stockpiles and facilities. Some channels would remain post-reclamation. Impacts would be negligible, long-term to permanent, and localized.

The Proposed Action could result in up to 81 acres of disturbance to soil map units classified as farmland of statewide importance. The majority of the disturbance along the access road would fall within the 40- to 60-foot-wide Hot Creek Road ROW. Disturbance of these map units would be reclaimed when the Project ends. The predominant use of lands outside of the fenced SR 264 ROW is grazing land for livestock. Following successful reclamation, these lands would again be capable of producing forage for livestock. The disturbance would not irreversibly convert farmland to nonagricultural use. Impacts to farmland of statewide importance would be minor, long-term, and localized.

There are 32 spring sites within the one-mile buffer of the predicted 10-foot groundwater drawdown contour from the Proposed Action dewatering (Piteau 2023b). Twelve spring sites were dry during surveys in 2019 (HydroGeoLogica 2020b); therefore, impacts from drawdown would be negligible on soils at these springs. Most of the springs within the drawdown contour are likely perched features as suggested by their elevated, hillside locations, while some are located in wash or canyon bottoms (HydroGeoLogica 2020b). Impacts to surface water availability from groundwater drawdown would depend on the source of groundwater at the springs. If the springs are sourced from upwelling groundwater on the upgradient side of a low permeability fault zone, the dewatering of the quarry may decrease the amount of water upwelling to discharge via the springs. The amount of spring flow reduction would be dependent on the actual increase in the horizontal groundwater gradient and could result in a cessation of groundwater sourced flow unless water levels recovered over a period of approximately 200 years (Piteau 2023b). Reduced flows or cessation of flows would alter the hydrologic conditions under which the soils formed at the spring sites. This can result in impacts to the soils' nutrient cycling and microbial processes which can affect the soils' ability to support riparian or wetland vegetation. Although riparian areas and wetlands comprise a small portion of the terrestrial landscape, they provide important wildlife habitat and ecosystem services (e.g., water purification, carbon sequestration) that are mediated by soil processes. The change from a hydric soil to a non-hydric soil could slow down the soil forming process due to sink or related weathering of soil forming facts including climate, organisms, relief, parent material, and time. If impacts to spring sites are realized, then impacts to soils at these sites would be moderate, long-term to permanent, and localized.

4.11.2 North and South OSF Alternative

Effects to soil resources under the North and South OSF Alternative would be similar to the Proposed Action except there would be a total of 2,266 acres of disturbance, of which 211 acres would be permanent. Effects from surface disturbance associated with the North and South OSF Alternative would be minor to moderate, long-term to permanent, and localized.

4.11.3 No Action Alternative

Under the No Action Alternative, the Project would not be approved. The existing 15 acres of exploration disturbance has occurred on public lands administered by the BLM and would be reclaimed. No additional surface disturbance would occur. Impacts would be localized, short-term, and negligible.

4.12 Threatened and Endangered Species

4.12.1 Proposed Action

4.12.1.1 Bi-State Sage-Grouse

Up to 1,064 acres of vegetation communities with the potential to provide habitat for BSSG would be disturbed. The surface disturbance would result in the conversion of shrub-dominated vegetation cover types to grass/forb-dominated vegetation cover types. This conversion would represent a permanent and localized impact as it may take up to 25 years following reclamation for mature shrubs to become re-established. Reclamation would be completed on approximately 785 acres of the potential BSSG habitat. Reclamation would reduce direct and indirect effects of the Proposed Action. Impacts from surface disturbance would be negligible, long-term to permanent, and localized.

There would be no impacts to leks or breeding BSSG due to the distances of these habitats from the Project. During construction, operation, and reclamation increased human presence and noise could cause those BSSG that occasionally travel through the OPA to avoid the area. Impacts would be negligible, long-term, and localized. While unlikely due to the limited use of the OPA by BSSG and established ACEPMs, vehicular traffic associated with the Project could injure or cause fatalities to individuals, but population-level impacts would not be expected. Impacts from vehicles would be minor, long-term, and localized.

The presence of the post-reclamation quarry lake is not expected to result in ecological risk to avian species. Impacts would be negligible, permanent, and localized. There is one spring located within the proposed critical habitat east of the OPA. This spring is inside the area of analysis and the maximum extent of the predicted 10-foot drawdown area for the Proposed Action. Impacts from groundwater drawdown associated with the Proposed Action are anticipated to be minor, permanent, and localized.

4.12.1.2 Monarch Butterfly

Surface disturbance would remove 2,306 acres that may provide habitat for monarch butterflies. Surface disturbance could displace monarch butterflies that use these areas, although none were documented during baseline surveys. The Project would not directly remove any identified milkweed species. However, the Project may remove other nectar producing plants utilized by monarch butterfly. The surrounding areas are anticipated to provide similar habitat that could support displaced monarch butterflies. Disturbance would be reclaimed except for 383 acres which would result in a permanent impact to potential monarch butterfly habitat. Reclamation activities would reduce effects of the Proposed Action. Impacts to monarch butterflies as a result of surface disturbance would be minor, long-term to permanent, and localized.

The quarry lake may eventually have limited vegetation establish in shallow areas along the quarry edges that may support flowering plants that could be nectar sources. Beneficial impacts from the quarry lake would be negligible to minor, permanent, and localized.

Impacts to monarch butterfly habitat include the potential establishment and spread of noxious and non-native invasive weed species during construction, operation, or reclamation. Invasive weedy species may outcompete native vegetation, reducing the quality of habitat for monarch butterfly. Implementation of the Noxious and Invasive Species Plan (Ioneer 2022) would reduce impacts from noxious and invasive weeds. Impacts to monarch butterflies as a result of the spread or establishment of noxious and non-native invasive plant species are expected to be minor, long-term, and localized.

Use of herbicides to control weeds has the potential to impact non-target vegetation such as milkweeds or other nectar producing plants that monarch butterflies might use. The Noxious and Invasive Weed Management Plan includes operational guidelines to ensure applications of herbicide are controlled and minimize impacts on non-target vegetation such as milkweed. Impacts to monarch butterflies from the use of herbicides is expected to be minor, long-term, and localized.

Impacts to monarch butterflies could occur from collisions with vehicles. The additional traffic on the access road and in the OPA would likely injure or cause fatalities to individuals, but population-level impacts would not be expected. Therefore, impacts would be minor, long-term, and localized.

Potential impacts from groundwater drawdown may include decreased plant species abundance diversity at seep and spring sites which would reduce nectar sources for monarch butterflies. The amount of spring flow reduction would be dependent on the actual increase in the horizontal groundwater gradient and could result in a cessation of groundwater sourced flow unless water levels recovered, which is predicted to occur over a period of more than 200 years (Piteau 2023b). Reduced flows or cessation of flows would limit water availability and impact monarch butterfly habitat. If impacts to spring sites are realized, then impacts to monarch butterfly would be negligible, long-term, and localized.

4.12.1.3 Tiehm's Buckwheat

The Proposed Action was designed to avoid impacts to Tiehm's buckwheat subpopulations. The Tiehm's Buckwheat Protection Plan (EM Strategies 2022b) was prepared to describe the ACEPMs intended to minimize potential impacts to Tiehm's buckwheat associated with the Proposed Action and increase the likelihood of the survival of the species. The ACEPMs consist of six elements: avoidance, education, dust management, invasive species prevention, wildfire prevention, and restoration of habitat.

Approximately 559 acres of Tiehm's buckwheat designated critical habitat would be fenced. Within the 559 acres of fenced critical habitat, 51 acres associated with six Tiehm's buckwheat subpopulations would be fenced (i.e., six subpopulations would be fenced within the fenced critical habitat) (**Figure 4-1**). The existing road between Cave Springs Road and proposed Communication Tower 4 is within a subpopulation. This road would be realigned outside of the Tiehm's buckwheat subpopulation to reduce impacts from use of the road.

The Proposed Action would avoid surface disturbance to all Tiehm's buckwheat subpopulations. The Proposed Action would disturb approximately 354 acres (39 percent) of designated critical habitat (**Figure 4-1**). Of the 910 acres of designated critical habitat, approximately 97 acres (11 percent) of surface disturbance would remain permanently in designated critical habitat (**Figure 4-2**). Reclamation activities include the reconstruction of Tiehm's buckwheat designated critical habitat with suitable soil salvaged and stockpiled during construction and operation. Ongoing soil evaluations would be used to describe and refine the understanding of Tiehm's buckwheat growth media requirements (EM Strategies 2022b). No soils would be removed or salvaged from occupied habitat, so no impacts to existing soil characteristics would occur within Tiehm's buckwheat occupied habitat. Surface soils suitable for Tiehm's buckwheat would be segregated and managed as a growth media resource, if appropriate, and retained for reclamation. Ongoing soils evaluations would be used to describe and refine the understanding of Tiehm's buckwheat growth media requirements (EM Strategies 2022b). However, the removal and storage of Tiehm's buckwheat preferred soils could alter the characteristics of the soils that the plant needs for survival. Reclamation seeding would occur within 12 feet of one subpopulation. Impacts to Tiehm's buckwheat and designated critical habitat from surface disturbance would be moderate to major, long-term to permanent, and localized.

The removal of this habitat may displace ground squirrels and reduce the amount of foraging habitat available. This may increase the use of the Tiehm's buckwheat subpopulation areas and designated critical habitat by potentially displaced herbivores. One herbivory event has been documented within Tiehm's buckwheat subpopulations and resulted in estimates of 60 percent of the plants being killed or damaged. Herbivory is a natural process, and it is unknown how often and at what scale it typically occurs within the subpopulations. Impacts from increased risk of herbivory as a result of the displacement from the Proposed Action would be minor to moderate, long-term to permanent, and localized.

Disturbance would reduce the amount of habitat available for pollinators. Reduced habitat for pollinators could lead to decreased Tiehm's buckwheat seed production (McClinton et al. 2020) which could lead to less recruitment. The haul road and the associated traffic may result in restriction to pollinator movements between the northern subpopulations (subpopulations 1, 2, and 8) and the southern subpopulation (subpopulations 3, 4, 5, 6a, 6b, and 7), which may limit genetic exchange between the two subpopulation groups. Following successful reclamation, the reclaimed areas would be expected to be similar to the pre-disturbance landscape in its ability to host a variety of pollinators. Increased sources of light, noise, traffic, and dust may also affect Tiehm's buckwheat pollinator movement, diversity, and abundance. Areas of increased light production may affect pollinator movement, foraging, reproduction, and food-web systems (Owens et al. 2020). Additionally, increased light sources may attract insects and associated predators

such as bats. Lights that create attractants may also serve as traps, increasing predation (Stone et al. 2015). Response of terrestrial arthropods to noise has been shown to be variable, with negative, positive and no relationship observed between different taxa (Bunkley et al. 2017). Impacts to Tiehm's buckwheat from altered pollinator relationships would be moderate to major, long-term to permanent, and localized.

Surface disturbance could lead to the establishment and spread of non-native, invasive plant species. A Noxious and Invasive Species Plan (Ioneer 2022) would be implemented to reduce the likelihood of invasive species becoming established or spreading. Chemical treatment and associated herbicide drift near Tiehm's buckwheat populations could damage or kill buckwheat plants if herbicide drift occurs. Applications of herbicide would be controlled to minimize impacts on non-target vegetation. Any invasive species treatment activities within the buckwheat exclusion areas would be limited to methods approved by BLM (EM Strategies 2022b). Impacts from the spread of non-native, invasive plant species and herbicide use would be negligible to minor, long-term, and localized.

Project activities and vehicle traffic would impact Tiehm's buckwheat if dust generated are not adequately controlled and resulting deposition rates in the subpopulations exceed tolerance levels of Tiehm's buckwheat. Increased dust deposition rates could result in lowered photosynthesis and decreased water use efficiency. Ioneer has committed to monitoring dust-related impacts to Tiehm's buckwheat and using fugitive dust controls on roads and disturbed areas, which would reduce generation of fugitive dust (EM Strategies 2022b). Measures include implementing a dust deposition monitoring program and verifying the effectiveness of dust suppressant measures on unpaved roads, construction areas, and stockpiles. Impacts to Tiehm's buckwheat from fugitive dust would be minor, long-term, and localized.

Use of chemical binding agents for dust suppression may impact Tiehm's buckwheat and designated critical habitat from potential damage to vegetation. The ability of Tiehm's buckwheat to tolerate salts is unknown but it is likely that Tiehm's buckwheat has some ability to tolerate salts. Because of the location of the Tiehm's buckwheat subpopulations in relation to roads and disturbed areas, it is not anticipated that the subpopulations would be at risk of receiving increased salts from runoff of treated areas because the subpopulations are located at elevations greater than planned facilities. All but one subpopulation are located upslope of roads and other disturbances. A portion of subpopulation 1 is situated in a wash downslope of an existing road that would be used for access to Communication Tower 4. Use of the existing road may result in some runoff, though it is not anticipated to increase substantially from existing conditions. Impacts from the use of dust suppressants would be minor to moderate, long-term, and localized.

Nitrogen and sulfur deposition from Project emissions may impact Tiehm's buckwheat by altering the growth, physiology, and community composition. Proposed Action emissions have been modeled and it is anticipated that the Project would be in compliance with primary and secondary standards. For further discussion, see the Air Quality SER. The current secondary NAAQS for nitrous oxides and sulfur oxides were set to protect against direct damage to vegetation by nitrous dioxide and sulfur dioxide (USEPA 2020). Therefore, impacts from emissions would be negligible, long-term, and localized.

Construction of the Proposed Action could alter overland flow following precipitation events. Due to existing topography, the North OSF would not alter overland flow patterns within designated critical habitat or within Tiehm's buckwheat subpopulations 1, 2, and 8. It is unlikely that there would be a noticeable increase in overland flow from the construction of the drainage collection structures at the toe of the West OSF. Because the extent to which Tiehm's buckwheat relies on overland flow is unknown, alteration of natural flow patterns could have adverse or beneficial effects by increasing or decreasing the amount of moisture reaching the subpopulations. Because Tiehm's buckwheat is adapted to dry, upland sites, subject only to occasional saturation by rain and snow, alteration of overland flow is anticipated to have negligible to minor, long-term to permanent, and localized impacts.

Based on quarry design (Geo-Logic Associates 2022), the loss of Tiehm's buckwheat from slope failure is unlikely and not anticipated. Construction of a post-quarrying buttress would increase the Factor of Safety along the prior minimum failure surfaces below the Tiehm's buckwheat subpopulations and that Project slope stability criteria can be readily achieved for long-term, post-reclamation quarry slopes (Geo-Logic Associates 2023). In most cases the buttressed faces would have a post-closure Factor of Safety close to or greater than 2.0 following construction of the planned final slope configuration (Geo-Logic Associates

2023). With the quarry lake, the Factor of Safety for the critical slip surface is reduced slightly from 1.91 to 1.72 but still within the stability criteria. (Geo-Logic Associates 2023). Based on the review of local faults and seismicity, it is anticipated that no significant infrastructure damage would occur to facilities within the Plan boundary during the life of the Project (NewFields 2019c). Impacts to Tiehm's buckwheat due to geologic hazards would be negligible, long-term to permanent, and localized.

Dewatering is not anticipated to affect Tiehm's buckwheat because it is not dependent on groundwater for water. Based on the depth to groundwater in designated critical habitat (estimated to be 140 feet or greater) (Piteau 2023b), designated critical habitat vegetation species root systems would not extend to the water table; thus they are not anticipated to utilize groundwater for their life cycle. Lowering of a water table by dewatering or water production has the potential to result in subsidence within water-bearing lithologies when the hydrostatic pressure that partially supports the lithologic matrix is removed. Any subsidence would coincide with the groundwater drawdown cone. Subsidence within Tiehm's buckwheat designated critical habitat and at subpopulation locations is estimated to range between 0.4 inch to four inches. The far western portion of unoccupied Tiehm's buckwheat designated critical habitat may experience approximately six inches of subsidence (HydroGeoLogica 2020c), but no subpopulations occur in this area. If subsidence occurs within critical habitat, impacts to Tiehm's buckwheat subpopulations and designated critical habitat may occur. However, the subsidence analysis prepared by HydroGeoLogica was evaluated from an older Project groundwater pumping scenario, which showed greater groundwater pumping in the vicinity of the quarry than under the Proposed Action. The quarry and associated dewatering pumping have been moved east and south of the Tiehm's buckwheat subpopulations under the Proposed Action relative to the location assessed for subsidence in HydroGeoLogica 2020c. It is anticipated that subsidence under the Proposed Action would be less than described in the HydroGeoLogica 2020c report because of the groundwater pumping differences, the clay content of the Cave Spring Formation where the Project is located, and the distribution of the volcanic baseline rocks (where subsidence would not be expected) (WestLand 2024b). Impacts to Tiehm's buckwheat and designated critical habitat from dewatering and subsidence would be negligible to minor, long-term, and localized.

4.12.2 North and South OSF Alternative

4.12.2.1 Bi-State Sage-Grouse

Impacts of the North and South OSF Alternative for BSSG would be same as described for the Proposed Action except that up to 776 acres of vegetation with the potential to provide habitat for BSSG would be disturbed. Reclamation would be completed on approximately 644 acres of the potential BSSG habitat; therefore, 132 acres of permanent disturbance would remain. Impacts would be negligible, long-term to permanent, and localized.

4.12.2.2 Monarch Butterfly

Impacts of the North and South OSF Alternative for monarch butterfly would be the same as described for the Proposed Action except that surface disturbance would remove 2,266 acres that may provide habitat. There would be 211 acres of permanent disturbance that would result in a permanent impact to monarch butterfly habitat. Impacts from surface disturbance would be negligible to minor, long-term to permanent, and localized.

4.12.2.3 Tiehm's Buckwheat

The North and South OSF Alternative was designed to avoid direct impacts to Tiehm's buckwheat subpopulations and minimize disturbance within designated critical habitat (WestLand 2024b). Subpopulations closest to major disturbance/Project facilities are subpopulation 3, which is approximately 15 feet from the quarry; subpopulations 4, 5, 6, and 7, which range from 67 feet to 459 feet from the Quarry Infill OSF; and subpopulation 5, which is approximately 208 feet from the quarry. In addition, several proposed dust monitors, sound level monitors, light monitors, a weather monitoring location, and insect monitoring plots would be located in direct proximity to each subpopulation (WestLand 2024b). Ioneer, in cooperation with the BLM and the USFWS, developed the *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* document which is specific to the North and South OSF Alternative (WestLand 2024b).

The North and South OSF Alternative would disturb approximately 191 acres (21 percent) of designated critical habitat and avoid all subpopulations (**Figure 4-3**). Disturbance within designated critical habitat would be reclaimed, with the exception of 45 acres (five percent), primarily associated with the quarry lake (**Figure 4-4**). The 40 acres of proposed highwall bench reclamation would only receive seeding with the pollinator seed mix and would receive no further pollinator habitat reclamation due to safety reasons and inaccessibility of the highwall benches after they are constructed. No post-seeding management for the seeded highwall benches would occur if the seeding were unsuccessful (WestLand 2024b). In addition, portions of the seeded highwall benches would be inundated by the post-reclamation quarry lake. It is unknown how successful seeding of highwall benches would be over the long-term in creating pollinator habitat. As a result, the highwall bench reclamation may be a permanent loss of pollinator habitat. The permanent removal of pollinator habitat would increase to 85 acres if the 40 acres of highwall bench seeding is unsuccessful, which would then become a permanent impact to pollinator habitat (approximately 10 percent of Tiehm's buckwheat designated critical habitat).

The *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* (WestLand 2024b), provides geotechnical design to ensure appropriate margins of safety of the quarry walls during operation and post-closure. Where necessary, ground anchors have been incorporated into quarry wall design to achieve the targeted Factor of Safety (Geo-Logic Associates 2023). Geotechnical slope stability analysis indicated that the ground anchors and post-mining buttress allow the wall to meet stability criteria of a minimum Factor of Safety of 1.2 or greater for quarry slopes (Geo-Logic Associates 2023). The stability analysis checked the potential for the quarry lake to affect the critical slip surface intercepting the Tiehm's buckwheat subpopulations. Only one section was determined to have an interaction between the quarry lake elevation and the critical slip surface, and this section is not directly below the Tiehm's buckwheat subpopulations. The stability analysis utilized a range of quarry lake elevations to be conservative. These elevations ranged from 5,744 feet AMSL to 5,621 feet AMSL (Geo-Logic Associates 2023). The final quarry lake is estimated to reach a steady state stage elevation of approximately 5,646 feet AMSL, and a maximum elevation of 5,650 AMSL, which is within the range of elevations used for assessing slope stability. The stability analysis determined that the Factor of Safety for the critical slip surface reduced slightly, but still achieved the Factor of Safety criteria. Geotechnical monitoring would occur to protect miners and Tiehm's buckwheat subpopulations, the monitoring activities and understanding of the rock mechanics derived during operations would allow for continued refinement of the geotechnical stabilization methods deployed (WestLand 2024b). In addition to the anchors and post-mining buttress discussed above, trim blasting techniques and blasting mats would be used. Further, Ioneer plans to prepare and implement protocol and procedures to adjust for conditions encountered in the quarry during mining. These procedures and protocols would be reviewed and approved by the BLM and the USFWS for monitoring quarry highwall stability during operations. This would include implementation of specific measures to address any potential stability issues identified during monitoring (WestLand 2024b). Impacts from geotechnical stability are anticipated to be long-term to permanent, moderate, and localized.

Approximately 719 acres of designated critical habitat would be fenced off (**Figure 4-3**). Within the fenced area, there would be approximately two acres of existing disturbance. Wildlife-friendly fencing of Tiehm's buckwheat designated critical habitat would prevent human access and livestock grazing and trampling, which would limit vegetation and associated pollinator effects in Tiehm's buckwheat designated critical habitat adjacent to the Tiehm's buckwheat subpopulations (WestLand 2024b). Approximately 18,118 linear feet of fence and 352 linear feet of gate would be constructed at the limit of planned surface disturbances and approximately 21,847 linear feet of fence would be constructed in undisturbed areas one foot outside of Tiehm's buckwheat designated critical habitat, except where site topography makes fence construction impracticable or unsafe. Impacts from fencing are anticipated to be minor, long-term, and localized.

Disturbance within designated critical habitat would occur incrementally during quarrying, starting in Year 1 with approximately 21 acres of designated critical habitat being disturbed in Year 1. Disturbance would increase to 23.6 acres within designated critical habitat in Year 3, 66.9 acres in Year 4, 87.9 acres in Year 5 through Year 6, 88.2 acres in Year 7 through Year 10, 133.8 acres in Year 11, and 191.4 acres in Year 12, which is the maximum level of disturbance that would occur within Tiehm's buckwheat designated critical habitat (WestLand 2024b).Other than incidental areas totaling 16.5 acres including some benches on the highwall, pollinator habitat reclamation within designated critical habitat is not anticipated to occur until Year 19, after the buttress is fully constructed (WestLand 2024b). Pollinator habitat reclamation would

consist of three phases, including planning and design, implementation, and performance criteria, monitoring, and reporting. Reclamation efforts inside of designated critical habitat that would be designed to accelerate the establishment of habitat suitable for the various life history stages of the diverse pollinator community that supports Tiehm's buckwheat, while limiting risk from undesirable species which are common in early-phase reclamation. This would include growth media characterization for use with pollinator reclamation efforts, site preparation, use of appropriate seed mixes and plant materials, seeding and erosion protection, and containerized plantings (WestLand 2024b). The validation and the effectiveness of the methods implemented would be refined and optimized during early phase reclamation efforts. Reclamation within designated critical habitat would begin in Year 19 once buttresses have been constructed to provide for long term stability of the west quarry wall (WestLand 2024b). There is no direct surface disturbance of the Tiehm's buckwheat subpopulations proposed as part of the North and South OSF Alternative. Impacts to Tiehm's buckwheat from surface disturbance in designated critical habitat would be moderate to major, long-term to permanent, and localized. Impacts to Tiehm's buckwheat from altered pollinator relationships are anticipated to be moderate to major, long-term to permanent, and localized.

The *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* (WestLand 2024b) provides specific details on noxious and invasive weed control regarding pollinator habitat reclamation. Ioneer would implement a non-native, noxious, and invasive weed species control program within the operations footprint with particular focus on saltlover for the life of the Project. Areas of existing disturbance would be evaluated on an annual basis to determine the relative level of infestation and required control efforts. Treatment would be achieved using herbicide treatments, and where appropriate, mechanical removal techniques. Application during the period when weeds are small and growing rapidly, but prior to the blooming period to prevent seed development, would take advantage of post-emergence. Herbicide and pesticide application would not occur within 50 feet of delineated Tiehm's buckwheat subpopulations. When weed removal within subpopulations is required, it would be accomplished mechanically and in a manner that minimizes disturbance to soils and desirable plants. Non-Native, Invasive, and Noxious Species Management and Monitoring Protocols and Procedures would be developed prior to Project construction in coordination with the Weeds Coordinator at the BLM Nevada State Office and USFWS. There would be 163 acres less of disturbance in designated critical habitat, reducing the areas with potential for spread of weed species. Impacts from the spread of non-native, invasive plant species would be negligible to minor, long-term, and localized.

Quarrying activities and vehicle traffic may impact Tiehm's buckwheat if dust generation is not adequately controlled and resulting deposition rates in the subpopulations exceed tolerance levels of Tiehm's buckwheat. Increased dust deposition rates may result in lowered photosynthesis and decreased water use efficiency. The primary area for dust generation from the North and South OSF Alternative is the haul road and associated traffic, as well as the blasting and operations in the quarry. Traffic and any associated dust deposition in subpopulations 1, 2, and 8 is expected to decrease as the unpaved road between these populations would be closed to public use. However, subpopulations 3, 4, 5, 6, and 7 (and in particular subpopulations 3 and 6) are in close proximity to the quarry, haul road, and South and Quarry Infill OSF. The North and South OSF Alternative includes dust monitoring using seven proposed onsite dust monitors to manage and potentially mitigate fugitive dust (Westland 2024b). With approval by the BLM and USFWS, adaptive management actions would be triggered, if the trailing 12-month average dust deposition levels are found to exceed four grams per square meter per day (WestLand 2024b). Development of protocols and procedures would occur to aid operations with the implementation of the dust monitoring requirements and a Study Design would be prepared to refine the established trigger threshold for particulate matter deposition discussed below, if required (WestLand 2024b).

The *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* (WestLand 2024b) includes a particulate matter deposition analysis of dust flux from the haul road for early phases of quarry development (Year 3 of operations) and peak operations (Year 11 of operations). Modeling was conducted using multiple inputs for background concentrations, surface silt material content, and fugitive dust control efficiency. Models were run for an average of two round trips for 150-ton haul trucks in Year 3, and for 525 round trips in Year 11. Operations Year 11 would have the maximum estimated roundtrips per day past subpopulation 3, thus operations Year 11 were used as the maximum impact year. Based on the analysis, the total estimated dust flux generated from the Project

would be below the threshold established (i.e., 12-month average dust deposition levels of four grams per square meter per day) (WestLand 2023b).

Determining the level of dust deposition at which effects to Tiehm's buckwheat would occur is difficult without species-specific studies or studies that document a no effect threshold in similar species. Because data on the effects of dust on Tiehm's buckwheat is lacking, Ioneer proposes to fund research using Tiehm's buckwheat plants it has growing in its greenhouse to provide data on the physiology and growth of Tiehm's buckwheat and would refine trigger thresholds for the implementation of the management strategy, if determined necessary. Dust suppression activities would not occur outside of proposed disturbance areas to avoid potential impacts to Tiehm's buckwheat subpopulations and designated critical habitat. Impacts to Tiehm's buckwheat from fugitive dust are anticipated to be minor to moderate, long-term, and localized.

The Air Quality Impact Analysis demonstrated that the Project would be below the threshold for all criteria pollutants (WestLand 2024b). The peak PM_{10} impacts occur primarily around Cave Springs Road, the processing facility, and the SOSF (WestLand 2024b). The average 24-hour PM_{10} impacts within Tiehm's buckwheat subpopulations ranged from seven to 26 percent of the NAAQS standard (i.e., 150 $\mu g/m^3$). The peak high average 24-hour PM_{10} impact does not overlap Tiehm's buckwheat subpopulations or designated critical habitat. Whereas particulate matter impacts would occur within Tiehm's buckwheat designated critical habitat, the Project is below the required primary standards set forth in the NAAQS. As the Project is below the required primary NAAQS, it would be below the secondary standards as well, so impacts to vegetation are anticipated to meet NAAQS.

Increased sources of light and noise may also affect Tiehm's buckwheat pollinators. Potential sources of light include lighting for non-daytime work at the quarry, South and Quarry Infill OSF, North OSF and night-time haul truck and vehicular traffic. Areas of increased light production may affect pollinator movement, foraging, reproduction, and food-web systems (Owens et al. 2020). The *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* (WestLand 2024b) would minimize artificial light and avoid lighting at night, avoid light spill into designated critical habitat, avoid white and blue wavelengths to reduce insect attraction, and filter lights with an amber or red tint to minimize visibility to pollinators and other insects. Ioneer would also implement light and sound monitoring activities proximate to Tiehm's buckwheat subpopulations. Light and sound monitoring equipment would be placed at six locations within designated critical habitat and proximate to Tiehm's buckwheat subpopulations in order to assess noise data and provide for a potential correlation between how pollinator communities are responding to Project-related noise. With implementation of light and noise monitoring, coupled with demographic and recruitment monitoring, insect visitors and pollinator diversity and abundance monitoring, the relocation of the haul road to the east, as well as sound attenuation that would likely occur from the quarry highwalls as the quarry gets deeper, light and noise generated within designated critical habitat would result in minor to moderate, long-term and localized impacts to pollinator populations.

The North and South OSF Alternative is not expected to alter surface water hydrology or moisture supply within any of the subpopulations of Tiehm's buckwheat based on the elevations of the subpopulations being greater than planned facilities or alter surface water hydrology or moisture supply within designated critical habitat located at elevations greater than planned facilities (WestLand 2024b). The Stormwater Management Plan (Ioneer 2022) outlines the designs of structural controls and procedures to keep non-contact surface water runoff separate from contact water. A stand-alone document would be developed to describe the design elements and BMPs that would be implemented within or have the potential to discharge to designated critical habitat and would include the specific monitoring and reporting protocols that would be implemented through closure of Project facilities (WestLand 2024b). Alteration of overland flow is anticipated to have negligible to minor, long-term to permanent, and localized impacts. Impacts from dewatering and subsidence would be the same as discussed for the Proposed Action.

The *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* (WestLand 2024b) would establish several monitoring efforts, including Demographic and Recruitment Monitoring, Critical Habitat Subpopulation Monitoring, Insect Visitation and Pollinator Diversity and Abundance Monitoring, Noise Monitoring, and Stormwater Control Measures Monitoring to help reduce impacts to Tiehm's buckwheat subpopulations.

4.12.3 No Action Alternative

4.12.3.1 Bi-State Sage-grouse

Under the No Action Alternative, the Project would not be approved. The existing 15 acres of exploration disturbance has occurred on public lands administered by the BLM and would be reclaimed. Exploration disturbance has contributed to loss of potential habitat and may have contributed to avoidance to those areas. Direct and indirect existing impacts to BSSG would remain, such as OHV use and habitat impacts from noxious or invasive species. Impacts would be negligible, temporary to short-term, localized impacts.

4.12.3.2 Monarch Butterfly

Under the No Action Alternative, the Project would not be approved. The existing 15 acres of exploration disturbance has occurred on public lands administered by the BLM and would be reclaimed. Exploration disturbance has contributed to loss of potential habitat and may have contributed to avoidance to those areas. Direct and indirect existing impacts to monarch butterflies would remain, such as OHV use and habitat impacts from noxious or invasive species. Impacts would be negligible, long-term, and localized.

4.12.3.3 Tiehm's Buckwheat

Under the No Action Alternative, the Project would not be approved and the associated effects to Tiehm's buckwheat would not occur. The existing 15 acres of exploration disturbance on public lands administered by the BLM would be reclaimed. Subpopulations of Tiehm's buckwheat would remain vulnerable to existing threats such as OHV use, invasion of noxious or invasive species, livestock grazing, and herbivory. Impacts would be negligible, long-term, and localized.

4.13 Transportation and Access

4.13.1 Proposed Action

Up to 4.7 miles of the Cave Springs Road and 0.9 miles of the Argentite Canyon Road would be rerouted in the OPA. The reroute of the Cave Springs Road would limit public interactions with Project equipment. The Argentite Canyon Road reroute would provide space for the quarry while still providing public access south of the Project (Ioneer 2022). The rerouted locations of Cave Springs Road and Argentite Canyon Road would remain upon closure. Other Project-related roads would be reclaimed.

The rerouted Cave Springs Road would have three crossings with Project-related traffic: where the haul road enters the processing facility, where the haul road enters the North OSF, and where the service road enters the explosives storage area. Autonomous (self-driving) haul trucks would cross Cave Springs Road where the haul road enters the processing facility and where the haul road enters the North OSF. Ioneer would maintain properly calibrated autonomous trucks, segregate haul truck traffic from public traffic by use of separate roads, enable emergency stop devices, and use staffed guard stations, gates, and warning signs to separate autonomous vehicles from public traffic at the two intersections with Cave Springs Road. Two "railroad-style" crossing gates would be installed at the intersections. The gates would always be closed and all traffic on Cave Springs Road would be stopped so that the public and Project-related traffic, including autonomous haul trucks, are not co-mingled. The west gate would have a guard station that would be staffed 24 hours per day. The east gate would have a call box connected to the guard station. When traffic arrives at the gates, the traffic would be escorted by a pilot car through the OPA. Given the limited amount of public traffic on Cave Springs Road, Ioneer estimates that maximum wait times for vehicles awaiting escort would be approximately 20 minutes. In the event of a public vehicle breakdown during escort, Ioneer would assist motorists with moving the stranded vehicle to a safe location (Ioneer 2023c). Where the service road enters the explosives storage area, a two-way stop sign would be installed on Cave Springs Road at the intersection because traffic volumes are anticipated to be low and there would be no autonomous vehicles at this intersection. Personnel would perform daily inspections of the traffic control systems, and systems would be continually evaluated and adjusted using adaptive management (NewFields 2022c). Impacts on public safety would be minor, long-term, and localized because of the proposed traffic control systems and segregation of autonomous haul truck traffic from public traffic.

The outer extent of Tiehm's buckwheat designated critical habitat would be fenced and gates locked (BLM 2024b), which would restrict public access of the two existing two-track roads in the Tiehm's buckwheat

designated critical habitat. Public users attempting to access the fenced area should coordinate with Ioneer for safety and to comply with MSHA regulations. Impacts would be moderate, long-term, and localized.

Under the Proposed Action, traffic on SR 264 and the access road would increase by an additional 186 to 248 vehicle trips per day during the four-year construction phase and an additional 230 to 288 vehicle trips per day during the 17-year quarrying phase. Project traffic would consist of a mix of passenger buses, pickups, passenger cars, and trucks ranging in size from single- to double-axle tractor trailers. During closure, there would be about 20 trips per day. The increased traffic during the construction phase would primarily occur during daylight hours. During quarrying and processing, traffic would be spread over 24-hours (Ioneer 2022). The Proposed Action would result in a readily apparent, measurable traffic increase on paved roadways. The increased traffic on SR 264 would be a noticeable change to those already using the roadway, as the number of vehicles passing would be about double the existing condition. The increased traffic would be less noticeable as distance from the OPA increases and trucks disperse along other routes to their final destinations. The increase in traffic may cause worsening of the existing condition of SR 264 which has rough spots and areas of settling. U.S. 6 and U.S. 95 are regularly maintained and receive frequent truck traffic. In addition, recent improvements were completed to U.S. 95 including repaving and adding occasional passing lanes. It is anticipated that these highways would be able to accommodate the increase in traffic. The increase in traffic along the U.S. 95, U.S. 50/50A, and I-80 corridors is not anticipated to affect the cost of maintenance, as NDOT plans account for regular traffic volume increases throughout the life of a transportation asset (NDOT 2019). There would be minor impacts on the highways, such as increased rates of rutting and cracking due to vibration and weighted loads. This effect is anticipated to peak during the quarrying when large truck traffic is most frequent. Impacts to regional paved roadways would be moderate, long-term, and regional.

Ioneer would be responsible for implementing their proposed Transportation and Access Plan and Access Road Improvement and Maintenance Plan (Ioneer 2022). As shown in the Access Road Improvement and Maintenance Plan, Ioneer would be responsible for improving the access road from SR 264 to the processing facilities located within the OPA, and Ioneer would be responsible for maintaining the access road from SR 264 to Cave Springs. Ioneer would maintain the access road life of the Project with the purpose of facilitating continued safe passage of Project-related personnel as well as the public. The access road and rerouted portions of Cave Springs Road would also be improved and maintained per Ioneer's MOU with Esmeralda County for Road Improvement and Maintenance to accommodate the additional traffic generated by the Proposed Action (NewFields 2022d; Ioneer 2023d). Ioneer would improve the roadway surface and drainage infrastructure to prevent washouts. Maintenance would include dust control, grading, and snow removal. The access road would be maintained at a minimum width of 24 feet wide and crowned to provide for proper drainage. Additional drainage control measures could include culvert installation, culvert repair, leadoff ditches, and fords/board-based dips. A combination of techniques such as compaction, blending, cement stabilization, polymer soil stabilization, and cellular confinement would be used to stabilize the access road (NewFields 2022d). Continued maintenance and improvement of the access road for the duration of the Proposed Action would reduce the impacts from the increased amount of traffic by improving the condition of the road to meet the needs of the Project plus the existing traffic. Impacts to traffic would be moderate to major, long-term, and regional as trucks would disperse to areas outside the area of analysis.

4.13.2 North and South OSF Alternative

The rerouted Cave Springs Road would have two crossings with Project-related traffic: where the haul road enters the processing facility and where the haul road enters the North OSF. The traffic control systems used for the North and South OSF Alternative would be the same as described for the Proposed Action except the stop sign at the Cave Springs Road and two-track intersection would no longer be needed. The Argentite Canyon Road realignment would be 1.2 miles (0.3 mile longer than the Proposed Action) to accommodate (0.3 mile longer than the Proposed Action) to accommodate the South OSF. Impacts to access would be moderate, long-term to permanent, and localized, as vehicle access to certain areas within the Plan boundary would be restricted but existing public access through the Plan boundary would remain.

4.13.3 No Action Alternative

Under the No Action Alternative, Esmeralda County would continue to provide maintenance on ROW grant (case NVN 062084) (BLM 1976a). Traffic associated with the No Action Alternative is already occurring on the local road network and is being accommodated with no measurable adverse effect on the roads beyond regular maintenance and grading. Impacts would be negligible, short-term, and localized.

4.14 Vegetation Resources

4.14.1 Proposed Action

Vegetation communities disturbed by the 2,306 acres of proposed surface disturbance include: 1,133 acres of Inter-Mountain Basins Mixed Salt Desert Scrub, 1,059 acres of Great Basin Xeric Mixed Sagebrush Shrubland, 12 acres of Inter-Mountain Basins Greasewood Flat, eight acres of North American Arid West Emergent Marsh, five acres of Inter-Mountain Basins Big Sagebrush Shrubland, three acres of Inter-Mountain Basins Cliff and Canyon, one acre of Great Basin Pinyon-Juniper Woodland, and less than one acre of Agriculture. Ecological sites disturbed by the Proposed Action include: 1,067 acres of cobbly loam 5-8" P.Z., 122 acres of gravelly loam 5-8 P.Z., 662 acres of shallow calcareous loam 8-12" P.Z., 139 acres of loamy slope 3-5" P.Z., 39 acres of loamy slope 5-8 P.Z., 38 acres of loamy 5-8" P.Z., 105 acres of sodic flat, 38 acres of sandy 3-5" P.Z., nine acres of saline meadow, four acres of sodic terrace 5-8" P.Z., and less than one acre of saline bottom. An additional 65 acres of surface disturbance could occur in any vegetation community or ecological site within the OPA from exploration and dewatering facilities, and 20 acres of disturbance could occur anywhere in the Plan boundary from water supply facilities. The surface disturbance from exploration, dewatering facilities, and water supply facilities would occur outside the fenced Tiehm's buckwheat designated critical habitat. No forested ecological sites would be impacted by surface disturbance. Impacts may occur to native shrubs, grasses, and forbs that may be utilized for seed collection, wildling transplanting, or floral and greenery collection. Impacts from surface disturbance would be minor, long-term to permanent, and localized.

Surface disturbance would result in the conversion of shrub-dominated vegetation cover types to grass/forb-dominated vegetation cover types. The loss of shrub-dominated vegetation would represent a moderate, long-term to permanent, and localized impact as it may take up to 25 years following reclamation for mature shrubs to become re-established. Reclamation would be completed on approximately 1,923 acres (approximately 83 percent) of the total proposed surface disturbance area. BLM-approved certified weed-free seed mixes would be used, and success of revegetation would be based on the guidelines described in *Attachment B: Nevada Guidelines – Successful Revegetation for the Nevada Division of Environmental Protection* (NDEP 2016). Reclamation activities would reduce direct and indirect effects of the Proposed Action. Impacts to vegetation as a result of surface disturbance would be minor, long-term to permanent, and localized.

Under the Proposed Action, approximately 383 acres of vegetation would be permanently removed from surface disturbance impacts to vegetation as a result of permanent disturbance would be minor, permanent, and localized. The potential effects from dust from the Project on vegetation would be reduced by periodic precipitation and ACEPMs to control and monitor dust. Impacts would be minor, long-term, and localized.

Groundwater drawdown associated with dewatering activities may affect water availability at surface water sites (Piteau 2023b). Most springs within the drawdown contour are likely perched features as suggested by their elevated, hillside locations, while two are located in wash or canyon bottoms (HydroGeoLogica 2020b). Impacts to surface water availability from groundwater drawdown would depend on the source of groundwater at the springs. If these springs are perched features, then groundwater drawdown from the Proposed Action would not affect discharge flows. If the springs are sourced from upwelling groundwater, the dewatering may decrease the amount of water discharged to the springs. Cessation of groundwater sourced flow may occur unless water levels recover for a period of approximately 200 years (Piteau 2023b). Reduced flows or cessation of flows would limit water availability for vegetation. Potential impacts from groundwater drawdown include decreased resilience of native vegetation communities at seep and spring sites, and increased susceptibility to invasion by noxious and invasive species. If impacts to spring sites occur, impacts to vegetation communities would be moderate, long-term to permanent, and localized. Impacts to riparian vegetation communities are described in Section 4.17.

The proposed groundwater drawdown may result in impacts to upland vegetation in the area of analysis. Herbaceous upland plant species have shallow root systems and predominantly rely on soil moisture from precipitation. Juniper trees have deep root systems, extending up to 15 feet deep (Zlatnik 1999); however, these trees occur at elevations in the area of analysis well above the potentially affected aquifer. Sagebrush and other shrubs have both deep taproots that can extend three to seven feet vertically and shallow, lateral roots that collect surface precipitation (Innes 2019). Phreatophytes, such as greasewood (*Sarcobatus* sp.), rubber rabbitbrush (*Ericameria nauseosa*), and saltgrass (*Distichlis spicata*), occur within the area of analysis and have the potential to be impacted by groundwater drawdown (USGS 1958). Reduced water availability could lead to reduced production and vigor, or changes in diversity or composition of phreatophyte communities. Impacts would remain unless water levels recovered over a period of approximately 200 years (Piteau 2023b). These species are common in areas adjacent to the Proposed Action and throughout this area of Nevada. Impacts to upland vegetation communities from groundwater drawdown are expected to be minor to moderate, long-term to permanent, and localized.

Impacts from invasive, non-native plant species, and noxious weeds include the potential establishment and spread of these species during construction, operation, or reclamation. Impacts from the spread and establishment of these species are expected to be minor, long-term, and localized, given the implementation of the Noxious and Invasive Weed Management Plan during construction, operation, and reclamation (NewFields 2022e).

Potential impacts from groundwater drawdown include decreased resilience of native vegetation communities at seep and spring sites, and increased susceptibility to invasion by noxious and invasive, non-native species. If impacts to spring sites are realized, then impacts to noxious and invasive, non-native weed species would be minor, long-term, and localized.

Candelaria blazingstar and Inyo blazingstar would not be directly impacted by surface disturbance, as none were identified in the Plan boundary. Candelaria blazingstar is adapted to dry, upland sites; therefore, impacts to Candelaria blazingstar and associated potential habitat from dewatering would be negligible, long-term, and localized.

Tecopa birdbeak would not be directly impacted by surface disturbance, as none were identified in the Plan boundary. Fugitive dust or sedimentation from the additional traffic on the access road could impact the plants by reducing their ability to photosynthesize. ACEPMs would reduce impacts from fugitive dust and sedimentation; therefore, impacts would be negligible to minor, long-term, and localized. Dewatering is not anticipated to impact Tecopa birdbeak because the known locations are located outside of the one-mile buffer of the predicted groundwater drawdown contour (Piteau 2023b). Impacts to Tecopa birdbeak and associated potential habitat from dewatering would be negligible, long-term, and localized.

The sagebrush cholla would not be directly impacted by surface disturbance. The sagebrush cholla located south of and outside of the Access Road and Infrastructure Corridor and the sagebrush cholla located south of the quarry could be impacted by fugitive dust or sedimentation from the Proposed Action. Dust could cover the sagebrush chollas and interfere with their ability to photosynthesize. ACEPMs established and periodic precipitation would reduce this impact; therefore, impacts would be negligible to minor, long-term, and localized. The Proposed Action could result in impacts to potential habitat in the area of analysis, as potential habitat is available in the proximity of the area of analysis. Impacts to the sagebrush cholla from the loss of potential habitat are considered negligible to minor, long-term, and localized. One sagebrush cholla is located within the one-mile buffer of the predicted 10-foot groundwater drawdown contour (Piteau 2023b). Roots of small cacti such as sagebrush cholla are shallow (Pinkava 1999) and rely on precipitation for soil moisture; therefore, impacts to sagebrush cholla from dewatering would be negligible, long-term, and localized.

The exact location and abundance of Mojave fishhook cactus individuals in the area of analysis is unknown; therefore, individuals may be directly removed from surface disturbance associated with the Proposed Action. This species is likely to occur within the Inter-Mountain Basins Mixed Salt Desert Scrub vegetation community; therefore, 1,133 acres of potential habitat could be impacted. This vegetation community is common in areas adjacent to the Proposed Action and throughout this area of Nevada. After reclamation, 102 acres of potential habitat would remain permanently disturbed. Impacts from surface disturbance would

be minor, long-term to permanent, and localized. Fugitive dust or sedimentation from the additional traffic on the access road could impact Mojave fishhook cactus. ACEPMs and periodic precipitation would reduce impacts from fugitive dust and sedimentation; therefore, impacts would be negligible to minor, long-term, and localized. The Mojave fishhook cactus could be located within the one-mile buffer of the predicted 10-foot groundwater drawdown contour (Piteau 2023b). Roots of small cacti such as Mojave fishhook cactus are shallow (FNAA 2023) and rely on precipitation for soil moisture; therefore, impacts from dewatering would be negligible, long-term, and localized.

The location of the Sodaville milkvetch identified is unknown; however, the species is known to occur in wetland areas and therefore, may occur just south of the Access Road and Infrastructure Corridor. It is unlikely that the individual would be impacted by surface disturbance from the Proposed Action. However, fugitive dust or sedimentation from the additional traffic on the access road could impact the plant, if present, by reducing its ability to photosynthesize. ACEPMs would reduce any impacts from fugitive dust and sedimentation; therefore, if present impacts would be minor, long-term, and localized. If the species is present at any of the surface water sites within the one-mile buffer of the drawdown contour, impacts may occur if there is a reduction in surface water flow from dewatering. Therefore, if present, impacts to Sodaville milkvetch and associated potential habitat from dewatering would be minor to moderate, long-term, and localized.

The Proposed Action would disturb plant communities with plant species of ethnobotanical importance to area Tribes. Reclamation would reduce impacts by seeding reclaimed areas with species of ethnobotanical importance and recreating stable plant communities that would provide potential habitat for other species to reestablish naturally. Plant species of ethnobotanical importance are common within the area of analysis and surrounding areas (Stoffle et al. 1990). Therefore, impacts to ethnobotanical plant species and associated potential habitat from the Proposed Action would be negligible to minor, long-term to permanent, and localized.

4.14.2 North and South OSF Alternative

Effects to vegetation resources would be similar to the Proposed Action except the placement of facilities would be shifted and less total acreage would be disturbed. A total of 2,2661 acres would be disturbed with 211 acres of permanent disturbance. Impacts from invasive, non-native species on vegetation resources would be the same as the Proposed Action. Impacts to ethnobotanical plant species would be the same as described for the Proposed Action.

One sagebrush cholla occurrence would be within the North and South OSF Alternative disturbance footprint; therefore, would be required to be relocated outside of the disturbance. Sagebrush cholla is not protected under NRS 527.270 as they are not fully protected species declared to be threatened with extinction. A Desert Flora Harvest Registration Form and Desert Flora tags would be needed for relocation of individuals if more than seven were present, as per NRS 527.500. Direct effects to sagebrush cholla include stress from the relocation of the plants, and removal of soil and growth media from suitable habitat. Impacts from the Proposed Action on sagebrush cholla would be negligible to minor, long-term to permanent, and localized. This species is widespread in Nevada and impacts are not anticipated to contribute to the listing of the species as threatened or endangered. All other impacts to special status plant species are the same as described for the Proposed Action.

4.14.3 No Action Alternative

Under the No Action Alternative, the Project would not be approved. The existing 15 acres of exploration disturbance has occurred on public lands administered by the BLM and would be reclaimed. No additional surface disturbance would occur. Impacts would be negligible, short-term, and localized.

4.15 Visual Resources

4.15.1 Proposed Action

From KOP 1, the SOSF would be slightly visible in the background against the existing mountains as a dark brownish gray angular form with angular lines and uniform texture. The SOSF would blend in with the existing mountainside and would be barely perceptible to the casual viewer. The processing facility would

have similar colors as the surrounding area and blend in with the existing landscape also due to its distance from the KOP and mountains blocking most of the direct view. When temperatures are below approximately 45 degrees Fahrenheit (ºF) and on clear days, a steam plume from the processing facility may be visible as a low, white cloud. Project-related traffic would be visible at varying times throughout the day on the roadways. Impacts to the viewshed from KOP 1 would be negligible to minor, long-term, and localized.

From KOP 2, the OSFs and quarry highwall would be visible in the far middleground to background (NewFields 2023). A steam plume from the processing facility may be visible. The OSFs would have similar materials and colors as the surrounding area; however, they would be trapezoidal and unvegetated and may contrast in texture compared to the surrounding landscape. The quarry would have repeating horizontal lines as each layback progresses. As the west-bound traveler approaches the Project on Cave Springs Road, the quarry and OSFs would become more noticeable and appear as a moderate contrast. The quarry would present a moderate contrast with the surrounding area due to the changed color, form, and line of the landscape. Views of the quarry would be limited to a few sections of the rerouted Cave Springs Road. The color, shape, and form of the existing landscape would change with development of the OSFs, and the change would likely be noticeable to most travelers, though overall contrast would be weak due to the highly varied geology of the area. Impacts would be moderate, long-term, and localized.

From KOP 3, the processing facility and OSFs would be barely perceptible in the far background and the pipeline would be barely perceptible in the middleground (NewFields 2023). A steam plume from the processing facility may be visible. Because the processing facility and the OSFs would be approximately 12.5 miles away and would have similar colors as the surrounding area, these features would create a weak contrast. OPA Project components would be too far from the KOP to be visible by the casual observer. The at-grade pipeline would be partially visible to the southeast. Project-related traffic would be visible at varying times throughout the day on the roadways. The form, line, color, and texture of the at-grade horizontal pipeline would create a weak contrast. Impacts would be minor, long-term, and localized.

From KOP 4, the SOSF, booster station, and processing facility would be visible in the far background while the at-grade pipeline for water supply would be visible in the middleground (NewFields 2023). A steam plume from the processing facility may be visible. The SOSF, processing facility, and booster station would be in the distance and partially hidden by hills presenting a weak contrast with the surrounding area. Though color, shape, and form would change with development of the SOSF to patchy areas void of vegetation, the change would be minor to most viewers due to the variable geology of the area and the distance to those areas from the KOP. The processing facilities angled shapes may contrast the existing landscape. Most features would be blocked from the casual observer's view, with a small portion visible above the existing hillsides yet backdropped by the Silver Peak range. These features are not anticipated to dominate the view along Hot Ditch Road and Cave Springs Road. Project-related traffic would be visible at varying times throughout the day on the roadways. Impacts would be minor, long-term, and localized.

The at-grade pipeline for water supply from Fish Lake Valley, booster station, and transmission line to the booster station from the OPA would be widely visible from KOP 1 as these features would be placed directly south of Cave Springs Road, and the at-grade pipeline would be visible from KOP 4. The form, line, color, and texture of the at-grade pipeline would create a moderate to strong contrast. Earthen mounds on the pipeline every approximately 50 feet would create repetitive and repeating humps of exposed soil along the length of the access road. The pipeline would appear smooth and linear, which would contrast against the rough background. The booster station would result in a new, cubed shaped structure on the landscape. The flat, smooth surfaces of the structure would contrast against the rough background. The exact amount of visual contrast from the booster station would be dependent on the final materials used to construct it. The transmission line would add new, repeating vertical structures that would dot the landscape every 200 feet from the KOP into the far background. They would extend prominently into the skyline in several areas. The thin horizontal powerlines connecting the poles would be visible as black lines in the foreground but would not discernable as they move to the middle and far background. These facilities would result in a strong degree of contrast compared to the existing environment. Impacts from KOP 1 and KOP 4 would be moderate, long-term, and localized.

Approximately 35 acres of exploration would occur anywhere within the OPA, 30 acres of disturbance could occur anywhere within the OPA for dewatering facilities, and 20 acres of disturbance for water supply

facilities could occur anywhere within the Plan boundary. Due to the existing topography depending on where these activities occur, these activities are likely to be slightly visible from KOP 1, visible from KOP 2, not be visible from KOP 3, and not be visible from KOP 4. Impacts are anticipated to be negligible, short- to long-term, and localized as they would not create a perceptible change to the existing landscape.

Once operations cease, facilities and disturbance areas would be reclaimed. Once reclamation is complete, impacts to visual resources would be negligible to minor as they would be removed or blended into the existing landscape. The quarry would remain as a permanent feature and impacts from the viewshed of KOP 2 from the quarry are anticipated to be moderate, permanent, and localized.

The Project would change the form, line, texture, and color of the viewshed from KOPs 1, 2, and 4, which have been designated as a BLM VRM Class IV, and KOP 3 which has been designated as VRM Class III. From KOP 1, the Project would have a weak to strong level of contrast to the existing landscape. From KOP 2, the Project would have a moderate level of change to the existing landscape. From KOP 3, the Project facilities would have a weak level of change to the existing landscape. From KOP 4, the Project would have a weak to moderate level of change to the existing landscape. The Proposed Action from KOPs 1, 2, 3, and 4 would not conflict with the established BLM VRM Class III and Class IV objectives. Impacts on visual resources from KOP 1 would be moderate, long-term, and localized, from KOP 2 would be moderate, long-term to permanent, and localized, from KOP 3 would be negligible to minor, long-term, and localized, and from KOP 4 would be minor to moderate, long-term, and localized.

Project components would be visible from portions of the Silver Peak WSA, particularly from ridgetops and mountain peaks in the far northern part of the WSA. Views of the Project components would be blocked in most areas by trees, and ACEPMs, the facilities would not stand out in appearance or color. Impacts on visual resources from the Silver Peak WSA are anticipated to be minor, long-term, and localized.

Implementation of the Proposed Action would add additional nighttime lighting, required for operations, to the dark skies and would cause a sky glow over the OPA. Lights would be used on equipment and vehicles, as well as stationary lights for operations. During nighttime hours, the Project lights would be viewed against the otherwise unlit black or nearly black backdrop of the landscape. The brightness of the lights and darkness of the black or nearly black background would create a strong contrast, and thus make the lights readily visible. Headlights from vehicles would be a temporary illumination while traveling at night and would be focused on the roadways. Motorists traveling on SR 264 and those in Dyer would constitute the majority of the users in the area during the night hours and those who may notice the illuminated night sky lighting or glow over the OPA. For passing motorists, the duration would be few minutes. For those in Dyer and Fish Lake Valley, the glow may be visible for the duration of the Proposed Action during nighttime hours. The Proposed Action impacts on dark sky resources are anticipated to be moderate, long-term, and regional.

4.15.2 North and South OSF Alternative

Visual impacts at KOP 1 and KOP 4 would be the same as those described for the Proposed Action. The North and South OSF Alternative contrast from KOP 1 and KOP 4 would be compatible with the management objectives for Class IV areas. Impacts to the viewshed from KOP 1 would be localized, moderate, and long-term. Impacts to the viewshed from KOP 4 would be minor to moderate, long-term, and localized. Visual impacts at KOP 2 and KOP 3 would be the same as those described for the Proposed Action, except the West OSF would not be constructed. The South OSF would be visible from KOP 2, but not visible from KOP 3. From KOP 2, it would add a trapezoidal form with horizontal lines where the benches are created. The texture would appear uniform, and the color would blend in with the existing mountainside in hues of brown and brownish gray. The North and South OSF Alternative contrast from KOP 2 and KOP 3 would not conflict with VRM Class IV or Class III objectives. Impacts on visual resources from KOP 2 would be moderate, long-term to permanent, and localized. Impacts on visual resources from KOP 3 would be negligible to minor, long-term, and localized.

Impacts on views from the Silver Peak WSA would be the same as those described for the Proposed Action, except the West OSF would not be constructed. The South OSF may be visible from the Silver Peak WSA but with implementation of ACEPMs, it would not stand out in appearance. Impacts on visual resources from the Silver Peak WSA would be minor, long-term, and localized.

4.15.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be developed and associated effects to visual resources would not occur. The existing 15 acres of exploration disturbance on public lands administered by the BLM would be reclaimed. Impacts would be negligible, short-term, and localized.

4.16 Water Resources

4.16.1 Proposed Action

4.16.1.1 Water Quantity

The quarry would extend below the water table requiring a system to capture and remove groundwater that flows toward or into the quarry as quarrying progresses. Water demands for ore processing would necessitate the installation of production wells, in addition to the dewatering system. Under predevelopment conditions, the majority of groundwater discharge occurs as ET and a minor amount of discharge occurs as spring discharge. Modeling predicts that dewatering requirements for the open quarry would range up to approximately 50 gpm (80.6 acre-foot per year) in the first seven years of quarrying and peak at approximately 650 gpm (1,048.5 acre-foot per year) in Year 10 of operation with an average rate of 280 gpm (451.6 acre-foot per year) over that 17-year period (Piteau 2023b). The groundwater inflow into the quarry would be pumped out for dewatering purposes by dewatering wells near the quarry and/or collection sumps within the quarry.

The area predicted to experience a change in groundwater elevation of 10 feet or more is used for quantification and comparison of Project effects and baseline conditions. Groundwater modeling indicate that the projected drawdown during operations and post-closure induced by the Proposed Action is around the production wellfield and quarry pumping areas. The extent of the 10-foot drawdown contour associated with the quarry would extend up to a maximum of approximately five miles from the quarry in a westerly direction and four miles in a northerly direction. Drawdown around the quarry area would extend two to three miles in southerly and easterly directions along the strike direction of faults that intersect the quarry lake and into the mountain block south and east of the quarry. The 10-foot drawdown around the production well field would extend approximately one-half mile from the pumping wells in the surrounding alluvium. Based on predicted drawdown, impacts to groundwater levels would spatially occur throughout the OPA, the alluvial fan immediately adjacent to the west and northwest, and the areas immediately around the quarry. The OPA wells would experience drawdown of up to 300 feet during the operating period followed subsequently by groundwater recovery over a period of approximately 60 years (Piteau 2023b). Drawdown in the groundwater resource would be moderate, permanent, and localized impact.

Lowering of a water table by dewatering or water production has the potential to result in subsidence in water-bearing lithologies when the hydrostatic pressure that partially supports the lithologic matrix is removed. Little subsidence would be expected to occur in the consolidated, highly silicified bedrock units, but subsidence may occur in the interbedded epiclastic ash-flows, air-fall tuffs, and sedimentary units of the Cave Spring Formation or in any unconsolidated fill present below the groundwater table. The subsidence analysis prepared by HydroGeoLogica in 2020 predicted up to 10 inches of localized subsidence in the vicinity of the pumping wells based on subsidence rates at other dewatering operations in Nevada (HydroGeoLogica 2020c). However, the subsidence analysis prepared by HydroGeoLogica (HydroGeoLogica 2020c) was evaluated from an older version of the Project under a different groundwater pumping scenario, which showed greater groundwater pumping in the vicinity of the quarry than under the current Project. The quarry and associated dewatering pumping are proposed in different locations under the Project relative to what was assessed by HydroGeoLogica in 2020 (HydroGeoLogica 2020c). It is anticipated that subsidence from the Project would be less than described in HydroGeoLogica 2020c because of the groundwater pumping differences, the clay content of the Cave Spring Formation where the Project would be located, and the distribution of the volcanic baseline rocks (where subsidence would not be expected) (WestLand 2024b). Because the saturated thickness of the lithologies in the OPA exceed 600 feet, this subsidence would have a negligible, long-term, localized impact on the groundwater storage properties of the lithologies.

There are 12 surface water resources (SP-01 [Cave Spring], SP-02, SP-03, SP-03A, SP-04, SP-05, SP-05A, SP-06, SP-07, SP-08, SP-25, and SP-25a) within the projected 10-foot drawdown area and four

surface stock water rights. There are an additional 20 surface water resources and one surface stock water right within the one-mile buffer of the predicted 10-foot drawdown. In total, there are 32 spring sites and five water rights within the predicted 10-foot maximum extent of drawdown and one-mile buffer (**Figures 4-5**, **4-6**, and **4-7**). There are no surface water locations or water rights within the predicted 10-foot drawdown around the water supply wells; there are nine irrigation water rights within the one-mile buffer area around that predicted 10-foot drawdown.

The discharges from Cave Spring and SP-02 through SP-05 are likely related to a fault zone at the base of the exposed Rhyolite Ridge Tuff formation. Likewise, SP-06 and SP-07 are likely related to a fault zone along the southern edge of the OPA. SP-08 is located uphill from Cave Spring along the Cave Spring Drainage where a spring has been developed for stock use. If these springs are perched features as suggested by their elevated, hillside locations (HydroGeoLogica 2020b), then groundwater drawdown from the Proposed Action may not affect discharge flows. However, if the springs are sourced from upwelling groundwater on the upgradient side of a low permeability fault zone, decreased water levels on the downgradient side of the fault zone could result in an increased horizontal groundwater gradient. The increased gradient would increase groundwater movement across the fault zone, decreasing the amount of water upwelling to discharge via the springs. The amount of spring flow reduction would be dependent on the actual increase in the horizontal groundwater gradient and could result in reduction or cessation of groundwater sourced flow unless water levels recovered, which is predicted to occur over a period of more than 200 years. Although not anticipated, if drawdown effects on surface waters occur, impacts would be major, permanent, localized. The effects of drawdown related to the water supply wells on surface water resources are similar to the No Action Alternative.

The analysis of effects on water rights assumes that existing consumptive uses in Fish Lake Valley would continue at their current rate which are near the Fish Lake Vally basin's perennial yield. Ioneer has secured water rights for the Proposed Action from other water rights owners in the Fish Lake Valley hydrologic basin, through leases or options to purchase (Ioneer 2022). Therefore, analysis of pumping for water supply assumes the use of active water rights. The BLM has no jurisdiction over State Engineer permitted water rights and regulations applicable to those water rights. Groundwater production from existing groundwater wells would be conveyed to the OPA via a 19-mile pipeline as a new point of use compared to the existing agricultural use. There are four surface water stock rights, and one groundwater stock water right located within the predicted 10-foot drawdown contour associated with the long-term maximal drawdown prediction for the Proposed Action. Within the one-mile buffer around the predicted 10-foot drawdown, there is one surface stock water right and one groundwater stock water right in the quarry buffer area and nine groundwater irrigation rights within the supply wells buffer area (**Figure 4-7**). The ability to pump water associated with these water rights may be impacted by groundwater drawdown.

Climate change has the potential to modify the amount and timing of groundwater recharge that contributes to the perennial yield of the basin. There is uncertainty regarding how these changes would affect utilization of water rights. However, the Proposed Action utilizes existing water rights rather than a new water appropriation. Utilization of existing water rights would have the same effect on groundwater availability for other water rights as the No Action Alternative regardless of the specific climate change effects realized.

The quarry would begin filling with water in the first year after the cessation of dewatering activities and would continue for approximately 60 years until the lake reaches near steady-state at an elevation of approximately 5,650 feet AMSL, resulting in a maximum quarry lake depth of approximately 170 feet (Piteau 2023b). The recovered quarry lake would have a 66 acre-ponded surface area (Piteau 2023b), providing sufficient surface area for evaporative losses (i.e., 347 acre-feet at equilibrium) to balance groundwater inflows at a lake surface elevation below the local groundwater elevation. Therefore, the quarry lake is predicted to act as a terminal sink where quarry lake water does not outflow into groundwater as the recovered quarry lake elevation of 5,650 feet AMSL would be approximately 100 feet lower than the adjacent recovered groundwater outside of the dewatering cone of depression around the quarry, resulting in hydraulic gradients inward toward the quarry lake (Piteau 2023b, 2024). The quarry lake evaporation's effect on the groundwater balance in HA 117 would be a minor, permanent, and regional impact.

No springs or seeps would be covered by the proposed facilities. Therefore, impacts to springs and seeps from Project surface disturbance would not occur. Drainage areas in the OPA would be affected by Project

components. Stormwater that would have run onto the Project facilities area would be routed to a location downgradient of quarry facilities and into a natural drainage. These local impacts to watershed areas would be relatively minor compared to the overall contributing watershed and would occur in ephemeral Cave Springs wash. The quarry would continue to capture approximately 32 acre-feet of runoff annually from the watershed. Overall, impacts to the ephemeral watershed areas associated with the construction, operation, and closure are expected to be minor, long-term, and localized.

Impacts associated with dust emissions, erosion, and sedimentation could occur in watersheds along the Project access route due to increased traffic. Engineering controls, such as road grading, gravelling, drainage installations, soil stabilization, snow removal, and dust control, plus administrative controls, such as speed limits, would limit potential impacts. Impacts to watersheds due to dust, erosion, and sedimentation would be minor, long-term, and regional.

4.16.1.2 Water Quality

As a terminal lake in a lithology that is primarily acid-neutralizing, evapoconcentration would be the dominant geochemical influence on the quarry lake water chemistry. Although the geochemical modeling predicts the water quality out to 200 years after dewatering stops, the salinity of the quarry lake would continue to increase over time in response to evaporation. Solute concentrations in lake water would not affect future groundwater quality.

The quarry lake is predicted to be a groundwater sink with concentrations of arsenic, boron, fluoride, and molybdenum expected to exceed secondary enforceable and non-enforceable standards as well as NDEP Profile III reference values (Piteau 2024b). NDEP Profile III reference values in the quarry lake would be in exceedance for arsenic from 50 to 200 years post-closure, boron from five to 200 years post-closure, fluoride from five to 200 years post-closure, and molybdenum from five to 200 years post-closure.

The quarry lake would be accessible by terrestrial and avian wildlife; therefore, quarry water solute concentrations are compared to the NDEP Profile III reference values to assess the need to consider the ecological risk of wildlife exposure to quarry lake water (NDEP 2018). An ERA was conducted to evaluate the risk of potential exposure of terrestrial wildlife and avian wildlife to quarry lake water. The constituents of potential concern for the assessment were arsenic, boron, fluoride, and molybdenum based on the results of the quarry lake chemistry predictions. None of the calculated doses exceeded the Lowest Adverse Effect Level for arsenic, boron, fluoride, or molybdenum. In the case of a mature quarry lake where constituent concentrations have had an opportunity to evapoconcentrate for more than 100 years, calculated doses exceeded the arsenic No Adverse Effect Level (NOAEL) for cliff swallows, deer mice, and little brown bats, boron NOAEL for cliff swallows, deer mice, killdeer, and mule deer, fluoride NOAEL for mallard ducks, and molybdenum NOAEL for cliff swallows, deer mice, and little brown bats at levels that were below the Lowest Adverse Effect Level Thresholds. Actual wildlife exposure that would be less than daily year-round and the low magnitude by which the calculated doses exceeded the NOAELs are interpreted to indicate a low probability that risks to wildlife would occur based on the predicted water quality in the quarry lake (Cedar Creek 2024).

There is uncertainty in predicting the quarry lake water chemistry prior to the development of the quarry. For this reason, monitoring data collection and updated predictions are utilized to continue to assess future quarry lake water quality conditions during the operating and closure periods. Quarried materials would be sampled and tested quarterly for acid-base accounting and leachate water chemistry via meteoric water mobility procedure testing throughout the operating life of the Project. These monitoring data confirm and supplement the data developed for the initial quarry lake water quality forecast. The existing and new geochemical data would be used to update the geochemical model and water quality prediction at least every five years to conform with NDEP WPCP requirements. Finally, as the quarry lake starts to form at the end of operations and into the closure period, the lake water quality is subject to sampling and analysis to confirm the predicted post-closure conditions.

The results of the geochemical characterization indicate that about 80 percent of the overburden is classified as non-PAG and presents a low risk of acid rock drainage. Portions of the Mixed Lacustrine, Gritstone, and Rhyolite Ridge Tuff materials were determined to be PAG. In aggregate, the overburden material to be placed the OSFs is net acid-neutralizing. While uncovered, overburden would be subject to

leaching by meteoric waters with the potential for neutral pH mobilization of some metals and metalloid oxyanions. Humidity cell testing results indicate that mobilized concentrations of metals and metalloid oxyanions decrease rapidly with successive leaching with the exception of arsenic. Therefore, leaching of most metals and metalloid oxyanions from the material would be short-lived. For arsenic, potential receiving waters exhibit arsenic concentrations in excess of NDEP water quality standards in their baseline condition, limiting the potential for leachate to further degrade water quality by introducing dissolved arsenic into the groundwater. The underdrain and contact water collection systems would minimize the volume of leachate contacting the environment. Therefore, potential for degradation of water quality by overburden leaching is limited, and monitoring of quarried materials placed in the facility and nearby water chemistry would be established per NDEP WPCP requirements to verify that the facility is not contributing to water quality degradation. As such, water quality impacts from placement of quarried materials in the OSFs would be minor, short-term, and localized.

The SOSF would be designed as a zero-discharge facility that incorporates liners and leak detection systems to prevent leakage during operations, and leachate would not contact the environment under design conditions either during operations or in closure. A lined underdrain pond would be installed to collect draindown and contact water. Any draindown collected would be pumped to a water truck for transport to the processing plant where it would be used consumptively during ore processing. At closure, a 48-inch cover including six inches of growth media would be placed over the facility and revegetated to form an ET cover to inhibit infiltration of meteoric waters. Drainage is expected to cease shortly after the ET cover is established. Stormwater runoff from precipitation on areas upgradient and adjacent to the SOSF would be routed away from the spent ore material via stormwater controls to prevent that runoff from becoming contact water. During operations, closure, and post-closure, the groundwater flow direction would be towards the quarry lake, therefore any groundwater affected by infiltration from the SOSF would flow into the quarry lake. The facility operations and nearby waters would be monitored in accordance with NDEP WPCP requirements to verify that the facility is not contributing to water quality degradation. Impacts from placement of residual materials in the SOSF would be negligible, long-term, and localized.

4.16.2 North and South OSF Alternative

Under the North and South OSF Alternative, impacts to surface water and groundwater quantity would be the same as the Proposed Action because the same Project dewatering and water management practices would be applied. The Overburden Management Plan applied to the modified configuration would result in similar effects on surface water quality. The quarry lake would be about 66 surface acres and would remain a terminal lake that would not outflow to local groundwater. Quantitative predictions of quarry lake analyte concentrations based the modified backfill configuration would not be expected to match those associated with the Proposed Action, but the same analytes would be expected to exceed the secondary enforceable and non-enforceable standards, as well as NDEP Profile III reference values.

4.16.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be developed and associated effects to water resources would not occur. The existing 15 acres of exploration disturbance on public lands administered by the BLM would be reclaimed. Existing groundwater rights and pumping wells associated with agricultural usage in Fish Lake Valley would not be used for quarrying and agricultural use of these water rights would continue. Cumulative drawdown assessed for the Project detailing changes that may occur due to ongoing pumping stresses as well as quarrying related activities showed the maximum differential drawdown between the Proposed Action and the No Action Alternative 200 years after the end of quarrying would be less than 20 feet (Piteau 2023b). As a result, impacts to water use in Fish Lake Valley would be similar to the Proposed Action.

4.17 Wetland and Riparian Resources

4.17.1 Proposed Action

Associated surface disturbance could impact 0.16 acre of Wetland 3 within the Access Road and Infrastructure Corridor due to widening of the road, replacement of the culvert below Fish Lake Valley Hot Springs (NewFields 2022d), and placement of the water supply pipeline. Placement of the water supply pipeline along SR 264 may impact the riparian community on Chiatovich Creek within the Access Road and

Infrastructure Corridor. Surface disturbance would impact 54.46 acres of NWI-mapped wetlands (54.04 acres of riverine, 0.40 acres of freshwater emergent wetland, and 0.02 acres of freshwater pond). Disturbance would be limited to access road improvements and placement of the water supply pipeline. Of the 54.46 acres of total surface disturbance, 54.04 are associated with riverine NWI-mapped wetlands, the majority of which are likely ephemeral drainages that lack wetland characteristics. Impacts from surface disturbance would be minor, long-term, and localized.

Increased traffic and maintenance on the access road could result in increased fugitive dust, erosion, and sedimentation that could impact the adjacent wetlands and riparian areas. ACEPMs would reduce or negate these impacts. Impacts to wetland and riparian areas would be negligible, long-term, and localized.

The three wetlands identified during baseline surveys are outside the one-mile buffer of the predicted maximum extent of the 10-foot drawdown contour; therefore, proposed dewatering activities would have negligible, long-term, localized effects on wetlands. There are 32 seep and spring sites within the one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour. Groundwater drawdown associated with quarry dewatering activities may affect water availability at surface water sites (Piteau 2023b). Most of the springs within the drawdown contour are likely perched features as suggested by their elevated, hillside locations, while two are located in wash or canyon bottoms (HydroGeoLogica 2020b). Impacts to surface water availability from groundwater drawdown would depend on the source of groundwater at the springs. If these springs are perched features, then groundwater drawdown from the Proposed Action would not affect discharge flows. If the springs are sourced from upwelling groundwater, the dewatering may decrease the amount of water discharged to the springs. Cessation of groundwater sourced flow may occur unless water levels recover for a period of approximately 200 years (Piteau 2023b). Reduced flows or cessation of flows would limit water to the surface, which could reduce wetlands, if present, by reducing or removing the hydrology required to support hydrophytic vegetation and hydric soils. If drawdown effects on surface waters occur, impacts to wetlands from the loss of a water source would be major, long-term, localized.

4.17.2 North and South OSF Alternative

The North and South OSF Alternative impacts to wetlands and riparian resources would be the same as those described for the Proposed Action except 54.87 acres of NWI-mapped wetlands would be disturbed (0.42 acres more of riverine than under the Proposed Action). Impacts to wetlands and riparian resources from surface disturbance would be minor, long-term, and localized.

4.17.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be developed and associated effects to wetland and riparian resources would not occur. The existing 15 acres of exploration disturbance on public lands administered by the BLM would be reclaimed. Impacts would be negligible, short-term, and localized.

4.18 Wildlife Resources

4.18.1 Proposed Action

4.18.1.1 General Wildlife

Aquatic Species

Aquatic species could be impacted by fugitive dust and potential sedimentation from runoff associated with the Proposed Action. There would be no impact from the proposed surface disturbance. Aquatic species are often identified near areas of water. It is unlikely that any runoff from the Proposed Action would impact the spring sites or surface water features where aquatic species are located. Additionally, ACEPMs would reduce any impacts from fugitive dust; therefore, impacts to aquatic species, if present, would be negligible, long-term, and localized. Dewatering from the Proposed Action may impact surface water features where aquatic species are located within the one-mile buffer of the 10-foot groundwater drawdown contour (Piteau 2023b). Therefore, if impacts are realized at surface water sites with aquatic species present, impacts to habitat would be negligible, long-term, and localized.

Avian Species

Approximately 2,306 acres of avian nesting and foraging habitat would be removed. Some of this habitat may remain available through interim reclamation, but most of this habitat would be unavailable until completion of reclamation. Approximately 383 acres would be permanently disturbed. Disturbance could result in increased competition in adjacent habitat that could potentially reduce clutch size and/or survival of young. Impacts from increased competition would be negligible to minor, long-term, and localized. Annual raptor surveys would occur during construction, which would survey for undocumented nests and document nest status (Ioneer 2023b). Vegetation removal during the migratory bird breeding season could result in crushing or destruction of nests; however, the BBCS commits to preconstruction clearance surveys during the breeding season (March 1 through July 31). Work would occur outside of spatial buffers of active nests (WestLand 2023c). Impacts from the loss of nesting and foraging habitat would be minor, long-term to permanent, and localized.

The processing facility vats and contact water ponds would present hazards to avian species. ACEPMs described in the BBCS would reduce impacts. These include using textured pond liners to facilitate wildlife egress, chain-link fencing to prevent wildlife access, using avian exclusion measures such as bird balls, and constructing the contact water pond so there are no shallow areas that would allow birds to wade, forage, or nest. Ioneer would obtain NDOW Industrial Artificial Pond Permits and comply with requirements. Avian exclusion measures would be monitored by Ioneer personnel (WestLand 2023c). Impacts from exposure to contact water ponds and leaching vats would be negligible to minor, long-term, and localized.

Powerlines may pose electrocution and collision hazards to migratory bird and raptor species. Ioneer has committed to design and construct powerlines in accordance with the Avian Power Line Interaction Committee (APLIC 2006, 2012) guidelines to minimize risk. Bird-safe power poles would be used or exposed parts would be covered to reduce electrocution risk. Areas of powerlines with the greatest risk of collision, if any, would be identified in consultation with NDOW and the BLM, and wire markings used to reduce potential for collision (WestLand 2023c). The powerlines would be reclaimed; therefore, impacts to avian species from the powerlines within the area of analysis would be minor, long-term, and localized.

Avian species could collide with vertical facilities, including the Tiehm's buckwheat designated critical habitat fencing, resulting in injuries or fatalities to individuals. Collision risk would be reduced by ACEPMs in the BBCS and design features of the facilities. The USFWS guidelines for tower siting, tower height, and lighting would be incorporated in tower construction and maintenance (WestLand 2023c). The five communication towers would be un-guyed, 30 to 40 feet in height, and free-standing monopoles to reduce collision risks. The use of hooded lights and dark sky lighting best practices would reduce collision potential for nocturnal avian species. The ancillary buildings and processing facilities would be no more than 200 feet high with few windows. Impacts would be negligible, long-term to permanent, and localized.

Constructed facilities would provide avian species with additional areas to perch and nest and could potentially increase predation by raptors on other avian species. Avian species may become entrapped in buildings which could lead to mortality from starvation and dehydration if they are unable to exit. Some species, such as sparrows and swallows, prefer to construct nests in covered areas and may be attracted to buildings. These impacts to avian species are anticipated to be minor, long-term, and localized.

Increased human presence and noise in the area of analysis could cause avian species avoidance. Over time, some species may become habituated to the Proposed Action. Impacts would be minor, long-term, and localized.

There would be an increase in traffic on the access road. Speed limits would be posted at 35 mph on haul roads, 45 mph on access roads, and 25 mph in the OPA (WestLand 2023c). Vehicle traffic associated with the Proposed Action could collide with avian species or other wildlife species. If fatalities occur, carcasses along the roadside could attract scavenging avian species such as common ravens. Ioneer would remove rabbit-sized or larger carcasses from roadways within the Plan boundary to reduce collision risks (WestLand 2023c). Impacts from vehicular traffic would be minor, long-term, and localized.

Ioneer would implement a reporting system for bird and bat mortalities and obtain appropriate permits and authorizations before removing carcasses. A quarterly mortality report would be submitted to NDOW,

USFWS, and BLM. There would be annual training for personnel that includes the reasons, needs, and methods for reporting bird and bat injuries and mortalities, how to implement nest management protocols, standard operating procedures for the disposition of carcasses, the importance of complying with applicable regulations, and the potential consequences of noncompliance. Trainees would be instructed to immediately report injured wildlife and/or mortalities to Ioneer's Environmental Department. The instruction would include information on how to fill out mortality forms (WestLand 2023c).

An ERA was completed for the quarry lake once the quarry lake reaches its final elevation. The purpose of the ERA was to evaluate the potential for chemical risk to wildlife from exposure or ingestion of the water in the quarry lake. The ERA evaluated two scenarios: a base case scenario (Proposed Action) and twelve sensitivity analyses in which climatic input, groundwater inflow rate, and quarry wall runoff was manipulated within the model (Cedar Creek 2024). Quarry lake chemical concentrations were predicted for two stages in the base case scenario, including the quarry lake infilling stage (up to 50 years after closure) and the mature quarry lake (after 50 years post-closure) (Cedar Creek 2024). The quarry lake is predicted to be a groundwater sink with concentrations of arsenic, boron, fluoride, and molybdenum expected to exceed secondary enforceable and non-enforceable standards as well as NDEP Profile III reference values (Piteau 2024b). To assess chemical risk to avian species, four avian species were identified as Receptors of Interest including cliff swallow, golden eagle, killdeer, and mallard (Cedar Creek 2024). The ERA demonstrated that predicted constituent concentrations in the quarry lake would not cause adverse effects to avian life (Cedar Creek 2024). The quarry lake would be available for use as a stopover site during migrations and as a foraging and watering site. If vegetation becomes established along the quarry edges or in areas of shallow water, additional nesting habitat may become present in the area of analysis. The value of the quarry lake as a stopover site would be dependent on the establishment of shallow water areas, aquatic/emergent vegetation, and a multi-level trophic food chain. Therefore, impacts would be negligible to minor, permanent, and localized.

Groundwater drawdown associated with quarry dewatering activities may affect water availability at surface water sites (Piteau 2023b). SP-01 (Cave Spring), SP-03A, SP-06, SP-07, SP-08, SP-09 (North Spring), SP-09A, SP-09B, SP-09C, SP-09E, SP-10 (Mamie Spring), SP-16, SP-17, SP-17A, SP-21, SP-21A, SP-21B, SP-22, SP-25, and SP-26 had surface water present during surveys (Piteau 2023b) and could be used by wildlife. Most of the springs within the drawdown contour are likely perched features as suggested by their elevated, hillside locations, while two are located in wash or canyon bottoms (HydroGeoLogica 2020b). Impacts to surface water availability from groundwater drawdown would depend on the source of groundwater at the springs. If these springs are perched features, then groundwater drawdown from the Proposed Action would not affect discharge flows. If the springs are sourced from upwelling groundwater, the dewatering may decrease the amount of water discharged to the springs. Cessation of groundwater sourced flow may occur unless water levels recover for a period of approximately 200 years (Piteau 2023b). Reduced flows or cessation of flows would limit water availability for wildlife. If impacts to spring sites are realized, then impacts to avian species would be moderate, long-term, and localized.

Insect and Arachnid Species

The majority of the habitat removed would be reclaimed, but 383 acres would be permanently removed. Impacts from loss of forage would be minor, long-term to permanent, and localized because the area surrounding the Project would continue to provide habitat. The quarry lake may eventually have limited vegetation establish in shallow areas along the quarry edges that support the common checkered skipper, which would be dependent on the extent of recovery in the quarry lake. Beneficial impacts from the quarry lake would be negligible to minor, permanent, and localized. The additional traffic on the access road and in the OPA would likely injure or cause fatalities to individuals, but no populations would be impacted. Therefore, impacts would be minor, long-term, and localized. Groundwater drawdown associated with quarry dewatering activities may affect water availability at surface water sites (Piteau 2023b). Reduced flows or cessation of flows would limit water availability for wildlife. If drawdown effects on surface waters occur, impacts to insect and arachnid species from the loss of a water source, foraging, and reproductive habitat would be moderate, long-term, localized.

Mammal Species

Approximately 2,306 acres of mammal habitat would be disturbed. Some may remain available through interim reclamation, but most would be unavailable for use until successful reclamation. Approximately 383 acres would be permanent. Competition for food and water resources could increase among individuals displaced. Increased competition may result in lower recruitment rates. Impacts from increased competition would be negligible to minor, long-term, and localized. Impacts from the loss of habitat would be minor, long-term to permanent, and localized.

The processing facility vats and contact water ponds would be fenced to exclude wildlife access. As such, impacts would be negligible, long-term, and localized. Even with fencing, there would be potential for small mammals to access contact water ponds and or the processing facility as they can typically go through, dig under, or climb over fencing. ACEPMs and NDOW Industrial Pond Permit requirements would reduce potential risk of exposure to contact water ponds. There would be a limited amount of leaching solution in the vats. The vats would contain the ore and there would be no solution at the surface. Therefore, leaching solution is not anticipated to be accessible to mammal species, but there could be limited potential for exposure. Impacts would be negligible to minor, long-term, and localized.

All sub-populations of Tiehm's buckwheat and designated critical habitat would be fenced to prevent disturbance, encompassing 559 acres. The areas fenced may provide forage for mammal species. The proposed fencing would be four strand, wildlife-friendly fencing with the top and bottom strands barbless. The fencing would result in avoidance to the area temporarily during construction; however, mammal species would be able to continue to use the area as needed once construction is complete. Large mammals attempting to cross the fence may become entangled and individuals may be injured. Fencing would remain in place until successful reclamation; therefore, impacts to mammal species from fencing would be negligible to minor, long-term, and localized.

Construction of the proposed facilities would provide raptors with additional hunting perches where none currently exist which could result in increased predation on small mammals although no population level impacts are anticipated. These impacts to mammals are anticipated to be minor, long-term, and localized.

Increased human presence and noise could cause mammal species avoidance. Over time, some species may become somewhat habituated. Impacts would be minor, long-term, and localized.

There would be increased traffic on the access road with posted speed limits. Vehicle traffic associated with the Proposed Action could collide with mammal species (e.g., black-tailed jackrabbit, mule deer, etc.), injuring or fatally wounding mammals. If fatalities occur, roadside carcasses could attract scavenging mammal species such as coyotes. Ioneer would remove carcasses from roadways within the Plan boundary which would reduce collision risks with scavengers (Ioneer 2023b). Impacts from vehicular traffic associated with the Proposed Action would be minor, long-term, and localized.

Approximately 2,136 acres of year-round mule deer habitat would be disturbed, with 383 acres removed permanently. Pronghorn have also been observed in the area of analysis, but no habitat occurs. Construction of the North OSF would result in surface disturbance and increased human activity within approximately 695 feet (212 meters) of NDOW Silver Peak 04 (Cave Springs) Guzzler. Increased human activity may cause big game avoidance of the guzzler, limiting big game access to water. Ioneer would relocate and rebuild the guzzler based on recommendations from NDOW. The relocated guzzler would provide a source of water away from the OPA (WestLand 2023c). Impacts would be minor, long-term to permanent, and localized.

To understand chemical risk to mammal species, deer mouse, little brown bat, and mule deer were assessed in the ERA, which demonstrated that predicted constituent concentrations in the quarry lake would not cause adverse effects to terrestrial life (Cedar Creek 2024). The quarry lake is not expected to result in ecological risk to mammals. Impacts would be negligible, permanent, and localized.

Groundwater drawdown associated with quarry dewatering activities may affect water availability at surface water sites (Piteau 2023b). Reduced flows or cessation of flows would limit water availability for wildlife. If drawdown effects on surface waters occur, reduced watering locations may result in increased competition

for water at remaining sites, particularly in drought years. The increased competition may result in lower recruitment rates. Impacts would be moderate, permanent, and localized.

Reptile and Amphibian Species

Approximately 2,306 acres of habitat would be removed, of which 383 acres would be permanently removed. Reptile species and any eggs within soil or underground burrows could be injured, crushed, and/or killed, by equipment during the construction, maintenance, operation, and reclamation, and vehicular collisions could occur from the additional traffic. Equipment and vehicles would cause individual reptiles to perish but no populations would be removed. Impacts would be minor, long-term to permanent, and localized.

Amphibians crossing the Access Road and Infrastructure Corridor may be injured, crushed, or killed by vehicles associated with the Proposed Action. Proposed Action equipment and vehicles would cause individual amphibians to perish but no populations would be removed. Impacts would be minor, long-term to permanent, and localized.

Facilities would allow for additional raptor perching opportunities which could lead to increased predation of reptile and amphibian species. Impacts would be minor, long-term to permanent, and localized.

The quarry lake was not predicted to have adverse impacts to wildlife (Cedar Creek 2024). Impacts from the quarry lake would be negligible, permanent, and localized.

Groundwater drawdown associated with quarry dewatering activities may affect water availability at surface water sites (Piteau 2023b). Reduced flows or cessation of flows would limit water availability for wildlife. If drawdown effects on surface waters occur, impacts to reptile and amphibian species from the loss of a water source, foraging, and reproductive habitat would be moderate, long-term, localized.

4.18.1.2 Special Status Species

Aquatic Species

Fish Lake Valley Tui Chub: There would be no additional impacts beyond what is described for general wildlife aquatic species. The documented location of Fish Lake Valley tui chub and its associated habitat are outside the one-mile buffer of the predicted maximum extent of the 10-foot drawdown contour; therefore, proposed dewatering activities would have negligible, long-term, localized effects to the Fish Lake Valley tui chub and its habitat.

Fish Lake Valley Pyrg: There would be no additional impacts beyond what is described for general wildlife aquatic species. The documented location of Fish Lake Valley pyrg and its associated habitat are outside the one-mile buffer of the predicted maximum extent of the 10-foot drawdown contour; therefore, proposed dewatering activities would have negligible, long-term, localized effects to the Fish Lake Valley pyrg and its habitat.

Wong's Springsnail: If dewatering impacts are realized at Cave Spring, then depending on the amount of water reduction and habitat lost, fatalities to individual Wong's springsnails or the population may occur. Impacts to Wong's springsnails would be moderate to major, long-term, and localized. All other impacts to Wong's springsnail would be the same as those described for non-special status aquatic species.

Avian Species

Black-throated Gray Warbler: Approximately one acre of pinyon-juniper woodland habitat would be removed and permanently disturbed. Impacts would be negligible, permanent, and localized. No other impacts beyond those described for general wildlife avian species are anticipated.

Brewer's Sparrow: Approximately 2,209 acres of habitat (sagebrush and mixed shrub vegetation communities) would be removed, with 381 acres permanently disturbed. Impacts would be minor, long-term to permanent, and localized. No other impacts beyond those described for general wildlife avian species are anticipated.

Pinyon Jay: Approximately 1,065 acres of habitat (sagebrush and pinyon-juniper vegetation communities) would be removed, with 281 acres permanently disturbed. Impacts would be minor, long-term to permanent, and localized. No other impacts beyond those described for general wildlife avian species are anticipated.

Golden Eagle: Two nesting territories (Territories 9 and 10) contain nests within the recommended disturbance buffers from Project facilities. No nests within Territory 7-B were identified to be located within the one-mile buffer of surface disturbance or two-mile buffer for blasting activities (Ioneer 2023b). Within Territory 9, nests 77 and 23-129 are approximately 0.6 miles outside of the OPA and 1.18 miles from the edge of the quarry where blasting may occur. Nests 4-A and 4-B are approximately two miles from the OPA. Nests 77 and 23-129 are topographically shielded from the Project (Ioneer 2023b). There are no proposed facilities that are visible within one mile of the nest sites. Both nests face west to northwest and are on the north side of a ridgeline that runs east-west between the nest site and the proposed quarry. The topographic position of the nests, shielded by the ridge, may reduce the view and noise the proposed facilities. Nests 77 and 23-129 have a limited view of the eastern OPA where exploration activities could occur. Within Territory 10, nest 29 is approximately 0.9 miles from the West OSF, and approximately 1.34 miles from the quarry where blasting would occur. Nests 31-A and 31-B are approximately 1.2 miles outside the OPA and 1.79 miles from the edge of the quarry. All three nests are topographically shielded from the Project. The proposed facilities within one mile of the nest sites are not within line-of-sight. Nest 29 faces west and northwest away from quarry facilities and is separated from the Project by a ridge that runs north-south. Nests 31-A and 31-B also face west and northwest away from proposed facilities and are separated from the Project by the same ridgeline, as well as a smaller ridge (Ioneer 2023b). The topographic position of the nests, shielded by the ridge, may reduce the view and noise the proposed facilities. Nests 31-A and 31-B, being further from the OPA, may be alternate nests for nest 29.

Minimal blasting would be required during the initial quarry development near the original ground surface (WestLand 2023c). Blasting noise and vibration could disturb nesting golden eagles in the area, which may disrupt nesting success, productivity, territory use, as well as foraging. If nests are in-use, impacts would be moderate, long-term, and localized.

Ioneer would implement its Eagle Conservation Plan (ECP) and is continuing to coordinate with the USFWS to refine its ECP based upon their comments and input. The ECP includes ACEPMs to reduce impacts from powerlines and to reduce the risk of vehicle collisions with eagles. The ECP contains annual training requirements for personnel that would include eagle recognition, identification, and ecology awareness to encourage proper operational conduct, response, and reporting if an eagle is observed or encountered onsite. The ECP describes reporting procedures for injured eagles or fatalities. Powerlines would be designed with a five-foot separation between phases which would make it unlikely that a perching eagle would create a circuit by touching conductors (Ioneer 2023b). Impacts to eagles from collisions or electrocution are anticipated to be negligible, long-term, and localized.

Surface disturbance would impact less than one percent of available golden eagle foraging habitat within the area of analysis (Ioneer 2023e). Although a small percentage of foraging habitat loss, the disturbance may still impact adults tending their nests, young in the nests, adults perched on nearby associated perches and roosts, adults foraging or defending their territories, or adults traveling between nests and foraging areas. Additionally, habitat loss from the Proposed Action may reduce the size of the home range for each golden eagle, as well as the foraging areas and opportunities. Prey currently in the area may also relocate further away from the Proposed Action, causing golden eagles to travel further for prey. Any reduction in prey base could impact golden eagles, including annual productivity and territory loss. Impacts from surface disturbance are anticipated to be moderate, long-term to permanent, and localized. All other impacts to golden eagles would be the same as those described for general wildlife avian species.

Cassin's Finch, Common Nighthawk, Loggerhead Shrike, Ferruginous Hawk, and Western Burrowing Owl: Impacts to these species would be the same as those described for general wildlife avian species.

Mammal Species

Botta's Pocket Gopher: Approximately 980 acres of soil types suitable for burrowing would be disturbed, of which 96 acres would be permanent. Impacts would be negligible to minor, long-term to permanent, and localized. All other impacts would be the same as those described for general wildlife mammal species.

Desert Kangaroo Rat: Approximately 980 acres of soil types suitable for burrowing would be disturbed, of which 96 acres would be permanent. Impacts would be negligible to minor, long-term to permanent, and localized. All other impacts would be the same as those described for general wildlife mammal species.

Pale Kangaroo Mouse: Approximately 1,039 acres of suitable habitat would be disturbed within the Access Road and Infrastructure Corridor, of which, 104 acres would be permanent. The improvements to the access road and construction of the pipeline in habitat could result in direct injuries or mortalities. Impacts would be minor, long-term, and localized. All other impacts would be the same as those described for general wildlife mammal species.

Western Water Shrew: Western water shrews have not been identified in the area of analysis; however, they have potential to occur. Approximately eight acres of potential habitat would be disturbed. Potential habitat disturbance could result in direct injuries or mortalities. All other impacts to western water shrew would be the same as those described for general wildlife mammal species. Overall, impacts from the Proposed Action would be minor, long-term, and localized.

Desert Bighorn Sheep: Approximately 2,129 acres of year-round desert bighorn sheep habitat would be removed, of which 383 acres would be permanent. Beneficial impacts may occur post-reclamation if disturbance results in creation of escape terrain such as steep slopes or rugged terrain or if reduced vegetation density or height results in improved visibility. Impacts would be minor to moderate, long-term to permanent, and localized. The Proposed Action would reduce the potential for the area of analysis to be used as lambing areas, and bighorn sheep would have to go into another area in the Silver Peak Range to lamb; potentially stressing ewes and lambs during the lambing season. Noise and increased human activity could have an adverse effect on desert bighorn sheep and cause them to avoid the area. This would be an added stressor to desert bighorn sheep, which may affect future recruitment. Impacts would be moderate, long-term, and localized. All other impacts would be the same as those described for general wildlife mammal species. Additionally, NDOW provided a proposed desert bighorn sheep monitoring plan, which BLM has provided to Ioneer for voluntary consideration (NDOW 2024). Ioneer has committed to funding the monitoring and is continuing to coordinate with NDOW.

Bats: One acre (all permanent) of pinyon-juniper vegetation and three acres (one permanent) of cliff and canyon would be disturbed that may provide roosting habitat. This loss of potential habitat would be a negligible to minor, long-term to permanent, and localized impact. The haul road would overlap the adit in the OPA and the adit would no longer be available to provide roosting habitat for bat species. No population impacts are anticipated. Depending on the extent that the adit is used, impacts would be negligible to minor, long-term, and localized. The quarry walls could be used as roosting habitat. The total area of steep cliff-like habitat created in the quarry would be reduced by the buttress for the long-term quarry wall stability and the extent of recovery at the quarry lake. Impacts would be negligible to minor, permanent, and localized. The quarry lake may provide a foraging area, as the water would likely attract insects, from which bats would feed. Beneficial impacts from additional roosting and foraging habitat would be negligible to minor, permanent, and localized. The quarry lake was not predicted to have an ecological risk to bats (Cedar Creek 2024). The Proposed Action would create a source of light in the Silver Peak Range that would attract insects and, thus, foraging bats. Foraging in close proximity to facilities may result in collisions with associated infrastructure, causing injuries or fatalities. ACEPMs, such as utilizing hooded stationary lights and lighting plants and applying the BBCS would reduce impacts. Impacts would be negligible to minor, long-term, and localized. All other impacts would be the same as those described for general wildlife mammal species.

Reptile and Amphibian Species

California Toad and Western Toad: Improvements to the access road and construction of the pipeline could remove up to eight acres of potential habitat and could result in direct injuries or mortalities to toads, if present. Potential impacts could occur from sedimentation from periodic flooding on the access road or fugitive dust. Traffic on the access road would increase, but ACEPMs would reduce any impacts to California toads and western toads from fugitive dust. Therefore, impacts would be minor, long-term, and localized. The surface water features that have been identified as habitat for California toads and western toads are located outside of the groundwater drawdown contour (Piteau 2023b). Therefore, impacts from

dewatering would be negligible, long-term, and localized. No special status reptile species were observed within the area of analysis.

4.18.2 North and South OSF Alternative

4.18.2.1 General Wildlife

The North and South OSF Alternative would have the same impacts to general wildlife species as the Proposed Action except there would be a shift in the location of some facilities and less surface disturbance. Total surface disturbance would be 2,266 acres. Permanent surface disturbance would be 211 acres. Disturbance to mule deer habitat would be 2,096 acres and surface disturbance would be 722 feet (220 meters) from the NDOW Silver Peak 04 (Cave Springs) Guzzler. Impacts to general wildlife species from surface disturbance, fugitive dust, quarry lake water quality, and dewatering associated with the North and South OSF Alternative would be negligible to minor, long-term to permanent, and localized.

4.18.2.2 Special Status Species

Aquatic Species

Impacts to the Fish Lake Valley tui chub, Fish Lake Valley Pyrg, and Wong's springsnail would be the same as those described for the Proposed Action.

Avian Species

Black-Throated Gray Warbler: Approximately 120 acres of habitat (pinyon-juniper vegetation community) would be removed, with eight acres permanently disturbed. Impacts would be minor, long-term to permanent, and localized. No other impacts beyond those described for general wildlife are anticipated.

Brewer's Sparrow: Approximately 2,011 acres of habitat (sagebrush and mixed shrub vegetation communities) would be removed, with 203 acres permanently disturbed. Impacts would be minor, long-term to permanent, and localized. No other impacts beyond those described for general wildlife are anticipated.

Golden Eagle: Impacts to golden eagles would be the same as those described for the Proposed Action except nest 29 would be approximately 0.53 miles from the South OSF. The South OSF would not be in line of sight of nest 29 (Ioneer 2023b). Impacts would be minor to moderate, long-term to permanent, and localized. No other impacts beyond those described for general wildlife species under the Proposed Action are anticipated.

Pinyon Jay: Approximately 896 acres of habitat (sagebrush and pinyon-juniper vegetation communities) would be removed, with 140 acres permanently disturbed. Impacts would be minor, long-term to permanent, and localized. No other impacts beyond those described for general wildlife avian species are anticipated.

Cassin's Finch, Common Nighthawk, Loggerhead Shrike, Ferruginous Hawk, and Western Burrowing Owl: Surface disturbance to 2,266 acres (211 permanent) of potential habitat. Other impacts to these species would be the same as those described for the Proposed Action.

Mammal Species

Botta's Pocket Gopher: Approximately 1,050 acres of soil types suitable for burrowing would be impacted, of which, 66 acres would be permanently disturbed. Impacts would be negligible to minor, long-term to permanent, and localized. All other impacts would be the same as those described for general wildlife.

Desert Kangaroo Rat: Impacts to desert kangaroo rat would be the same as those described for the Proposed Action, except that the North and South OSF Alternative would disturb 1,050 acres (66 permanent) that contain soils with suitable texture.

Pale Kangaroo Mouse: Impacts to pale kangaroo mouse would be the same as those described for the Proposed Action, except that the North and South OSF Alternative would disturb 1,106 acres of habitat, of which 62 acres would be permanent.

Western Water Shrew: Impacts to western water shrew would be the same as those described for the Proposed Action.

Desert Bighorn Sheep: Approximately 2,089 acres of year-round desert bighorn sheep habitat would be removed, of which 211 acres would be permanent. All other impacts would be the same as those described for the Proposed Action.

Bats: Impacts to bats would be the same as described for the Proposed Action except 120 acres of pinyon-juniper habitat and 10 acres of cliff and canyon habitat would be removed. Permanent disturbance would occur to eight acres of pinyon-juniper habitat. The one adit would not be removed.

Reptile and Amphibian Species

California Toad and Western Toad: Impacts to California toad and western toad would be the same as those described for the Proposed Action.

4.18.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be developed and associated effects to wildlife resources would not occur. The existing 15 acres of exploration disturbance on public lands administered by the BLM have already occurred and have contributed to loss of forage, habitat, and wildlife avoidance to those areas. These areas would be reclaimed. Impacts to wildlife, including migratory birds and special status species would be negligible, temporary to short-term, and localized.

4.19 Wild Horses and Burros

4.19.1 Proposed Action

Although the AML is set to zero for the portion of the Silver Peak HMA where the Proposed Action would take place, impacts to wild horses and burros could still occur. Approximately 2,286 acres of surface disturbance, including the conceptual dewatering and exploration disturbance, would occur in the 242,462-acre HMA which would be less than one percent of the HMA. Additionally, a portion of the water supply facility disturbance may occur in the Silver Peak HMA. All but 383 acres in the HMA would be reclaimed. Disturbance would reduce forage available to wild horses and burros. The wild horses and burros that are present in the Silver Peak HMA would be able to continue to forage outside of the areas disturbed. Impacts to wild horses and burros from habitat disturbance would be minor, long-term to permanent, and localized.

Fencing would be constructed around the processing facility, the quarry, explosives storage area, contact water ponds, Tiehm's buckwheat exclusion areas, and Tiehm's buckwheat designated critical habitat, excluding wild horses and burros. The fencing would prevent wild horses and burros from accessing areas that could have process solutions or be toxic for consumption. Impacts from fencing would be negligible to minor, long-term, and localized. There would be increased traffic on the access road which could lead to fatalities or injuries from collisions. The constant steady-flow of traffic on the access road would increase noise and may displace wild horses and burros in the area. Impacts from the additional traffic on the access road would be minor, long-term, and localized.

Increased noise and human presence would occur in the area of analysis. Wild horses and burros typically respond to noise and human presence by avoidance or habituation. Avoidance would result in displacement of animals from an area larger than the actual disturbance area. Effects to wild horses and burros from human disturbance and noise could cause them to reduce or eliminate use of a larger land area than the Plan boundary itself; therefore, increasing use of other portions of the HMA over the life of the Proposed Action. The total extent of habitat loss from avoidance response is unable to be determined since the degree of this response varies between individual animals. Also, after initial avoidance of human activity and noise-producing areas, certain individuals may acclimate to the activity and begin to reoccupy areas initially avoided. Impacts from noise and human presence is anticipated to be minor, long-term, and localized.

The Proposed Action may result in the introduction or spread of noxious weeds and invasive species potentially resulting in the reduction of available forage quality and quantity within the HMA. Implementation of the Noxious and Invasive Weed Management Plan (NewFields 2022e) would reduce the potential for

noxious weeds, invasive, and non-native species to become introduced or spread within the HMA. Impacts from noxious weeds, invasive, and non-native species would be negligible, long-term, and localized.

An ERA indicates that the predicted constituent concentrations in the post-reclamation quarry lake would not cause an adverse effect to terrestrial wildlife (e.g., wild horses or burros) (Cedar Creek 2024). Impacts from the quarry lake would be negligible to minor, permanent, and localized.

SP-1 (Cave Spring) and SP-6, have both been documented as having surface water present (HydroGeoLogica 2020b) and are located within the OPA. Increased activity near these two sites may cause wild horses and burros to avoid watering at these springs. Over time, wild horses and burros may become habituated to the increased activity. Impacts would be minor, long-term, and localized because there are multiple nearby springs outside of the OPA that provide water. There are 32 springs within the one-mile buffer of the predicted 10-foot groundwater drawdown contour from the Proposed Action dewatering and all are within the Silver Peak HMA. Groundwater drawdown associated with quarry dewatering activities may affect water availability at surface water sites (Piteau 2023b). Reduced flows or cessation of flows would limit water availability for wild horses and burros. Wild horses and burros would be required to travel to other locations for water. If impacts to spring sites are realized, then impacts to wild horses and burros within the Silver Peak HMA would be moderate, long-term, and localized.

4.19.2 North and South OSF Alternative

Impacts to wild horses and burros would be the same as those described for the Proposed Action, except there would be approximately 2,164 acres of disturbance in the Silver Peak HMA and Tiehm's buckwheat designated critical habitat would be fenced. Additionally, a portion of the water supply facility disturbance may occur in the Silver Peak HMA. There would be 211 acres of permanent disturbance. Impacts to wild horses and burros from habitat disturbance would be minor, localized, and long-term to permanent. Designated critical habitat fencing would exclude wild horse and burro use on 719 acres within the Silver Peak HMA which is less than one percent of the HMA. Impacts from fencing would be negligible to minor, long-term, and localized.

4.19.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be developed and associated effects to wild horse and burrow would not occur. The existing 15 acres of exploration disturbance on public lands administered by the BLM would be reclaimed. Impacts to wild horses and burros would be negligible, temporary to short-term, and localized.

4.20 Cumulative Effects Analysis

This section analyzes potential impacts from past, present, and reasonably foreseeable future actions (RFFAs) combined with the Proposed Action and alternatives within the cumulative effects study area (CESA) specific to the resources for which impacts may be anticipated.

This analysis focuses on cumulative impacts of the Proposed Action, North and South OSF Alternative, and No Action Alternative, and other actions within the CESA. Major past and present land uses and disturbances within the resource CESAs that are projected to continue into the future include mineral development and exploration, utilities, infrastructure, roads, and other public purpose projects, geothermal exploration and development, solar energy development, wildland fires, livestock grazing, and agriculture. Dispersed recreation (including hunting, fishing, and OHV use) also occurs and is expected to continue. Past and present actions are included in the affected environment descriptions as they are part of the existing environment.

Past, present, and RFFAs were identified within each CESA as projects that could potentially interact or have a close causal relationship with the Proposed Action or alternatives. These actions were identified using BLM's LR2000 records and aerial imagery. Present actions that are considered include those that have existing and/or ongoing disturbance. RFFAs are those actions where a permit application has been submitted but an action has not yet been authorized. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future.

The CESA boundaries vary in size and shape to reflect each evaluated resource. Cumulative effects should be evaluated in terms of the specific resource, ecosystem, and human community being impacted. To determine the size of each CESA, each resource was analyzed to determine the extent to which the environmental effect from the Proposed Action and alternatives could be reasonably detected and the geographic area impacted was defined. The geographical areas considered for the analysis of cumulative effects are illustrated on the CESA figures for each resource (**Figures 4-8**, **4-9**, **4-10**, and **4-11**). Descriptions, acreages, and corresponding figures for each CESA are detailed in **Table 4-5**.

Within each CESA, projects have been grouped as past, present, and RFFAs, as well as identified by resource group in the sections below. Surface disturbance characteristics were selected to describe the projects for most resources because it allows the combined surface disturbance impacts of all projects to be totaled; these surface disturbances are shown in **Table 4-6**. Acres of disturbance are not applicable to air quality, environmental justice, hazardous materials and solid waste, social and economic values, and transportation and access; thus, impacts to those resources are discussed qualitatively.

Table 4-5 Cumulative Effects Study Area by Resource

Resource	Cumulative Effects Study Area	Size (acres)	Figure
Air Quality and Climate Change	Includes the local airshed, which is a 50-km buffer of the OPA.	2,227,749	Figure 4-10
Cultural Resources	Includes the direct, visual, auditory, and vibrational ZoAs.	138,575	Figure 4-8
Environmental Justice	Includes Census Block Groups overlapping portions of Esmeralda, Mineral, and Nye counties, Nevada and Inyo and Mono counties, California.	22,888,952	Figure 4-11
Geology and Minerals	Includes the Plan boundary.	7,166	Figure 4-8
Hazardous Materials and Solid Waste	Includes the Plan boundary and main routes on which hazardous materials would be transported, including the routes from the Project north on SR 264, SR 773, U.S. 6, and U.S. 95 to Reno; and from the Project south on SR 264, SR 266, and U.S. 95 to Las Vegas.	7,166[1]	Figure 4-8
Land Use and Realty	Includes the Plan boundary.	7,166	Figure 4-8
Livestock Grazing	Includes the Ice House, Red Spring, Silver Peak, and Fish Lake Valley allotments.	481,299	Figure 4-9
Native American Traditional Values	Includes the Plan boundary and a larger regional area that encompasses Fish Lake Valley and Clayton Valley.	810,519	Figure 4-10
Recreation	Includes the Plan boundary and hunt unit 211.	620,928	Figure 4-10
Social and Economic Values	Includes Esmeralda, Nye, and Mineral counties in Nevada and Inyo County in California.	22,929,628	Figure 4-11
Soil Resources	Includes the Plan boundary and a one-mile buffer of the maximum extent of the predicted 10-foot groundwater drawdown contour related to dewatering.	53,790	Figure 4-8
Threatened and Endangered Species – BSSG	Includes the Plan boundary and White Mountain PMU.	1,753,885	Figure 4-10
Threatened and Endangered Species – Monarch Butterfly	Includes the Plan boundary and a one-mile buffer of the maximum extent of the predicted 10-foot groundwater drawdown contour related to dewatering.	53,790	Figure 4-8
Threatened and Endangered Species – Tiehm's buckwheat	Includes the Plan boundary.	7,166	Figure 4-8
Transportation and Access	Includes the Plan boundary and main routes which Project traffic would utilize, including from the Project north on SR 264, SR 773, U.S. 6, and U.S. 95 to Reno; and from the Project south on SR 264, SR 266, and U.S. 95 to Las Vegas.	7,166 (Plan boundary)	Figure 4-11

Resource	Cumulative Effects Study Area	Size (acres)	Figure
Vegetation Including Noxious Weeds and Special Status Species	Includes the Plan boundary and a one-mile buffer of the maximum extent of the predicted 10-foot groundwater drawdown contour related to dewatering.	53,790	Figure 4-8
Visual Resources	Includes the Plan boundary and the range of possible viewpoints as seen from the KOPs associated with the Project.	99,929	Figure 4-9
Water Resources	Includes the model domain boundary, which includes Fish Lake Valley HA 117 and portions of Big Smoky Valley and Clayton Valley.	845,428	Figure 4-10
Wetland and Riparian Resources	Includes the Plan boundary and a one-mile buffer of the maximum extent of the predicted 10-foot groundwater drawdown contour related to dewatering.	53,790	Figure 4-8
Wildlife Resources - General Wildlife, Special Status Species, and Migratory Birds	Includes the Plan boundary and a one-mile buffer of the maximum extent of the predicted 10-foot groundwater drawdown contour related to dewatering.	53,790	Figure 4-8
Wildlife Resources – Golden Eagles	Includes a 10-mile buffer of the Plan boundary.	506,241	Figure 4-10
Wildlife Resources – Bighorn Sheep and Mule Deer	Includes hunt unit 211.	620,928	Figure 4-9
Wild Horses and Burros	Includes the Plan boundary and a one-mile buffer of the maximum extent of the predicted 10-foot groundwater drawdown contour related to dewatering.	242,868	Figure 4-9

Table 4-6 Past, Present, and RFFAs

Past, Present, and RFFAs, Disturbances and Projects	Cultural Resources CESA	Geology and Minerals; Land Use and Realty; Threatened and Endangered Species – Tiehm's Buckwheat CESA	Livestock Grazing CESA	Native American Traditional Values CESA	Recreation; Bighorn Sheep and Mule Deer CESA	Soils; Threatened and Endangered Species – Monarch Butterfly; Vegetation; Wetlands; and General Wildlife CESA	Threatened and Endangered Species – BSSG CESA	Visual Resources CESA	Water Resources CESA	Golden Eagle CESA	Wild Horses and Burros CESA
CESA Acres	138,575	7,166	481,299	810,519	620,928	53,790	1,753,885	99,929	845,428	283,429	242,868
Past Actions											
Mineral and Mining Development and Exploration											
Sand and Gravel Operations, Materials Sites and Community Sand and Gravel Pits	80	40	332	421	340	40	279	0	464	0	215
Notices	62	26	990	339	1,001	45	62	22	244	166	850
Mining and Exploration Projects	0	0	6	31	6	0	0	0	31	6	0
Utilities, Infrastructure, and Public Purpose											
Powerlines	194	194	279	292	0	199	4,307	85	632	0	12
Water Infrastructure	0	0	3	32	0	0	2,047	0	33	12	0
Telephone and Fiber Optic Lines	0	0	1,987	113	0	0	1	0	146	1,655	113
Communication Facilities	0	0	148	0	0	0	64	0	0	11	0
Public Purpose	83	0	253	901	1,345	0	89	0	901	521	0
Solar Energy											
Solar Facilities	0	0	16,560	0	0	0	0	0	0	0	0
Geothermal											
Geothermal Infrastructure	0	0	7	15	0	0	5	0	0	0	0
Oil and Gas											
Oil and Gas Pipeline	0	0	0	631	0	0	0	0	631	0	0
Past Actions Total Disturbance Acres	**419**	**260**	**20,564**	**2,775**	**2,692**	**284**	**6,853**	**107**	**3,082**	**2,371**	**1,190**
Present Actions											
Mineral and Mining Development and Exploration											
Sand and Gravel Operations, Materials Sites and Community Sand and Gravel Pits	81	41	899	417	989	41	200	40	774	779	14
Clayton Valley Mine	0	0	0	620	620	0	0	0	620	620	620
Mineral Ridge Mine	0	0	0	250	250	0	620	0	250	250	0
Silver Peak Mine	0	0	0	40	40	0	40	0	40	40	40
Grefco Mine	0	0	0	0	220	0	0	0	0	0	0
Notices	<1	0	29	56	7	<1	16	0	21	0	0
Utilities, Infrastructure, and Public Purpose											
Powerlines	24	1	964	1,617	1,137	43	1,401	116	1,518	397	2,605
Communication Facilities	<1	0	13	15	13	0	5	0	9	5	0
Telephone and Fiber Optic Lines	15	14	53	24	43	14	73	0	24	20	<1
Water Pipelines and Water Infrastructure	0	0	34	50	28	0	56	0	68	47	28
Public Purpose	340	0	0	360	360	10	30	0	360	350	30
Airports	0	0	0	160	160	0	0	0	160	160	0
Agricultural											
Agricultural Areas	2	0	1,785	7,658	7,658	1,687	11,710	2,751	11,481	6,210	4,662
Geothermal											
Geothermal Development	0	0	0	0	100	0	0	0	100	0	0
Geothermal Exploration	0	0	100	0	0	58	100	0	0	100	1
Roads and Railroads											
State Routes	9	9	250	374	374	36	1,509	81	719	319	9
US Highway	0	0	128	333	333	0	1,921	0	0	0	0

Past, Present, and RFFAs, Disturbances and Projects	Cultural Resources CESA	Geology and Minerals; Land Use and Realty; Threatened and Endangered Species – Tiehm's Buckwheat CESA	Livestock Grazing CESA	Native American Traditional Values CESA	Recreation; Bighorn Sheep and Mule Deer CESA	Soils; Threatened and Endangered Species – Monarch Butterfly; Vegetation; Wetlands; and General Wildlife CESA	Threatened and Endangered Species – BSSG CESA	Visual Resources CESA	Water Resources CESA	Golden Eagle CESA	Wild Horses and Burros CESA
Local Roads	297	134	2,967	4,106	4,106	418	13,715	732	5,374	2,997	1,343
Present Actions Total Disturbance Acres	**767**	**200**	**7,221**	**16,082**	**16,438**	**2,307**	**31,396**	**3,720**	**21,519**	**12,294**	**9,352**
RFFAs											
Mineral and Mining Development and Exploration											
Sand and Gravel Operations, Materials Sites and Community Sand and Gravel Pits	0	0	0	0	0	0	0	0	5	0	3
Silver Sun Mine	0	0	10	10	10	0	10	0	10	10	10
Neolith CV Project	0	0	1,280	1,280	1,280	0	624	0	1,280	0	1,280
Notices	<1	0	0	6	0	0	0	0	0	<1	0
Clayton Ridge North Mine	0	0	1,295	1,295	0	0	1,295	0	0	0	0
Clayton Ridge Exploration	0	0	0	200	0	0	0	0	0	0	0
Montezuma Exploration Project	0	0	0	7,673	0	0	0	0	0	0	0
Clayton Valley Lithium Exploration	0	0	1,280	1,280	0	0	0	0	0	0	0
Teels Marsh Exploration	0	0	0	0	0	0	64	0	0	0	0
Utilities, Infrastructure, and Public Purpose											
Powerlines	156	0	3,278	929	1,879	188	1,955	0	0	3,404	643
Solar Energy											
Solar Energy Facilities	0	0	70,463	6,922	65,335	0	49,848	0	65,335	70,463	20,099
Geothermal											
Geothermal Exploration	57	<1	57	104	57	0	312	57	57	57	57
Geothermal Utilization	311	311	311	311	311	311	311	311	311	311	311
RFFAs Total Disturbance Acres	**524**	**311**	**77,974**	**20,024**	**68,872**	**500**	**54,419**	**368**	**70,480**	**74,245**	**22,403**
Past, Present, and RFFAs Total Disturbance Acres	**1,711**	**771**	**105,759**	**38,881**	**88,002**	**3,091**	**92,668**	**4,196**	**95,080**	**88,911**	**32,945**
Percent of CESA	**1**	**11**	**22**	**5**	**14**	**6**	**5**	**4**	**11**	**31**	**14**
Fires	**0**	**0**	**<1**	**0**	**<1**	**0**	**0**	**0**	**0**	**0**	**0**

Source: BLM 2023e

4.20.1 Air Quality

The CESA for air quality is a 50-km buffer of the OPA which encompasses 2,227,749 acres. Existing air quality within the CESA is currently in Attainment or Unclassified for all criteria pollutants. Development in the CESA has included: mining and mineral exploration activity; utility and infrastructure construction (e.g., water pipelines, fiber optic lines, powerlines, etc.); range improvements; road construction; limited urban development; and agriculture areas. These uses would continue in the future. Projects have accounted for short-term to long-term surface disturbance generating varying levels of PM, gaseous emissions, and GHG emissions. Smoke generated during past wildland fires have had intermittent impacts on local air quality and wildland fires are likely to occur in the future.

Effects to air quality in the CESA from past, present, and RFFAs is largely from airborne dust released during construction, vehicle travel on unpaved roads, and smoke from wildland fires. Mine development and exploration operations can also affect air quality through emissions from vehicles and process equipment, as can utility development during construction. Grazing and agricultural operations can produce fugitive dust, but the quantities are minimal and are expected to remain approximately equal to present conditions. They also generate gaseous pollutants from vehicle emissions used for these activities.

There are several past and present sand and gravel operations, including the authorized mineral materials that hold Surface Area Disturbance permits from NDEP or Class II Change or Location permits throughout the CESA. There are no pending sand and gravel authorizations. Sand and gravel operations generate dust from grading and generate vehicle emissions from equipment used for extraction.

There is a pending geothermal utilization site within the CESA for the Open Mountain Energy Fish Lake Geothermal Project. There is also a geothermal exploration site for the Lone Mountain Geothermal Exploration Project. Particulate and gaseous emissions would be generated during construction and operation of these RFFAs. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. These authorizations typically include ACEPMs that reduce fugitive dust emissions as well as equipment emissions, and the authorizations would need to comply with applicable NDEP air permitting requirements.

Travel on unpaved roads in the CESA can affect air quality from vehicle emissions and fugitive dust, but this type of use has not affected air quality measurably in the past and is considered a negligible in terms of overall air quality impacts within the CESA. Two mining projects are reasonably foreseeable within the CESA. The Clayton Valley Mine is currently authorized under a small pilot plant, with a full project assessment in development with an estimated disturbance area of 3,700 acres. The Silver Sun Mine is a possible future project with an expected disturbance area of 10 acres.

The Proposed Action would generate lithium, which could be used in batteries for EVs. The EV battery supply chain consists of four general steps: upstream includes direct extraction of raw materials; midstream includes processing and refining of raw materials; downstream includes battery manufacturer assembly of cells; and end of life includes when batteries are reused or recycled (Carreon 2023). The energy required to extract and refine battery materials for EV production tends to emit more GHGs per car than traditional vehicle production. However, average use of EVs typically makes up the difference within two years (Carreon 2023). Annual shipments of lithium would go to Germany (64 percent), Asia (16 percent), and the United States (20 percent). Of the domestic shipments in the United States, 40 percent would go to Tesla in Nevada, 30 percent to the midwestern United States, and 30 percent to the southeastern United States. Approximately 94 percent of boron would go to Asia and six percent would remain in the United States. Currently, the downstream sector of EV batteries is global with Asian companies dominating battery manufacturing. The Proposed Action would increase battery manufacturing capacity of the United States. Ioneer currently has at least 21,000 tpy of lithium contracts for the next three to five years to help expand the United States market (PRNEWS 2021, 2022a, 2022b; Ioneer 2023f). Over the next three to five years, approximately 78 percent of the total lithium carbonate produced (26,800 tpy) would remain within the United States.

4.20.1.1 Proposed Action

The cumulative effects assessment evaluates whether the combined effects of the Proposed Action, alternatives, and other significant permitted or pending air pollutant emissions from adjacent sources, plus background levels of applicable air pollutants, have the potential to create any exceedances of NAAQS. A recent renewal of the Class II NDEP Operating Permit (AP1041-2733) was completed for Mineral Ridge Gold, LLC (Mineral Ridge Mine). Air emissions from the facility consist of PM, $PM_{2.5}$, PM_{10}, NO_x, CO, SO_2, VOC, HAPs, and GHGs. This consists of process and insignificant emission sources (ASI 2020). Albemarle U.S., Inc. operates a Lithium Carbonate manufacturing facility associated with the Silver Peak Mine currently operating under NDEP Permit AP2819-005.04 (Trinity 2022b).

It is not anticipated that the cumulative increase in emissions, when combined with emissions from the Proposed Action, would result in NAAQS compliance issues. The total estimated cumulative HAP emissions are less than 10 tpy for a single HAP and 25 tpy for all HAP emissions in aggregate. The state of Nevada is expected to fall short of its GHG reduction goals for 2025 and 2030. The cumulative GHG emissions resulting from the Proposed Action and other major sources would represent approximately one percent of the gross GHG emissions for the state of Nevada (46.3 million metric tons) (NDEP 2021). The GHG emissions associated with the Project would impact the Nevada goal of being carbon neutral by 2050 (based on 2005 baseline emissions) and the intermittent reduction goals in 2025 and 2030. The expected emissions from the Project are minor when compared to other various GHG sources throughout the county and region, but the increase would have an effect in reaching projected goals.

Data was gathered for all sources within the 50-km radius which included Esmeralda, Mineral, Nye, and Mono counties. The inventory included 11 sources, which were screened based on an emissions (Q) over distance (D) technique identified as “20D” (Trinity 2023). **Table 4-7** illustrates the results of the Q/D assessment, all of which are below 20. Therefore, increment and cumulative modeling was determined to not be required.

Table 4-7 Regional Inventory Q/D Analysis

Facility Name	Emissions Q (tons)	Distance from Project D (km)	Q/D	Q/D<20
Argentum Mill[1]	130	37.0	3.52	Yes
Silver Peak Operations[1]	97.8	25.3	3.86	Yes
Grefco Minerals, Inc.[1]	145	36.7	3.96	Yes
Mineral Ridge Mine[1]	116.6	14.3	8.15	Yes
Circle L ranch Airport[2]	9.12	21.9	0.42	Yes
Dyer Airport[2]	4.50	26.5	0.15	Yes
North Valley Airport[2]	1.88	21.2	0.09	Yes
Heart of Nature[1]	16.5	21.4	0.77	Yes
Coaldale Junction Cell Tower[2]	0.04	23.0	1.91E-03	Yes
Fisher Sand & Gravel[2]	53.7	28.5	1.89	Yes
Jim Wilkin Trucking, LLC[2]	68.6	40.8	1.68	Yes

[1] Emissions are derived from most recent NDEP Permit or Technical Review
[2] Emissions are derived from the USEPA 2017 NEI database

4.20.1.2 North and South OSF Alternative

The authorized emissions would be similar to the Proposed Action, but some impacts would be geographically different. The geographic differences in disturbance are not anticipated to result in different emissions from the Proposed Action. As a result, cumulative impacts are anticipated to be the same as the Proposed Action.

4.20.1.3 No Action Alternative

Under the No Action Alternative, cumulative emissions would occur within the CESA. No emissions inventory has been prepared for the previously authorized explorations operations. However, it is

reasonable to assume that the No Action Alternative would have less emission generation levels than the Proposed Action; thus, cumulative emissions would be less than discussed for the Proposed Action, and this alternative, when combined with past, present, and RFFAs would be compliant with all NAAQS.

4.20.2 Cultural Resources

The CESA for cultural resources includes the PAPE and visual, auditory, and vibrational ZoAs. The total area of the CESA encompasses 138,575 acres. Past and present actions affecting cultural resources include mineral development and exploration projects; utilities, infrastructure, and public purpose activities; roads and railroads; agricultural areas; dispersed recreation; and livestock grazing. There have been no wildfires in the CESA. The past and present land uses in the CESA may have resulted, or may result, in the loss, disturbance, theft, and burial of cultural artifacts, as well as the modification and alteration of the setting of cultural resources. The incremental degradation of cultural resources reduces the information and interpretive potential of historic properties.

Development on state and federal lands requires that cultural resource surveys be conducted to determine the presence of cultural resources eligible for listing on the NRHP; however, there is no such requirement for disturbance on private lands unless there is a federal or state nexus. As directed by Section 106 of the NHPA, NRHP-eligible cultural resources are generally avoided or mitigated if avoidance is not feasible for projects with a federal or state nexus. Disturbances conducted prior to 1966 and the NHPA, and/or those without a federal or state nexus generally did not identify/quantify cultural resources or impacts to them.

The RFFAs within the CESA would include a mineral notice and geothermal exploration/development. Wildland fires could occur in the future, as would restoration projects, agriculture, livestock grazing, and dispersed recreation. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. These activities would lead to similar impacts as stated for past and present actions. Of the 138,575 acres covered by the CESA, 1,711 acres of disturbance are associated with past, present, and RFFAs, which is a disturbance of approximately one percent of the CESA.

4.20.2.1 Proposed Action

The Proposed Action would increase the disturbance within the CESA by 2,306 acres to approximately 4,017 acres or approximately three percent of the CESA. Development of the Proposed Action may contribute to the loss of site integrity of NRHP-eligible historic properties if they cannot be avoided by Project design. The implementation of an MOA and HPTP would adequately mitigate adverse impacts. Data recovery of NRHP-eligible cultural resources that could not be avoided would expand the regional database and knowledge of prehistoric and historic contexts. Mitigation measures developed to avoid or minimize direct and indirect impacts would also minimize contributions to cumulative effects. Cumulative effects to cultural resources from past, present, and reasonably foreseeable future activities combined with the Proposed Action would be adverse, permanent, and localized.

Historic properties located in the CESA on federal land or if there is a federal nexus, would be mitigated in accordance with applicable Section 106 consultation requirements. In addition, any previously unknown NRHP-eligible cultural resources discovered during construction activities would be treated in accordance with the MOA and ACEPMs. Compliance with Section 106 of the NHPA has minimized adverse effects to historic properties; however, past and present disturbances in the CESA have resulted in cumulative impacts to these properties. Cumulative effects to historic properties from past, present, and reasonably foreseeable future activities combined with the Proposed Action would be adverse, permanent, and localized; an MOA and HPTP would be implemented to mitigate these adverse impacts.

4.20.2.2 North and South OSF Alternative

The North and South OSF Alternative would increase the disturbance within the CESA by 2,266 acres to approximately 3,977 acres or approximately three percent of the CESA. Cumulative impacts under North and South OSF Alternative would be similar to the Proposed Action.

4.20.2.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. The alternative would not contribute to cumulative effects to cultural resources.

4.20.3 Environmental Justice

The CESA for environmental justice includes Esmeralda, Nye, and Mineral counties in Nevada and Inyo County in California and encompasses 22,888,952 acres.

Past and present actions within the CESA include mineral exploration and development, oil and gas development, geothermal exploration and development, agricultural operations, solar facility development, and utilities and infrastructure development. Utilities and infrastructure development would typically have impacts during construction but may also have impacts during operations and maintenance, especially if these facilities are disproportionately located in areas where communities with environmental justice concerns exist.

Agricultural activities occur throughout the CESA and have potential impacts to water quantity from ground water or surface water pumping needed for irrigation and stormwater runoff. Agriculture may also impact ground water quality from stormwater runoff and ground water pumping. In 2022, there were eight farms in Esmeralda County, six farms in Mineral County, and 13 farms in Nye County that were owned by farmers of Hispanic, Latino, or Spanish origin (USDA 2024). Agricultural activities impact the socioeconomic conditions of the CESA, including employment and income, but impacts to population increases, housing availability, and community facilities and services are more limited than other industries, such as mining. These activities may increase traffic and the use of and transportation of hazardous materials, though generally to a lesser extent than large projects.

Mining is an existing activity in the CESA. Past and present mining include the Mineral Ridge Gold Mine, Albemarle Silver Peak Lithium Operation, Blanco Mine, Basalt Mine, and Lone Mountain Turquoise Mine in Esmeralda County; Denton-Rawhide Mine and Isabella Pearl Mine in Mineral County; and Premier Chemicals, LLC Mine and Round Mountain Mine in Nye County (NBMG 2022). Impacts from mining and exploration may include increased traffic, air, noise, and light pollution, transportation of hazardous material, socioeconomics, and potential water resource conflicts through water quality impacts from operations, and water quantity impacts from dewatering operations and consumptive water use. All of these projects have resulted in the existing socioeconomic conditions of the CESA, which include impacts from increased population, housing availability, community facilities and services, local government finances, social and cultural landscape, employment, and income.

Authorized geothermal exploration includes the Lone Mountain and Pearl Geothermal Exploration Projects. Geothermal leases occur throughout the CESA, and geothermal lease holders have a right to exploration activities, so the possibility of future exploration is likely. Geothermal exploration may impact existing socioeconomic conditions, as well as air quality, visual resources, water quality and quantity, traffic generation, and transportation of petroleum products and hazardous materials. Impacts from geothermal exploration are typically short-term due to the nature of exploration and employment levels are low. However, if multiple geothermal exploration projects occur at the same time, the impacts would occur to a greater extent. The Don A Campbell I and II Geothermal Projects are two existing 25-megawatt geothermal power generating facilities located in Mineral County (SCPPA 2023), and part of the existing condition in terms of air quality, visual impacts, water quality and quantity, traffic and hazardous material transportation, and the socioeconomic conditions of the CESA.

RFFAs include mineral exploration and new and continuing mining operations, such as the Clayton Valley and Neolith Projects, Silver Sun Mine, Clayton Ridge North Mine, and Kinross Montezuma Exploration Project. ACME Lithium, Inc and Nevada Alaska Mining Co. have interest in claims for lithium exploration in Clayton Valley and Fish Lake Valley in Esmeralda County (ACME 2024; BLM 2024v; Nevada Alaska Mining 2024). However, it is unknown whether interest in claims and exploration would result in project development. Impacts would be the same as discussed for past and present mining actions. Other developments would include utilities and infrastructure construction, solar facility development, and wind energy developments. Primary impacts to environmental justice populations from these actions would be

during construction, including noise, air, and light pollution, traffic generation, water quality from erosion or sedimentation, and water use; however, lasting impacts may remain on the landscape after construction. Pending geothermal development and exploration projects include the Fish Lake Geothermal Project. Geothermal development and exploration operations have similar impacts as discussed for other actions, including increased traffic, air quality impacts, increased night lighting, noise increases, water use, and increased job opportunities. The NV Energy Greenlink West Project is proposed throughout portions of the CESA, which would include a system of new 525-kV, 345-kV, 230-kV, and 120-kV electric transmission facilities between northern and southern Nevada (BLM 2022). Due to the extent of this project, socioeconomic impacts would occur regionally throughout the CESA, primarily during construction of the power facilities, but impacts would also occur during operations and maintenance, and the project may allow for further development of the areas due to increased potential for power connectivity.

Six applicants have requested ROW grants to construct, operate, and decommission seven solar projects in Esmeralda County that, if approved and authorized for construction, facilities would apply for power purchase agreements with the intent to connect to the proposed 525-kV Esmeralda Substation that would be constructed as part of the separate Greenlink West transmission project. The solar projects would likely contribute to the same impacts as discussed above. This would include visual impacts during and after construction, water use and potential water quality impacts from grading operations (e.g., sedimentation and erosion), increased population during construction which may result in potential housing shortages, increased use of public services and facilities during construction, impacts to county budgets, impacts to employment and income, increased traffic, air quality impacts during construction, and potential increases in transportation of hazardous materials during construction. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. The RFFAs would have impacts to the social and cultural landscape of the CESA, which primarily has a rural character.

4.20.3.1 Proposed Action

The Project would result in a cumulative increase in surface disturbance, mining and ancillary facility construction, transportation of hazardous materials, traffic generation, air quality impacts, and increased water use within the CESA. Air, noise, and visual impacts from the Project would reduce further from the Project. However, it would be an overall increase in air emissions, noise, and viewshed impacts when combined with present and RFFAs, so impacts may be more noticeable with simultaneous projects.

The Project would represent a cumulative increase in hazardous material transportation within the CESA. The probability of release of hazardous material was determined to be low, with diesel being the highest probability of release. When combined with present or RFFAs, there would be more hazardous material shipments occurring on the hazardous material transportation route, which may have a potential to increase some of the probability of release with multiple projects transporting hazardous material concurrently.

Impacts to water quality and quantity would be cumulatively increased under the Proposed Action. It is not anticipated that the Proposed Action would result in water quality issues due to the design and requirements from the WPCP that would be secured for the Project through the NDEP, Bureau of Mining Regulation and Reclamation. Water pumping from the agricultural areas would be equal to the agricultural pumping, less the NDWR adjustment, Therefore, analysis of pumping for mine water supply assumes the use of active water rights. The analysis of effects on water rights assumes that existing consumptive uses in Fish Lake Valley would continue at their current rate which are near the Fish Lake Vally basin's perennial yield. RFFAs including the Proposed Action may require acquisition of water rights, which could impact some of the 27 farms owned by Hispanic, Latino, or Spanish origin farmers in the CESA (USDA 2024). If present and RFFAs include concurrent groundwater pumping from new or existing water rights, this would cumulatively impact the groundwater resources, including agricultural water rights, in the CESA which could disproportionately affect communities with environmental justice concerns. Depending on the location and extent of water use or dewatering operations from other past, present, or RFFAs, the water use and dewatering operations under the Proposed Action would cumulatively impact groundwater levels, including potentially impacting flow to springs sites.

The Proposed Action would cumulatively increase traffic on the CESA roadways when combined with present and RFFAs. The Proposed Action would increase traffic on area roadways from bus traffic, truck traffic, and light vehicle traffic. When combined with present and RFFAs that add additional vehicle traffic

on the roads, there would be a cumulative impact to traffic conditions. This may include motorist delays as the roadways become more congested or increased accident rates as more vehicles are on the road. Given there are low-income, minority and Native American populations that meet the environmental justice screening requirements within Census Block Groups along the transportation route within the CESA, transportation-related impacts from present and RFFAs would disproportionately affect populations with environmental justice concerns.

The Proposed Action, when combined with present and RFFAs would increase the population of the CESA through construction and operations employment. This would also increase income and employment levels, and cumulatively add to tax revenues. When combined with present and RFFAs, the increased population would potentially have impacts on housing availability within the CESA, which already has low vacancy rates for rental and long-term housing. Other cumulative impacts may occur to county revenues if counties need to hire additional staff, or account for increasing public services/capacity to accommodate the Proposed Action population, in addition to concurrent present or RFFAs. Impacts to county finances may affect capacity to increase services and infrastructure to accommodate population increase from present and RFFAs in the CESA. This would disproportionately and adversely impact environmental justice populations in the area of analysis by potentially decreasing access to public social services. Whereas there would be additional tax revenue received from the Proposed Action, present actions and RFFAs, it is uncertain if the additional cumulative tax revenue would completely offset increased spending required by the counties to accommodate population increases and use of public services, particularly since the timing of receiving tax revenue may not coincide with when impacts occur.

The Proposed Action Alternative would contribute to cumulative effects on low-income, minority, and Native American populations in the CESA. The cumulative effects on communities with environmental justice concerns from the past, present, and RFFAs, including the Proposed Action, would be moderate to major, long-term, and regional.

4.20.3.2 North and South OSF Alternative

Cumulative impacts would be similar to the impacts from the Proposed Action.

4.20.3.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur contributing to potential impacts to communities with environmental justice concerns. Cumulative impacts would be moderate, long-term, and regional.

4.20.4 Geology and Minerals

The CESA for geology and minerals includes the Plan boundary and encompasses 7,166 acres. Within this CESA, past actions resulted in 259 acres disturbance, including sand and gravel mining, minerals exploration notices, and powerlines. Present actions have resulted in 200 acres of disturbance, including sand and gravel mining; power, telephone, and fiber optic lines; and state and local roads. RFFAs would result in 311 acres of disturbance, consisting of geothermal exploration and use.

Mineral development and exploration activities typically have the largest impacts on geology and mineral resources because they can contribute to mineral resource depletion, removal of mineral resources from availability for development, topographic changes, and affect geotechnical stability. Other past and present actions may impact access to mining claims, or access to areas for mineral exploration and development. Geothermal exploration and development would have similar impacts. Other actions with potential effects include utility lines and roads. While these activities also disturb surface acreage, they typically conform closely to the local topography and have negligible, if any, impacts on geology and mineral resources. RFFAs within the CESA would include wildland fires, restoration projects, livestock grazing, and dispersed recreation. While these activities also disturb surface acreage, they would have negligible, if any, impacts on geology and mineral resources. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Of the 7,166 acres covered by the CESA, 771 acres of disturbance are associated with past, present, and RFFAs, which is a disturbance of approximately 11 percent of the CESA.

4.20.4.1 Proposed Action

The Proposed Action would add approximately 2,306 acres of surface disturbance resulting in a cumulative surface disturbance in the CESA of 3,077 acres, or approximately 43 percent of the CESA. Not all these acres would result in major permanent impacts to geology and mineral resources as they would be reclaimed and accessible for future mineral exploration and development. Cumulative impacts to geology and mineral resources would be moderate, localized, and long-term to permanent.

4.20.4.2 North and South OSF Alternative

Cumulative effects to geology resources under the North and South OSF Alternative would be similar to those described for the Proposed Action. The alternative would result in 2,266 acres of surface disturbance. Combined with 711 acres of disturbance associated with past, present, and RFFAs, this would be about 42 percent of the CESA. Cumulative impacts to geology and minerals would be minor, long-term, and localized.

4.20.4.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. Impacts to geology and minerals from past, present, and RFFAs in the CESA have resulted in minor, long-term to permanent, and localized cumulative effects. No additional cumulative impacts beyond the past, present, and RFFAs would occur.

4.20.5 Hazardous Materials and Solid Waste

The CESA for hazardous materials and solid waste includes the Plan boundary and main transportation access routes on which hazardous materials would be transported. Within this CESA, past and present actions using the transportation routes within the CESA occurs from mineral development and exploration projects; utilities, infrastructure and public purpose activities; oil, gas, and geothermal exploration and development; road and railroads; dispersed recreation; agricultural operations; and livestock grazing.

The transportation routes have been used in the past, and currently are being used to transport hazardous materials, including reagents and petroleum, to nearby users. Vehicles using these routes also contain petroleum fuels. Increased traffic on these routes increases the potential for vehicle collisions, including those transporting hazardous materials. Utilities such as telephone lines would use petroleum-based products during construction and operation. Recreation and public purpose sites may require transportation and use of chemicals and hazardous material, including petroleum products, as well as disposal of material in permitted landfills. All existing projects would need to comply with federal, state, and local regulations relevant to the transport, handling, and disposal of wastes. RFFAs within the CESA would continue to include restoration projects, livestock grazing, agricultural operations, and dispersed recreation. These actions would have similar impacts as stated for past and present actions. Wildland fires may also occur in the future. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. These actions would have similar impacts as stated for past and present actions. Transportation to proposed geothermal development projects would increase the amount of vehicles in the CESA and transport of hazardous materials, including petroleum products.

4.20.5.1 Proposed Action

The Proposed Action and other past, present, and RFFAs would transport and utilize hazardous materials throughout the CESA. Past, present, and RFFAs have used, or are currently using off site permitted landfills to dispose of solid waste and must comply with all federal, state, and local regulations relevant to the transport, handling, and disposal of wastes. With BMPs and management plans in place for these authorizations, a release to the environment during transportation and use is low, though possible. The Project would cumulatively increase the amount of bulk process chemicals, fuels, and supplies transported on roadways within the CESA, potentially increasing the chances of accidents during transportation or inadvertent spills of hazardous material or petroleum products during use on site. Hazardous materials would be transported by commercial carriers or vendors in accordance with the requirements of Title 49 of the CFR, and carriers would be licensed and inspected as required by the NDOT and USDOT. Tanker trucks would be inspected and have a Certificate of Compliance issued by the Nevada Motor Vehicle Division. These requirements would also apply to other present and RFFA authorizations.

The Proposed Action would increase the disposal of solid waste transported off site to an authorized landfill. This would increase the transportation and disposal of solid waste within the CESA, but the Project would be required to comply with all applicable regulations and requirements for solid waste disposal. Potential cumulative effects associated with the transportation and use of hazardous materials and solid waste from past, present, and RFFAs including the Proposed Action, are expected to be negligible to moderate, long-term, and localized to the CESA.

4.20.5.2 North and South OSF Alternative

Under the North and South OSF Alternative, the cumulative environmental impacts for hazardous materials and solid waste would be the same as the Proposed Action.

4.20.5.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. Impacts associated with the transportation and use of hazardous materials from past, present, and RFFAs in the CESA have resulted in negligible, long-term, and localized cumulative effects. No additional cumulative impacts beyond the past, present, and RFFAs would occur.

4.20.6 Land Use and Realty

The CESA for land use and realty includes the Plan boundary and encompasses 7,166 acres. Past and present disturbance has resulted from: sand and gravel operations, mineral and mining exploration projects; utilities and infrastructure; roads and railroads; dispersed recreation; livestock grazing, and agricultural operations. RFFAs would include geothermal exploration and development. Dispersed recreation, livestock grazing, and agricultural operations would continue in the future within the CESA. Utilities and infrastructure represent the majority of land disturbing activities within the CESA, primarily from powerlines and roads. Public infrastructure, such as utilities and roads, often have long-term impacts to lands and may facilitate other land uses. These authorizations can increase access for other types of activities (e.g., recreational activities), while easements or ROWs can limit the types of land use that can occur in these areas. Traffic is expected to increase during construction of utilities and other infrastructure, but traffic is often negligible during operation. These facilities often require routine maintenance which may also increase traffic in the CESA, but they typically do not generate the same impacts as construction. It is possible that operators of the Mineral Ridge Mine may utilize Cave Springs Road through the OPA as detailed in the Transportation and Access Plan (Ioneer 2022).

Present mining activities within the CESA consist of exploration and sand and gravel operations. These activities remove the areas that are being utilized for mineral exploration and sand and gravel operations from other multiple use activities. Though exploration disturbance is often reclaimed, if there are any permanent features left after closure of sand and gravel operations, this can result in permanent removal of areas from other multiple use authorizations. Mineral exploration and sand and gravel operations also result in increased traffic on the surrounding road network, including from large vehicles. Overall traffic generation depends on the intensity of operations. Roads often allow improved access to land uses and may alter current or future traffic patterns, livestock grazing, agricultural operations and recreational land uses are other important land categories that can occur throughout the CESA. Other types of land uses may be compatible and even facilitate these activities (e.g., rural roads). In addition, some authorizations may conflict with these activities, such as mining and mineral development and sand and gravel operations which generally restricts these activities during the life of operations. Agricultural operations, depending on the intensity of use, may remove areas from other multiple use authorizations for the life of agricultural operations. Livestock grazing is more dispersed than some of the more intensive uses; however, depending on fencing and other rangeland improvements, can restrict other land use activities that are not compatible with grazing.

RFFAs in the CESA would include geothermal exploration and utilization projects, including the pending Fish Lake Valley Geothermal Development Project and Emigrant Mountain Exploration Project. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Overall, impacts to land use and access are similar to those discussed for past and present actions, including restricted or delayed access to areas of active operations. Wildland fires in this CESA may occur

in the future, as would livestock grazing, continued agricultural operations, and dispersed recreation. These activities would have similar impacts as stated for past and present actions.

Of the 7,166 acres covered by the CESA, 711 acres of disturbance are associated with past, present, and RFFA disturbances, which is a disturbance of approximately 11 percent of the CESA.

4.20.6.1 Proposed Action

Approval of the Project would increase disturbance within the CESA by 2,306 acres in addition to disturbance associated with past, present, and RFFAs for a total disturbance of 3,077 acres, which is approximately 43 percent of the CESA. The Proposed Action would result in a large increase in disturbance and would be a significant land use authorization in the CESA. However, the areas surrounding the CESA have similar potential for multiple use authorizations that may be restricted within the CESA as a result of the Proposed Action. Impacts from loss of multiple use authorizations within the CESA would be moderate, short-term, and localized. Ioneer would need to coordinate with any ROW holders or companies with mining claims or geothermal leases that may be impacted to ensure continued access to these authorizations. Other present and RFFAs within the CESA that operate on public land would be required to do the same. Cumulative impacts to land use authorizations and ROWs would be minor, short-term, and localized.

It is anticipated that all surface disturbance within the CESA would be reclaimed except for a total of 383 acres of disturbance remaining post-reclamation. This may be a cumulative increase in permanent disturbance if currently authorized and RFFAs also have permanent features. Cumulative impacts from permanent features would be minor to moderate, permanent, and localized.

4.20.6.2 North and South OSF Alternative

Cumulative impacts would be the same as described under the Proposed Action.

4.20.6.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Cumulative impacts to land use and realty from past, present, and RFFAs in the CESA, when combined with the No Action Alternative would be minor, short-term, and localized.

4.20.7 Livestock and Grazing Resources

The CESA for livestock and grazing resources includes the Ice House, Red Spring, Silver Peak, and Fish Lake Valley allotments. The CESA encompasses 481,299 acres. Within this CESA, past and present disturbance has resulted from: mineral development and exploration projects; utilities, infrastructure, and public purpose activities; roads; solar development; geothermal exploration and infrastructure; agriculture; dispersed recreation; livestock grazing, and wildland fire.

Mineral exploration and development, as well as sand and gravel operations directly remove land from livestock grazing use and increases the likelihood of spreading non-native, invasive species, and noxious weeds. Establishment and spread of invasive, non-native species and noxious weeds further reduce the amount of usable range and available forage. While disturbance from utilities and infrastructure construction does not typically reduce access to range resources, vegetation clearing occurs. Impacts from roads also includes clearing of vegetation. Clearing vegetation decreases available forage and provides opportunity for spread of invasive, non-native species and noxious weeds, which reduces the available forage. Vehicles traveling on the roads may serve as a vector to spread noxious weeds and non-native invasive species. Agriculture in the CESA includes crop production on irrigated private lands primarily for hay. Because it occurs on private lands, there is no impact on public lands grazing. Development of wind, solar, and geothermal infrastructure directly removes land from livestock grazing use and results in surface disturbance that increases the likelihood of spreading non-native, invasive species, and noxious weeds and reduced the amount of usable range and available forage. RFFAs include the same type of disturbance that are already occurring within the CESA. Wildland fires in this CESA may occur in the future, as would restoration projects, livestock grazing, and dispersed recreation. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future.

Of the 481,299 acres covered by the CESA, 105,759 acres of disturbance are associated with past, present, and RFFAs, which is a disturbance of approximately 22 percent of the CESA.

4.20.7.1 Proposed Action

The Proposed Action would impact 96 BLM-permitted AUMs and incrementally increase disturbance by an additional 2,306 acres (less than one percent of the CESA) resulting in a total cumulative disturbance of approximately 108,061 acres (approximately 22 percent of the CESA). Pending completion of successful reclamation, the incremental loss of AUMs as a result of the Project would be long-term for the majority of the disturbance area. The reclaimed areas would be capable of supporting livestock use; however, forage production may change in the long-term but is anticipated to be minor and localized. Groundwater drawdown associated with proposed dewatering operations is not anticipated to result in a long-term reduction in the amount and extent of available surface water within the groundwater drawdown contour (Piteau 2023b). The contribution of the Proposed Action to effects on livestock grazing resources in the CESA would be minor, long-term to permanent, and localized and would be reduced following reclamation.

4.20.7.2 North and South OSF Alternative

Cumulative effects to livestock and grazing resources would be similar to the Proposed Action, except that total disturbance would be 2,266 acres and additional fencing would result in impacts to 108 BLM-permitted AUMs. The North and South OSF Alternative would result in disturbance to 2,266 acres (less than one percent of the CESA) resulting in a total cumulative disturbance of approximately 108,013 acres (approximately 22 percent of the CESA). Cumulative impacts to livestock and grazing resources would be minor, long-term to permanent, and localized.

4.20.7.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Impacts to livestock and grazing resources would be negligible, temporary, and localized.

4.20.8 Native American Traditional Values

The CESA for Native American Traditional Values includes Fish Lake Valley and Clayton Valley in Nevada and encompasses 810,519 acres. Past and present actions affecting Native American Traditional Values include mineral and mining development and exploration projects; utilities, infrastructure, and public purpose activities; geothermal projects; agricultural activities; roads and railroads; potential vandalism and looting of prehistoric sites; potential unauthorized excavation of prehistoric sites; dispersed recreation; and livestock grazing. RFFAs within the CESA would include mineral and mining development and exploration activities; utilities, infrastructure, and public purpose activities; geothermal activities; solar energy facilities; and wind energy facilities. Wildland fires in this CESA may occur in the future, as would restoration projects, livestock grazing, and dispersed recreation. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future.

Federal statutes, regulations, and executive orders require consultation with recognized Tribes when a federal action is taken. Past and present actions on public land would need to have gone through consultation with the Tribes to determine potential impacts to areas of Native American Traditional Values. If human remains, funerary objects, or items of cultural patrimony are encountered on BLM-administered land, procedures spelled out in the MDP, HPTP, and/or MOA would be followed.

Past and present actions may have resulted, or may result, in illegal collecting and/or inadvertent damage to areas of tribal concern. As stated above, items or areas of tribal concern that may have been, or may be, discovered during environmental analysis of past or present projects, or during construction of projects, would be addressed through consultation between the proponent, BLM, Tribes, and the SHPO, as appropriate. The RFFAs within the CESA would have similar impacts as stated for past and present actions.

Of the 810,519 acres within the CESA, 38,881 acres of disturbance has been associated with past, present, and RFFAs. This disturbance is approximately five percent of the CESA.

4.20.8.1 Proposed Action

The Proposed Action would increase disturbance in the CESA by 2,306 acres to approximately 41,187 acres, or five percent of the CESA. Tribal concerns regarding mining and other developments can include access restrictions to traditional resource areas, degradation of cultural and biotic landscapes within traditional territory, potential effects to cultural properties from development and data recovery, increased visibility and accessibility of cultural properties, inadvertent discovery of human remains, and impacts to wildlife and plant resources (BLM 2019). Within the context of Native American Traditional Values, disturbance of cultural sites as a result of mining and other developments, either through destruction of those sites without further management (i.e., those not eligible for the NRHP) or through excavation as mitigation under NHPA, is an adverse impact. Landmarks can be associated with traditional uses or cultural stories. Changes in or disturbance to the landscape affect the role of the landscape within sacred and historical tribal traditions, and potentially change how tribes use the landscape. The visual effects may diminish the spiritual and religious experiences of tribal members who use these areas.

The Big Pine Paiute Tribe of the Owens Valley, Bishop Paiute Tribe, Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation, , Te-Moak Tribe of Western Shoshone Indians of Nevada, Ely Shoshone Tribe of Nevada, Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada, Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada, Yomba Shoshone Tribe of the Yomba Reservation, Nevada, Timbisha Shoshone Tribe, and Fort Independence Paiute Tribe have been consulted with by the BLM and informed of the Proposed Action (Section 5.2). The Lone Pine Shoshone Tribe and Walker River Paiute Tribe were informed of the Proposed Action and were asked to notify the BLM if they would like to be consulted. Cumulative effects on cultural resource sites would be the same as those described in Sections 4.2 and 4.20.2. Impacts to cultural resources, including those not eligible for the NRHP, can cumulatively impact the cultural landscape. The Proposed Action would contribute to the cumulative effects. Minimization of cumulative effects would be addressed through avoidance of identified eligible and unevaluated sites. If avoidance is not possible, eligible and unevaluated sites would be mitigated as agreed upon by BLM and SHPO through the development and implementation of a MOA and HPTP. The intensity and duration of the cumulative effects would vary depending on the cultural resource and sensitive areas impacted; however, these impacts would be localized.

4.20.8.2 North and South OSF Alternative

The North and South OSF Alternative would increase the disturbance within the CESA by 2,266 acres to approximately 41,147 acres, or five percent of the CESA. Cumulative effects to Native American Traditional Values would be the same as those described for the Proposed Action.

4.20.8.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. The 38,881 acres or five percent of the CESA would remain effected by the past, present, and RFFAs. The intensity and duration of the effects would continue to vary depending on the cultural resource and sensitive areas impacted by past, present, and RFFAs. These cumulative effects would be localized.

4.20.9 Recreation

The CESA for recreation is hunt unit 211 and encompasses 620,928 acres. Past and present disturbance has resulted from: mineral development and exploration; utilities, infrastructure, and public purpose activities; roads and railroads; geothermal development; agricultural areas; dispersed recreation; and livestock grazing.

Mineral development and exploration operations can limit public access to areas previously used for dispersed recreation. They may reduce the recreational value and modify the recreational setting when vegetation and/or wildlife are affected and may result in visual and noise impacts for those recreation users seeking experiences of isolation and solitude. These actions also may displace recreationists to surrounding areas. Impacts may be long-term if left permanently (such as open pits); however, impacts are typically short-term until reclamation is complete and access and use of the area is restored to pre-project conditions. Mining activities may increase the population of an area by bringing in employees and workers,

which may increase the use of recreation areas within the CESA. Past and present disturbance associated with utilities, infrastructure, and public purpose projects include transmission lines, telephone and fiber optic lines, and water and sewer infrastructure. Lands occupied by utilities and infrastructure generally remain available for dispersed recreation activities, but the recreation setting may have changed due to the presence of human-caused features. These facilities often include maintenance roads that may increase OHV use and allow access to areas that previously had little, if any, OHV traffic. Public purpose sites have resulted in these areas no longer being available for dispersed recreation. Road disturbance provides access to recreation areas and also can become a form of recreation. For those seeking solitude and a primitive outdoor experience, development of roads can impact the recreation experience by modifying the recreation setting with the visual appearance and noise of road traffic, and the increased vehicular traffic. Wildland fires may affect recreation resources as they would temporarily affect the area available for dispersed recreation and would impact the recreation setting until revegetation and/or reclamation occurs on the burned area. However, wildland fires do not typically restrict access for recreation activities. Livestock grazing has limited impact on most recreational uses. Some recreationists may perceive grazed areas as having lower recreational value for some uses such as dispersed camping.

RFFAs in the CESA include mineral development and exploration projects; utilities, infrastructure, and public purpose activities; geothermal projects; and solar energy facilities. Wildland fires in this CESA may occur in the future, as would restoration projects, livestock grazing, and dispersed recreation. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Impacts would be similar to those described for past and present actions. Of the 620,928 acres in the recreation CESA, approximately 88,002 acres of disturbance are associated with past, present, and RFFAs, which is a disturbance of approximately 14 percent of the CESA.

4.20.9.1 Proposed Action

The Proposed Action would increase disturbance in the CESA by an additional 2,306 acres (approximately one percent of the CESA) resulting in a total cumulative disturbance of approximately 90,308 acres (approximately 15 percent of the CESA). Although the cumulative surface disturbance would be considerably greater than the direct disturbance from the Proposed Action, the vast acreage of public lands in the CESA would be sufficient to accommodate dispersed recreation activities. Much of the past, present, and RFFA surface disturbance would be reclaimed, thereby decreasing the potential impacts to recreation. The cumulative un-reclaimed disturbance area that would remain after completion of the interrelated actions, including the Proposed Action, would be a small percentage of the total land area in the CESA, and would have a minor, long-term to permanent, and localized impact to recreation.

4.20.9.2 North and South OSF Alternative

Cumulative effects to recreation would be the same as described for the Proposed Action except that the total disturbance would be 40 acres less than the Proposed Action. The North and South OSF Alternative would result in disturbance to 2,266 acres (less than one percent of the CESA) resulting in a total cumulative disturbance of approximately 90,268 acres (approximately 15 percent of the CESA). Cumulative impacts to recreation would be minor, long-term to permanent, and localized.

4.20.9.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Impacts to recreation would be negligible, temporary to short-term, and localized.

4.20.10 Social and Economic Values

The CESA for social and economic values includes Esmeralda, Nye, and Mineral counties in Nevada and Inyo County in California and encompasses 22,929,628 acres. All data on socioeconomic conditions, fiscal conditions, public services, and utilities discussed in Section 3.10 apply to the CESA analysis. Approximately 11 percent of all employment in the CESA is within the natural resources and mining sectors. Most of these employees work in the mining sector.

Past and present actions within the CESA include mineral exploration and development, oil and gas development, geothermal exploration and development, solar facility development, and utilities and infrastructure development. Utilities and infrastructure development would typically have potential impacts to social and economic values during construction but may also have impacts from operations and maintenance, if the utility infrastructure increases potential development opportunities or increases public facility capacities. Agricultural activities occur throughout the CESA and are an important industry to the communities within the CESA. Agricultural activities impact the socioeconomic conditions of the CESA, including employment and income, but impacts to population increases, housing availability, and community facilities and services are more limited than other projects, such as mining. Mining is a major industry throughout the CESA. The major mines in the CESA include the Aurora Mine, Borealis Mine, Denton-Rawhide Mine, Isabella Pearl, Basalt Diatomite Mine, Mineral Ridge Mine, Blanco Mine, Albemarle Silver Peak Lithium Operations, Amargosa Clay Operation, Manhattan Gulch, New Discovery Mine, Premier Magnesia, and Round Mountain Mine (NBMG 2021). Sand and gravel operations and community pits also occur. These projects have resulted in the existing socioeconomic conditions of the CESA, which include impacts from increased population, housing, community facilities and services, local government finances, social and cultural landscape, employment, and income. Geothermal exploration and leases occur throughout the CESA and include Sierra Geothermal Power's Silver Peak exploration, Chemetall Foote's geothermal exploration, Lone Mountain, and Pearl Geothermal exploration. Geothermal lease holders have a right to exploration activities. Geothermal exploration results in similar impacts as discussed for mining, though to a lesser degree as operations typically do not require the same level of employment and occur for shorter periods of time. If multiple geothermal exploration projects occur at the same time, the impacts to housing, population increases, community facilities and services, income, and the social and cultural landscape would be impacted at a greater extent due to simultaneous operations. For example, the Don A Campbell I and II Geothermal Projects are two 25-megawatt geothermal power facilities located in Mineral County (SCPPA 2023). These facilities have had impacts resulting in increased population, housing, community facilities and services, local government finances, social and cultural landscape, employment, and income.

Past and present actions have increased employment levels within the CESA, which may be positive, potentially drawing on the local and regional workforce. However, if the demand for labor cannot be met by the region's labor pool, the activities may have led to an influx of non-local workers, resulting in socioeconomic impacts from the increased need to accommodate from a housing and community facilities and services perspective, since these workers need housing accommodations and increase the use of public services. This potentially affects public sector revenues and/or expenditures and infrastructure to accommodate this population increase. Increased demand for housing from employment may increase housing shortages in communities within the CESA.

RFFAs are expected to be a continuation and potential expansion of the past and present actions. This may include mining and exploration projects, sand and gravel operations, and utilities and infrastructure. RFFAs include the Clayton Valley and Neolith Projects, Silver Sun Mine, Clayton Ridge North Mine, Kinross Montezuma Exploration Project, and North Bullfrog Mine. Other developments would include solar facility development and associated infrastructure, and wind energy developments. Pending future geothermal development and exploration projects include the Fish Lake Geothermal Project, Lone Mountain, and Pearl Exploration Project which could eventually transition to geothermal development, increasing socioeconomic impacts. Geothermal development and exploration operations have similar impacts as discussed for past and present actions. The NV Energy Greenlink West Project is proposed in portions of the CESA, (BLM 2022). Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Due to the extent of this project, socioeconomic impacts would occur regionally primarily during construction, but impacts would also occur during operations and maintenance of the power facilities.

Six applicants have requested ROW grants to construct, operate, and decommission seven solar projects in Esmeralda County that, if approved and authorized for construction, facilities would apply for power purchase agreements with the intent to connect to the proposed 525-kV Esmeralda Substation that would be constructed as part of the separate Greenlink West transmission project. Potential solar projects in Esmeralda County include the Esmeralda Energy Center, Esmeralda North Solar, and Nivloc Solar in Silver Peak. The projects have completed the variance request process as required by the Solar Energy

Development Programmatic EIS ROD, which provides the opportunity for developers to propose applications outside of identified solar energy zones (BLM 2022). The proposed solar projects would likely contribute to additional socioeconomic impacts including increased population which may result in potential housing shortages, increased use of public services and facilities, impacts to county budgets, and impacts to employment and income. RFFAs would have impacts to the social and cultural landscape of the CESA, which primarily has a rural character.

The past, present, and RFFA land uses in the CESA have had a direct and indirect/induced effect on social and economic values through changes to employment, income, housing availability, population and demographic changes, public finance, public facility use, and social values.

4.20.10.1 Proposed Action

The Proposed Action would contribute to the cumulative effects for the social and economic values in the CESA. This would include providing employment, generating income for residents through direct employment or through indirect and induced employment, increased tax revenues, increasing demand for housing, and increased demand for community facilities and services. Tonopah, Hawthorne, and Bishop would likely experience the greatest impacts from RFFA-related population due to greater existing services and infrastructure than other communities in the CESA. The ability and capacity for these communities to keep up with increased population and demand for services and infrastructure depends on which counties would receive tax revenues including net proceeds of mineral taxes, from RFFAs. Increased tax revenues would potentially assist with some of these demands, although there would likely be a time lag between demand and supply for long lead items, and tax revenues resulting from the Project are unlikely to provide all the funding necessary to increase public service capacity when multiple other projects are occurring or may occur at the same time as the Project. The Proposed Action would cumulatively contribute to changes in the social and economic landscape of the CESA due to limited emergency services, community facilities and services, available housing, grocery stores, and other convenience needs that may not be able to accommodate the anticipated influx of population, particularly when combined with other projects that are similarly resulting in demands for these services.

The past, present, and RFFAs including the Proposed Action would have a cumulative increase in employment opportunities and tax revenue throughout the CESA. Depending on the areas that employees locate to, the increase in employment opportunities may present inadequate housing availability and increased use of public utilities such as sewage, water, and other services. Due to the limited services and housing opportunities in Esmeralda County, more workers would likely reside in and commute from other areas in Nye and Mineral counties and Inyo County, which have more housing options and available services. However, overall housing options and public services are also limited in these areas under current conditions and projects in operation, so similar shortages of services and housing would also likely result in these counties, particularly when potential future projects start creating the same demand. Cumulative increases of demand for these services may result in socioeconomic impacts to these communities if the demand for the services exceeds the ability for the communities to provide these services, and tax revenues generated from the Project and other present and RFFAs are not fully sufficient to cover the needs to increase capacity of the services. Currently, authorized activities and reasonably foreseeable actions in the CESA, including the Proposed Action would cumulatively place increased demand on Esmeralda County housing and public services, as well as the other counties within the CESA. Due to the limited services within Esmeralda County, some of the indirect and induced employment, income generation, and tax revenue would likely go to other counties within the CESA that have more services, so Esmeralda County may not realize all of the indirect and induced tax revenue, indirect and induced purchasing, and income generation relative to the other counties in the CESA. As some of the county budgets within the CESA already are operating on deficit budgets, cumulative impacts from the Proposed Action, combined with present and RFFAs may aggravate this due to the need to hire additional staff, including emergency services and deputies, and to accommodate increases in use of public services. Should budget deficits continue, Nevada Department of Taxation may decide to increase property taxes to balance County budgets in the area of analysis, which may be a permanent cumulative impact (Boland 2023). The socioeconomic impacts from the Proposed Action and present and RFFAs would modify the social and cultural landscape of the CESA by increasing population, demand for services that may require public investment for additional infrastructure and increasing the development in areas primarily defined by a rural character. This may permanently shift the social and cultural landscape. Socioeconomic impacts would

likely be felt after operations at the Project and other projects in the CESA cease, as long-term public investment is required to increase public services capacity, which would affect county budgets long after operations at the Project and other present and RFFA projects cease. Closure of projects could result in housing market decline and decreased tax revenues to support infrastructure and services that may have resulted from present and RFFAs. However, due to uncertainty of future economic conditions, it is unknown exactly how closure of present and RFFAs may impact nearby communities. The cumulative effects on social and economic values from the past, present and RFFAs including the Proposed Action would be long-term to permanent, regional, and major.

4.20.10.2 North and South OSF Alternative

The socioeconomic environmental consequences of this alternative would not be substantively different than the Proposed Action and cumulative impacts would be the same as those discussed under the Proposed Action.

4.20.10.3 No Action Alternative

Under the No Action Alternative, the Project would not be developed and the associated social and economic values would not occur, including the additional employment and tax revenue that may result from the Proposed Action. No additional impacts beyond the past, present, and RFFAs would occur, but other present and RFFAs would continue or may occur in the future, generating potential socioeconomic impacts within the CESA. Impacts to social and economic values from past, present, and RFFAs in the CESA would result in moderate to major, long-term, and regional cumulative effects.

4.20.11 Soil Resources

The CESA for soil resources includes the Plan boundary and one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour. The CESA encompasses 53,790 acres.

Within this CESA, past and present disturbance has resulted from: mineral development and exploration projects; utilities, infrastructure, and public purpose activities; roads; geothermal exploration; agriculture; dispersed recreation; and livestock grazing. Each past and present disturbance may have impacted soil resources in a variety of ways. Heavy equipment could have resulted in soil compaction, increasing the density to the point where vegetation cannot grow and support the ecosystem. Disturbance of soil and biocrusts can increase vulnerability to wind and water erosion. Paved roads reduce the infiltration of water into the soil and concentrate erosive forces down embankments. Fine particulates can contaminate the water or air and are difficult to recapture once they are disturbed from the environment. Natural soil profiles are lost during ground disturbance. Contamination can occur by exposing naturally occurring geochemical process or through inadvertent releases of pollutants. Recreation and livestock grazing may have resulted in impacts to the soil. These uses can increase erosion, particularly along waterways where activities are concentrated. Trails can serve as new sources of erosion, combining disturbance of the vegetation with breaking apart the soil surface, which can channel precipitation into new areas.

RFFAs in the CESA would include utilities projects, geothermal utilization projects, restoration projects, livestock grazing, and dispersed recreation. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. These activities would have the same impacts as discussed for past and present disturbances. Wildland fires could also occur in the future. Fire can alter soil infiltration and remove or change the vegetation, which prevents erosion. Particularly hot fires also can sterilize the soil, eliminating the seed bank, and preventing vegetative regrowth. Occurrences of fire within appropriate fire return intervals for a vegetative community are a natural component of the landscape, returning nutrients to the soil and triggering succession of different communities in the CESA.

Of the 53,790 acres covered by the CESA, 3,090 acres of disturbance are associated with past, present, and RFFAs, which is a disturbance of approximately six percent of the CESA.

4.20.11.1 Proposed Action

The Proposed Action would incrementally increase disturbance to soils by an additional 2,306 acres (four percent of the CESA) resulting in a total cumulative disturbance of approximately 5,396 acres

(approximately 10 percent of the CESA). Measures include completing concurrent reclamation to the maximum extent possible and implementing BMPs to limit erosion, trap sediment, and control stormwater from the effects of wind, precipitation, and stormwater run-off. Pending completion of successful reclamation, the incremental additional effects to soils as a result of the Proposed Action would not be permanent in nature for the majority of the disturbance area. Impacts to soil resources in combination with past, present, and RFFAs in the CESA would be moderate, long-term to permanent, and localized. Groundwater drawdown associated with proposed dewatering is not anticipated to result in a long-term reduction in the amount and extent of available surface water (e.g., springs) within the groundwater drawdown contour (Piteau 2023b). The contribution of the Proposed Action to these effects would be negligible, long-term, and localized.

4.20.11.2 North and South OSF Alternative

Cumulative effects to soil resources would be similar to those described for the Proposed Action except that total disturbance from the Project would be 40 acres less than the Proposed Action. The Tiehm's buckwheat designated critical habitat would be fenced for the duration of the Project, reducing any other non-Project related activities that may occur there and result in cumulative impacts (e.g., unauthorized off-highway vehicle use, livestock grazing, etc.). The North and South OSF Alternative would result in disturbance to 2,266 acres resulting in a total cumulative disturbance of approximately 5,356 acres (approximately 10 percent of the CESA). Cumulative impacts to soil resources would be moderate, long-term to permanent, and localized.

4.20.11.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Impacts to soil resources would be negligible, temporary, and localized.

4.20.12 Threatened and Endangered Species

4.20.12.1 Bi-State Sage-Grouse

The CESA for BSSG includes the White Mountain PMU and encompasses 1,753,885 acres. Past and present disturbance has resulted from: mineral development and exploration projects; utilities, infrastructure, and public purpose activities; geothermal; agriculture; roads; dispersed recreation; and livestock grazing. Past and present disturbances from mineral and geothermal development and exploration can result in fragmentation and displacement of BSSG populations and fragmentation of their habitats. Direct mortalities and further habitat fragmentation from roads associated with these activities may have also occurred. Disturbed areas also create opportunities for the spread and establishment of nonnative invasive plants that may degrade the quality of remaining habitat. Effects from past and present mineral and geothermal development and exploration activities can cause increased ambient noise levels, which may disturb BSSG breeding, nesting, and brood rearing behavior. Past and present disturbances from utilities, infrastructure, and public purpose activities have resulted in disruption of BSSG populations and their habitats. In addition, past and present construction of powerlines have potentially increased areas for predator perching which may have impacts on prey species such as BSSG. Powerlines and other infrastructure provide nesting and perching opportunities for common ravens which may increase BSSG nest predation and reduce productivity. Road construction and use in the CESA tends to fragment habitat and leads to increased mortalities for BSSG from vehicle collisions or indirect from habitat fragmentation effects. Other effects include increased ambient noise levels, which may lead to habitat avoidance. There is OHV traffic associated with hunting and dispersed recreational activities in the CESA. Vehicle and OHV use may increase the risk of nonnative invasive species introduction or spread. BSSG can be affected by livestock grazing due to competition for forage, water, and habitat removal/conversion. Proper rotation and stocking rates can minimize impacts to wildlife. Agricultural fields in the CESA may provide habitat. The BLM records show no past wildfires in the CESA. Wildfire leads to conversion of sagebrush dominated habitats to invasive annual grassland monocultures, which have little or no value to BSSG. Wildfire fragments habitat and leads to reduced survival and productivity and has negative effects on multiple life stages. Reseeding and restoration activities after wildland fires occur may mitigate negative effects on BSSG habitats although the effects from these activities are often not realized for many years until desirable plants have had an opportunity to become established.

RFFAs include solar development projects. These types of projects may fragment habitat and increase noise levels resulting in similar impacts as described for past and present activities. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future.

Proposed Action

The Proposed Action would increase disturbance within the CESA by an additional 2,306 acres (approximately 0.1 percent of the CESA), which includes the existing exploration disturbance incorporated into the Project, resulting in total cumulative disturbance of approximately 94,974 acres (approximately five percent of the CESA). The Proposed Action would cumulatively contribute additional vehicle trips per day which may potentially lead to vehicle collisions with BSSG. However, cumulative impacts resulting from vehicle collision is unlikely due to the limited use of the Plan boundary by BSSG. If other present or RFFA's within the CESA include dewatering or groundwater pumping, cumulative groundwater drawdown impacts may occur depending on location and if the dewatering impacts surface water sites used by BSSG. The Proposed Action would cumulatively disturb approximately 1,064 acres of sagebrush dominated vegetation communities that may provide habitat for BSSG.

The disturbance associated with the Proposed Action would be reclaimed following completion of quarrying operations, except for 383 acres in potential BSSG habitat. Approximately 279 acres of the permanent acreage would occur within the Great Basin Xeric Mixed Sagebrush Shrubland and Inter-Mountain Basins Big Sagebrush Shrubland resulting in a cumulative permanent loss of potential sagebrush dominated vegetation communities within the CESA. Other present or RFFAs occurring within the CESA on public land would also be required to reclaim disturbance, but some permanent disturbance from past and RFFAs may remain depending on if they occur on private or public land, as well as reclamation requirements. Overall, cumulative impacts would be negligible to minor, long-term to permanent, and localized.

North and South OSF Alternative

The North and South OSF Alternative would incrementally increase disturbance within the CESA by an additional 2,266 acres, resulting in total cumulative disturbance of approximately 94,934 acres (approximately five percent of the CESA). The North and South OSF Alternative when combined with past, present and RFFAs would be similar to cumulative impacts as described for the Proposed Action, with approximately 40 acres less of cumulative disturbance. The North and South OSF Alternative would cumulatively disturb approximately 776 acres of Great Basin Xeric Mixed Sagebrush Shrubland and Inter-Mountain Basins Big Sagebrush Shrubland that may provide habitat for BSSG. Approximately 132 acres of Great Basin Xeric Mixed Sagebrush Shrubland would not be reclaimed under the Proposed Action, resulting in a cumulative, permanent impact to potential BSSG habitat. Cumulative impacts on BSSG would be negligible to minor, long-term to permanent, and localized.

No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Cumulative impacts to BSSG would be negligible to minor, long-term, and localized.

4.20.12.2 Monarch Butterfly

The CESA for monarch butterfly includes the Plan boundary and one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour and encompasses 53,790 acres.

Within this CESA, past and present disturbance has resulted from: mineral development and exploration projects; utilities, infrastructure, and public purpose activities; roads; dispersed recreation; and livestock grazing. No wildland fires have been documented in the CESA. Surface disturbance can remove milkweed species, as well as crush or destroy monarch butterfly eggs and larvae on milkweed, if present during surface disturbance. The majority of present and RFFAs would be reclaimed, potentially restoring monarch butterfly habitat. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Of the 53,790 acres covered by the CESA, 3,033 acres of disturbance are associated with past, present, and RFFAs, which is a disturbance of approximately six percent of the CESA.

Proposed Action

The Proposed Action would incrementally increase disturbance within the CESA by an additional 2,306 acres (approximately four percent of the CESA), resulting in a total cumulative disturbance of approximately 5,339 acres (approximately 10 percent of the CESA). Cumulative impacts from the Proposed Action and past, present, and RFFAs may affect monarch butterfly habitat in the CESA including removal of nectar and milkweed resources. Additional impacts to monarch butterfly habitat may include establishment and spread of noxious and non-native invasive weed species. Increased vehicular traffic within the CESA from past, present, and RFFAs may result in injuries or fatalities to individual monarch butterflies but population-level impacts would not be expected. The disturbance associated with the Proposed Action would be reclaimed following completion of quarrying operations, except for 383 acres, which would be permanently removed from monarch butterfly use. Cumulative impacts from the Proposed Action on monarch butterflies would be minor, long-term to permanent, and localized.

North and South OSF Alternative

Cumulative impacts to monarch butterfly under the North and South OSF Alternative would be the same as discussed for the Proposed Action, with approximately 40 acres less disturbance.

No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Cumulative impacts to the monarch butterfly would be negligible to minor, long-term, and localized.

4.20.12.3 Tiehm's Buckwheat

The CESA for Tiehm's buckwheat is the same as the area of analysis, and encompasses 30,492 acres. Past and present disturbances in the CESA may have impacted Tiehm's' buckwheat in a variety of ways. Five of the subpopulations have been impacted by disturbance from past mineral exploration activities. Tiehm's buckwheat has colonized several soil sample trenches that are estimated to be between 40 and 80 years old in subpopulations 1, 2, 3, 4, and 6 (EM Strategies 2020b). There is OHV traffic associated with hunting and dispersed recreational activities in the CESA. OHV use has been documented in several subpopulations. Cave Springs Road separates subpopulations 1, 2, and 8 from subpopulations 3, 4, 5, 6, and 7. Subpopulations 1, 2, 5, and 8 are directly adjacent to secondary dirt roads. Fences have been constructed to limit OHV access to these subpopulations. Mineral exploration and development activities in the area have created, reopened, or improved roads in the area, allowing easier and greater access to OHV use. In addition to impacts on individual plants, OHV may increase the risk of nonnative invasive species introduction or spread, as well as increase the risk of fire in the CESA. Traffic along roads in the CESA may generate fugitive dust that can affect the photosynthesis ability of Tiehm's buckwheat and plants that support pollinator species. Surface disturbance can lead to the introduction or spread of non-native invasive species. Invasive species have not formed monocultures in the CESA and are not a significant component of the existing vegetation communities (EM Strategies 2020b, 2022a). However, saltlover has become established in all subpopulations of Tiehm's buckwheat (WestLand 2021). Activities that remove vegetation in areas near Tiehm's buckwheat subpopulations, have the potential to reduce habitat for pollinators that Tiehm's buckwheat relies upon. The BLM records show no past wildfires in Tiehm's buckwheat subpopulations. Tiehm's buckwheat occurs on sparsely vegetated, rocky habitat, and would likely only be impacted by a high-severity wildfire. A high-severity wildland fire could result in a loss of Tiehm's buckwheat individuals and seedbanks, resulting in reduced likelihood of regeneration and recruitment in affected subpopulations. Fuel load accumulations in the area are low, reducing the chance of a high-severity fire (EM Strategies 2020b). Tiehm's buckwheat subpopulations are accessible to livestock grazing and livestock could trample or graze individual Tiehm's buckwheat. Tiehm's buckwheat have been previously impacted by ground squirrel herbivory, which would likely continue in the future.

RFFAs include geothermal exploration and utilization projects. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Impacts from geothermal projects would be similar to other projects that create surface disturbance and increase the likelihood of noxious and non-native weed spread.

Proposed Action

The Proposed Action would incrementally increase disturbance within the CESA by an additional 2,306 acres (approximately eight percent of the CESA) resulting in a total cumulative disturbance of approximately 3,434 acres (approximately 11 percent of the CESA). Of this, the Proposed Action would disturb approximately 354 acres (39 percent) of designated critical habitat for Tiehm's buckwheat. The disturbance associated with the Proposed Action would be reclaimed following completion of quarrying operations, except for 97 acres in designated critical habitat (10 percent of designated critical habitat) associated with the quarry, drainage controls, solution management facilities, and re-aligned roads. Implementation of the Tiehm's Buckwheat Protection Plan (Ioneer 2022) would limit effects from fugitive dust, invasive non-native species, and reduce the chances of catastrophic events in Tiehm's buckwheat designated critical habitat. Reclamation would further reduce impacts, but there would be cumulative impacts from loss of designated critical habitat that may affect the species. Cumulative impacts to Tiehm's buckwheat would be moderate to major, long-term to permanent, and localized.

North and South OSF Alternative

Cumulative impacts would be similar to those described for the Proposed Action except there would be 40 acres less overall cumulative disturbance. Approximately 191 acres of designated critical habitat for Tiehm's buckwheat would be disturbed, of which 45 acres would be permanent (about five percent of designated critical habitat). The North and South OSF Alternative would implement the *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* (WestLand 2024b) that would reduce cumulative impacts to Tiehm's buckwheat and its designated critical habitat. This would include pollinator habitat reclamation to promote a diversity of pollinators that are important to Tiehm's buckwheat which would cumulatively add to pollinator habitat post-reclamation. All designated critical habitat would be fenced, which would reduce other cumulative impacts such as livestock grazing and OHV use. As there would still be a cumulative loss of designated critical habitat that may affect the species, cumulative impacts would be less than the Proposed Action, but still moderate to major, long-term to permanent, and localized.

No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. The remaining exploration disturbance at Rhyolite Ridge would be reclaimed, and the majority of other present and RFFAs on public land would also have to be reclaimed. Subpopulations of Tiehm's buckwheat would remain vulnerable to existing threats such as OHV use, invasion of noxious or invasive species, livestock grazing, and herbivory. Any projects that may propose disturbance within Tiehm's buckwheat designated critical habitat would need to go through the NEPA process. Past, present, and RFFA impacts to Tiehm's buckwheat would be variable due to the unknown extent of future OHV use, noxious or invasive species establishment, livestock grazing, and herbivory activities; therefore, would range from negligible to major, temporary to permanent, and localized.

4.20.13 Transportation and Access

The CESA for transportation includes the Plan boundary and main transportation routes to Reno and Las Vegas. Mining and exploration activities in the vicinity of the CESA often have impacts to the transportation system by increasing traffic on the surrounding road network. Traffic generation depends on the size and intensity of operations. Transportation and access impacts from utilities and infrastructure are generally short-term, with impacts mainly occurring during construction. However, easements or ROWs associated with the utility lines and other infrastructure can limit non-compatible land uses within the area of the easement or ROW. Utility lines often require routine maintenance, which could increase traffic within the CESA. Impacts to transportation and access resulting from roads are long-term. Construction of roads allows improved access to land uses surrounding the CESA. Additional and improved roads are a result of needs for improved access. Impacts may alter current and future traffic patterns. Localized urban development includes the towns of Dyer and Silver Peak. Urban development has minimally increased traffic on the transportation system and road network within rural areas of the CESA, while in larger population centers of Las Vegas, Reno, and Sparks development has had a larger effect on traffic. Transportation increases depend on the overall size and density of the urban development, but these areas

generally have a more concentrated population, which increases traffic levels when compared to more rural, undeveloped areas.

RFFAs include geothermal development (Fish Lake Project), geothermal exploration (Lone Mountain Geothermal Exploration Project), and mining development (Silver Sun Mine). Geothermal development projects could result in long-term impacts through the construction of roads, limiting access to developed areas, and increased traffic on the existing road network. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Impacts depend on the size of the projects. Wildland fire may occur in the future, as would restoration projects, livestock grazing, and dispersed recreation. These actions would have similar impacts as stated for past and present actions. Future restoration projects also could occur in and surrounding this CESA, which may restrict access to land uses during and after treatments and may increase traffic on roadways during treatments.

The existing access road has two overlapping ROWs granted by the BLM. One for Esmeralda County and the other for Mineral Ridge Resources. The improvements proposed would remain for future use of all permit holders, should this route be used.

4.20.13.1 Proposed Action

Cumulative effects from Proposed Action and other interrelated past, present, and RFFAs would occur to accommodate safe public access through the Plan boundary. There would be intermittent stops at intersections by users accessing the area, which would be an inconvenience. The outer extent of Tiehm's buckwheat designated critical habitat would be fenced, which would restrict public access of the two existing two-track roads in the Tiehm's buckwheat designated critical habitat (EM Strategies 2022b). Therefore, cumulative impacts on access are anticipated to be minor, long-term to permanent, and localized. The Proposed Action would increase traffic within the CESA particularly during the construction and operation. The Proposed Action would result in a readily apparent, measurable traffic increase on paved roadways within the CESA. The increased traffic would be less noticeable as distance from the OPA increases and trucks disperse along other routes to their final destinations. It is not anticipated that there would be discernible impacts to traffic along major roadways near metropolitan areas from the Proposed Action. During the closure and post-closure, Ioneer estimates that Project-related traffic counts would drop considerably, and these cumulative impacts would no longer be realized. Cumulative impacts to transportation in the CESA would be moderate to major, long-term, and regional.

4.20.13.2 North and South OSF Alternative

Cumulative impacts would be the same as described for the Proposed Action. Existing public access through the Plan boundary would be maintained. Cumulative effects to access would be minor, long-term to permanent, and localized and cumulative effects to transportation would be moderate to major, long-term, and regional.

4.20.13.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Cumulative impacts to access or transportation would be negligible, short-term, and localized.

4.20.14 Vegetation Resources

The CESA for vegetation resources is the Plan boundary and the one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour. The CESA was defined to include the maximum geographic extent of possible effects from the proposed Project disturbance and dewatering activities and past, present, and RFFAs. The total area of the CESA encompasses 53,790 acres.

Surface disturbance associated with mineral development and exploration, utilities, infrastructure, public purpose projects, and roads directly removes vegetation and increases the likelihood of spreading non-native, invasive species, and noxious weeds. Noxious weeds and non-native invasive species are often the first species to establish in disturbed areas. Vehicles serve as a vector to spread noxious weeds and non-native invasive species along roads as well as off road into areas that might not otherwise have been

accessible. Livestock and recreationists can also spread noxious weeds and non-native invasive species. Reclamation and revegetation required for projects on public land would minimize long-term impacts to vegetation. Noxious weeds and non-native invasive species are more likely to establish in disturbed areas; therefore, successful reclamation assists to limit the spread of these species.

Indirect impacts from past and present disturbances includes impacts from fugitive dust, which can cover leaves, thereby reducing photosynthesis. Erosion can be increased due to disturbance of the vegetative layer, including from off-road recreation and livestock trampling.

RFFAs in the CESA include utilities projects (188 acres), geothermal utilization projects (311 acres), restoration projects, livestock grazing, and dispersed recreation. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. These activities would have the same impacts as discussed for past and present disturbances. Wildland fires in this CESA could also occur in the future. Occurrences of fire within appropriate fire return intervals for a vegetative community are a natural component of the landscape, returning nutrients to the soil and triggering succession of different communities in the CESA. Wildland fire can alter vegetation communities, often changing them from shrublands to grasslands and increasing the potential for spread and establishment of noxious weeds and non-native invasive plants. Of the 53,790 acres covered by the CESA, 3,090 acres of disturbance are associated with past, present, and RFFAs, which is a disturbance of approximately six percent of the CESA.

4.20.14.1 Proposed Action

The Proposed Action would increase disturbance to vegetation by an additional 2,306 acres (four percent of the CESA) resulting in a total cumulative disturbance of approximately 5,396 acres (approximately 10 percent of the CESA). Pending completion of successful reclamation, the incremental additional effects to vegetation as a result of the Proposed Action would not be permanent in nature for the majority of the disturbance area. The reclaimed areas would continue to provide wildlife habitat and support livestock use; however, species composition and forage production may change in the long term. Groundwater drawdown associated with proposed dewatering operations may result in impacts to vegetation communities or the spread of noxious or invasive species. No impacts to special status plant species within the groundwater drawdown contour are anticipated. Cumulative effects from noxious weed and non-native invasive plant species would be minor since Ioneer's Noxious and Invasive Weed Management Plan (NewFields 2022e) would reduce the potential for noxious and invasive non-native species to establish or spread. Additionally, the only deep-rooted noxious weed species identified in the CESA is saltcedar, which can be treated prior to becoming an infestation. Due to these factors, impacts to vegetation resources in combination with past, present, and RFFAs in the CESA would be minor to moderate, long-term to permanent, and localized.

4.20.14.2 North and South OSF Alternative

Cumulative effects to vegetation resources, including noxious weeds and non-native invasive plant species from the North and South OSF Alternative would be the same as described for the Proposed Action except that the North and South OSF Alternative would result in disturbance to 2,266 acres (approximately four percent of the CESA) resulting in a total cumulative disturbance of approximately 5,356 acres (approximately 10 percent of the CESA). Cumulative effects would be minor to moderate, long-term to permanent, and localized.

4.20.14.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be developed and associated impacts to vegetation would not occur. Under this alternative, the existing 15 acres of exploration disturbance (i.e., drill sites, monitoring sites, and access roads) on public lands administered by the BLM would be reclaimed and impacts to vegetation would be negligible, short-term, and localized.

4.20.15 Visual Resources

The CESA for visual resources includes the Plan boundary and the range of possible viewpoints as seen from the KOPs associated with the Project. The CESA encompasses 99,929 acres. Past and present disturbance has resulted from: mineral development and exploration projects; utilities, infrastructure, and public purpose activities; roads; agriculture; dispersed recreation; and livestock grazing.

Mining for minerals and sand and gravel have concentrated impacts on visual resources. These often include large-scale topographic changes with associated changes in vegetation and alternations in linear features (e.g., drainage patterns, skylines). Effects are often long-term, with permanent changes in topography and un-reclaimed features such as pits, ponds, and cliff faces. Rehabilitation can contour topography to blend into the surrounding landscape and promote re-establishment of vegetation communities. Utilities, roads, and other public purpose activities disrupt the visual landscape with form and line elements. These can be aboveground (e.g., powerlines and roads) with visible infrastructure interrupting the landscape. Belowground utilities also can cause disturbances with linear changes in vegetation caused by ground disturbance or support infrastructure (e.g., access roads). Reclamation can re-establish vegetation, which can be in different successional stages than the surrounding habitat. Wildland fire can impact visual resources primarily through changes in texture and color elements. Cover vegetation is often eliminated, shrubs are converted to grasslands, and the landscape is darkened with carbon. Fire is also patchy, altering the visual landscape in apparently random paths. This can be recognized in the long term, with different neighboring successional stages of vegetation communities visible throughout the CESA. Recreation can have impacts on visual resources, often through the introduction of linear features. Trails can be visible from great distances and are easily formed from disturbance of the soil with relatively low levels of activity. Trails take long time periods to restore, and often attract use from their visual signature. Concentrated recreational areas, such as campgrounds and interpretive sites, also disrupt the visual landscape.

The RFFAs within the CESA would include geothermal exploration and development projects. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Wildland fires in this CESA may occur in the future, as would restoration projects, livestock grazing, and dispersed recreation. These activities would lead to similar impacts as stated for past and present actions. Of the 99,929 acres covered by the CESA, 4,195 acres of disturbance are associated with past, present, and RFFAs, which is a disturbance of approximately four percent of the CESA.

4.20.15.1 Proposed Action

Cumulative effects to visual resources in the CESA from the Proposed Action in combination with past, present, and RFFAs would include changes in line, form, color, and texture elements that would contrast with the existing landscape. The Proposed Action would increase the direct effects of contrast with the existing landscape by increasing visual impacts in the CESA. This increase would blend with the existing landscape and have a negligible to moderate additional impact to visual resources depending on observation point. ACEPMs would lessen the degree of contrast of facilities on the landscape. Concurrent reclamation would further reduce the visual impacts of the proposed Project over time through regrading of the slopes of the OSFs and revegetation. Once reclamation is complete, impacts from the OSFs, SOSF, booster station, pipeline, transmission line, and processing facility to visual resources would be negligible to minor as they would be removed or blended into the existing landscape. Reclaimed and remaining features from the Proposed Action in combination with the other past, present, and RFFAs within the CESA would continue to have long-term cumulative impacts to visual resources in the CESA that would be negligible to moderate depending on the viewpoint.

4.20.15.2 North and South OSF Alternative

Cumulative effects to visual resources would be the same as described for the Proposed Action. Cumulative impacts to visual resources would be negligible to moderate, long-term to permanent, and localized.

4.20.15.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. The existing 15 acres of exploration disturbance on public lands administered by the BLM would be reclaimed and impacts to visual resources would be negligible, temporary, and localized.

4.20.16 Water Resources

The CESA for water resources includes model domain boundary, which includes Fish Lake Valley HA 117 and portions of Big Smoky Valley and Clayton Valley. The CESA encompasses 845,428 acres. Past and

present actions affecting water resources include: mineral and mining development and exploration projects; utilities, infrastructure, and public purpose activities; oil and gas pipelines; geothermal exploration and development projects; agricultural activities; roads; dispersed recreation; and livestock grazing. Approximately less than one acre within the CESA has been affected by recent and past wildfires. Mining, including sand and gravel operations, has the potential for cumulative impacts to water quality and quantity. These operations likely have used or are currently using water (typically groundwater) as part of their operations, either for dust control, processing, or dewatering. Surface disturbance can cause sediment loading, channel rerouting that results in erosion/sedimentation, and inadvertent spills of process water, drilling fluids, or other hazardous substances that can contaminate surface water or shallow groundwater. Individually insignificant dewatering of numerous mine pits or underground facilities can cause CESA-wide changes in both groundwater and surface water quantity. Exposure of naturally occurring geochemical conditions can cause harmful constituents to enter the watershed through inadvertent release. Overburden material poses a potential for erosion and sedimentation to the watershed if not properly designed and maintained. Previous construction associated with utilities, infrastructure projects, and roads may have used water during construction, and the largest potential post-construction effect likely is related to erosion and sedimentation associated with access roads or reclaimed disturbances. All roads can present water quality impacts due to inadvertent spills or releases during vehicular accidents. Unpaved roads, such as those crossing public lands and those within recreation sites in the CESA, also can be a source of increased erosion and sedimentation. Paved roads may cause water quality issues resulting from increased stormwater run-off. Rangeland management also is an important disturbance to, and utilizer of, water resources in the CESA. Rangeland management relies on predictable subsurface and surface water quantity and quality to sustain activities. This source can contribute to changes in water quality through the additions of nitrogen and other constituents. Livestock also can trample vegetation around water sources, degrading surface water quality through the subsequent erosion. Agricultural operations have potential consequences to water quality and quantity because these activities use water that may impact groundwater levels in the CESA, and it involves surface disturbance that may result in erosion and sedimentation. Wildland fires are a major disturbance to water resources and can impact surface water quality by removing the vegetation layer increasing erosion and downstream turbidity. Storms can cause mass losses of sediment along eroded embankments, altering the course of hydrological systems. Wildland fires also can change the ecosystem, replacing shrub habitat with grasslands. Shrubs are more resistant to erosion, but grasslands are more adaptable to changing environmental conditions.

RFFAs include mineral and mining development and exploration activities; utilities, infrastructure, and public purpose activities; geothermal activities; and solar energy facilities. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Wildland fires in this CESA may occur in the future, as would restoration projects, livestock grazing, and dispersed recreation. Of the 845,428 acres covered by the CESA, 95,079 acres of disturbance are associated with past, present, and RFFA disturbances, which is a disturbance of approximately 11 percent of the CESA.

4.20.16.1 Proposed Action

The Proposed Action would increase disturbance in the CESA by 2,306 acres in addition to past, present, and RFFAs for a total cumulative disturbance of 97,385 acres, which is approximately 12 percent of the CESA. Cumulative impacts may include increased sedimentation and erosion associated with ground disturbance operations. Additional exposure of naturally occurring geochemical conditions that may result from the Project may add a cumulative impact from constituents entering the watershed through inadvertent release. The additional overburden potentially poses a cumulative impact for erosion and sedimentation to the watershed if not properly designed and maintained. Additional roads may also result in a cumulative source of increased erosion and sedimentation affecting water quality, as would potential inadvertent spills or releases during vehicular accidents associated with the Project. However, currently authorized activities and RFFAs would be required to comply with necessary regulations to prevent sedimentation and erosion, as well as appropriately maintaining vehicles and having a plan in place to clean up spills or inadvertent releases. This would be accomplished through facility design and ACEPMs. As such, cumulative water quality impacts would be negligible to minor, long-term, and localized.

The Proposed Action would result in a cumulative drawdown within the CESA from dewatering operations affecting water quantity in the CESA, including at potential spring sites. If these springs are perched features as suggested by their elevated, hillside locations (HydroGeoLogica 2020b), then groundwater drawdown

from the Proposed Action, present, and RFFAs would not affect discharge flows from groundwater use. However, if the springs are sourced from upwelling groundwater on the upgradient side of a low permeability fault zone, decreased water levels on the downgradient side of the fault zone could result in an increased horizontal groundwater gradient, which may result in cumulative impacts. Cumulative drawdown was assessed from simulated heads at certain periods of time relative to the Steady-State Model (simulating hydrologic conditions prior to groundwater development in the area). This assessed changes that may occur due to ongoing pumping stresses as well as quarrying related activities. This assessment showed cumulative drawdown 200 years after the end of quarrying for the Proposed Action was almost identical to the change in piezometric levels under simulated changes for the No Action Alternative from 1940 to 2240 (Piteau 2023b). If RFFAs within the CESA include additional drawdown, additional drawdown of the groundwater table may occur over the long-term. Cumulative impacts to groundwater drawdown, including at springs sites, would be a moderate to major, permanent, localized cumulative impact.

4.20.16.2 North and South OSF Alternative

The North and South OSF Alternative would increase disturbance within the CESA by 2,266 acres, in addition to past, present, and RFFAs for a total cumulative disturbance of 97,345 acres, or approximately 12 percent of the CESA. Overall, cumulative impacts within the CESA as a result of the North and South OSF Alternative would be the same as described for the Proposed Action as water supply requirements, drawdown requirements, and surface and groundwater monitoring would be the same except total surface disturbance under the Project would be 40 acres less than the Proposed Action, resulting in less cumulative acres of surface disturbance.

4.20.16.3 No Action Alternative

Cumulative drawdown was assessed from simulated heads at certain periods of time relative to the Steady-State Model (simulating hydrologic conditions prior to groundwater development in the area). This assessed changes that may occur due to ongoing pumping stresses as well as quarrying related activities, which showed the maximum differential drawdown between the Proposed Action and No Action Alternative 200 years after the end of quarrying would be less than 20 feet (Piteau 2023b). As a result, cumulative impacts under the No Action Alternative would be similar to the Proposed Action.

4.20.17 Wetland and Riparian Resources

The CESA for wetland and riparian resources includes the Plan boundary and one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour. The CESA encompasses 53,790 acres. Past and present disturbance has resulted from: mineral development and exploration projects; utilities, infrastructure, and public purpose activities; roads; geothermal exploration; agriculture; dispersed recreation; and livestock grazing. Impacts from the past and present actions include potential increase of run-off into wetlands, groundwater drawdown from groundwater pumping, and potential reduced flows to streams in the area. Additionally, livestock and wildlife grazing may impact wetland and riparian areas through trampling and shearing of streambanks, compaction of wetland soils, trampling of plants, and overuse of riparian plant species. Riparian and wetland areas that have been overgrazed are susceptible to invasion by invasive and noxious weeds, which can displace riparian and wetland species over time. Increased activity in the CESA may increase wildland fire risk, resulting in a loss of vegetation stabilizing banks and an increase in noxious and invasive species. This can cause an increased amount of precipitation runoff and erosion which could drain into wetlands, resulting in indirect impacts to wetland and riparian areas. Past and present projects within the CESA may have directly or indirectly impacted mapped wetlands and riparian areas.

RFFAs in the CESA would include utilities projects, geothermal utilization projects, restoration projects, livestock grazing, and dispersed recreation. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. These activities would have the same impacts as discussed for past and present actions. Wildland fires in this CESA could also occur in the future. Impacts to wetlands and riparian resources as a result of RFFAs would be expected to continue in common use areas and along the road corridor. Of the 53,790 acres covered by the CESA, 3,090 acres of disturbance are associated with past, present, and RFFAs, which is a disturbance of approximately six percent of the CESA.

4.20.17.1 Proposed Action

The Proposed Action would incrementally increase disturbance within the CESA by an additional 2,306 acres (four percent of the CESA) resulting in a total cumulative disturbance of approximately 5,396 acres (approximately 10 percent of the CESA). Disturbance from the Proposed Action to wetlands and riparian resources would be limited to surface disturbance in the OPA and pipeline construction and access road improvement within the Access Road and Infrastructure Corridor. Pending completion of successful reclamation, the effects from surface disturbance would be temporary in nature.

The Proposed Action, combined with past, present, and future actions may cumulatively impact wetlands and riparian resources through removal or disturbance of wetland and riparian communities in the CESA; through the removal of vegetation from upland areas; through potentially altering flow within wetlands and riparian areas in the CESA; through reducing quantity of water received by wetlands and riparian areas within the CESA; and degradation of aquatic habitat or other resources associated with wetlands and riparian areas. The amount of disturbance to wetland and riparian areas within the CESA is likely low as the types of projects authorized within the CESA typically avoid wetland and riparian areas by design when feasible.

Groundwater drawdown associated with proposed dewatering operations is not anticipated to result in a long-term reduction in the amount and extent of available surface water at springs within the groundwater drawdown contour (Piteau 2023b). The contribution of the Proposed Action to these effects on wetlands and riparian areas would be negligible, long-term, and localized.

Predicting the impacts of changing climatic conditions due to potential for altered weather patterns in the future is difficult to ascertain. However, an increase in evaporation due to warmer conditions as well as a decrease in the amount of late winter and spring snowpack would likely continue to decrease as precipitation increasingly falls as rain instead of snow given the projected warmer temperatures. This could cause regional decreases in surface water runoff in the summer months resulting in reduced intermittent or ephemeral flow along drainage channels and increased likelihood of flash floods in Nevada.

Overall, impacts to wetlands and riparian resources in combination with past, present, and RFFAs in the CESA would be minor, long-term, and localized.

4.20.17.2 North and South OSF Alternative

Cumulative impacts to wetland and riparian resources would be the same as described for the Proposed Action except that total disturbance from the Project would be 40 acres less than the Proposed Action. Cumulative impacts to wetlands and riparian resources would be minor, long-term, and localized.

4.20.17.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Impacts to wetland and riparian areas would be negligible, long-term, and localized.

4.20.18 Wildlife Resources

4.20.18.1 General Wildlife, Special Status Species, and Migratory Birds

The CESA for general wildlife, special status species (excluding golden eagles, bighorn sheep, and mule deer), and migratory birds, includes the Plan boundary and one-mile buffer of the predicted maximum extent of the 10-foot groundwater drawdown contour for 53,790 acres. Past and present disturbance has resulted from: mineral development and exploration projects; utilities, infrastructure, and public purpose activities; roads; geothermal exploration; agriculture; dispersed recreation; and livestock grazing. Less than one acre of wildland fires has been documented in the CESA.

Surface disturbance from mineral exploration and development and utilities, infrastructure, and public purpose activities removes and fragments wildlife habitat and increases the likelihood of spreading noxious weeds and non-native invasive species, which may degrade habitat. Noise and increased human activity

from these operations may displace wildlife or herds to adjacent areas. Once construction is completed and once revegetation reestablishes on reclaimed areas, impacts from utilities would be reduced. Construction of some utilities such as transmission lines create perches for raptors that would remain on the landscape. Creation of additional perches may result in increased predation. Impacts from roads on wildlife includes the potential for increased vehicle-related mortalities, and potential displacement from increased human presence. In addition, vegetation is cleared for the roads, which decreases habitat. Vehicles traveling on the roads also may spread noxious weeds and non-native invasive species, which would affect habitat quality. Grazing from livestock and wild horses and burros within the CESA can change vegetation abundance and influence dominant cover types. Particularly around areas of concentrated use, such as water sources, livestock and wild horses and burros can degrade habitat and promote erosion. This can remove important habitat for wildlife, particularly in the desert environment.

RFFAs include utilities projects, geothermal utilization projects, restoration projects, livestock grazing, and dispersed recreation. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Impacts from utilities and geothermal projects would be similar to other projects that reduce foraging habitat through disturbance, increase the likelihood of noxious and non-native weed spread, displacement from areas of increased human activity, and creation of raptor perches. Of the 53,790 acres covered by the CESA, 3,090 acres of disturbance are associated with past, present, and RFFAs, which is a disturbance of approximately six percent of the CESA.

Proposed Action

The Proposed Action would increase habitat disturbance in the CESA by 2,306 acres (approximately four percent of the CESA). Most of this disturbance would be long-term and would be restored when operations are complete. The Proposed Action would result in a total cumulative disturbance of approximately 5,396 acres (approximately 10 percent of the CESA). Disturbance may result in the establishment or spread of invasive, non-native weed species which may degrade habitat quality. Effects associated with human presence and noise would increase in the CESA during the life of the proposed Project and may displace wildlife resulting in increased competition in other areas of the CESA. Displacement and habitat fragmentation may result in decreased survival rates. Increased traffic from the Proposed Action may result in increased mortality due to collisions. Groundwater drawdown associated with quarry dewatering activities may affect water availability at surface water sites (Piteau 2023b). SP-01 (Cave Spring), SP-03A, SP-06, SP-07, SP-08, SP-09 (North Spring), SP-09A, SP-09B, SP-09C, SP-09E, SP-10 (Mamie Spring), SP-16, SP-17, SP-17A, SP-21, SP-21A, SP-21B, SP-22, SP-25, and SP-26 had surface water present during surveys (Piteau 2023b). If impacts to spring sites are realized, impacts from the loss of a water source, foraging habitat, and reproductive habitat would occur. Effects on general wildlife, special status species, and migratory birds would be minor, long-term to permanent, and localized.

North and South OSF Alternative

Cumulative effects to general wildlife, special status species (excluding golden eagles, bighorn sheep, and mule deer), and migratory birds would be the same as described for the Proposed Action except that total disturbance from the Project would be 40 acres less than the Proposed Action. The North and South OSF Alternative would result in disturbance to 2,266 acres. Quantitative predictions of quarry lake analyte concentrations based the modified backfill configuration would not be expected to match those associated with the Proposed Action, but the same analytes would be expected to exceed the secondary enforceable and non-enforceable standards as well as NDEP Profile III reference values. Cumulative impacts to general wildlife, special status species, and migratory birds would be minor, long-term to permanent, and localized.

No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Impacts to wildlife would be negligible, short-term, and localized.

4.20.18.2 Golden Eagles

The CESA for golden eagles includes the Plan boundary and 10-mile radius of the OPA, for 283,429 acres. Past and present disturbance has resulted from: mineral development and exploration projects; utilities,

infrastructure, and public purpose activities; roads; agriculture; geothermal exploration; dispersed recreation; and livestock grazing. Impacts to golden eagles and their habitat occur from activities such as mineral exploration and development, geothermal exploration, installation of utilities and infrastructure, and roads. These impacts include direct removal of potential eagle forage areas and nesting habitat. Indirect effects from these activities include degradation, or conversion of habitat for golden eagles; potential reduction in flow to water sources from water consumption; disturbance that prevents golden eagles from breeding; displacement potential due to increased competition and stress; loss of golden eagle active nests, or territories; and or injury or mortality. Operations and maintenance activities that cause movement and noise can also lead to displacement of individuals. Past and present projects have impacted golden eagles by removing habitat through construction of mining facilities, exploration pads, support roads, utilities, and similar infrastructure. Development may have resulted in the loss of productivity of breeding golden eagles, as well as the potential loss of breeding territories. Structures can create artificial nesting or roosting habitat, which (depending on the type) could be beneficial or harmful to eagles. These impacts change the predator and prey relationships for the CESA. Increased human presence and noise can deter golden eagles from areas of activity, further fragmenting CESA habitat. Wildland fires change the habitat available to golden eagles and their prey. Fires convert sagebrush or other shrub habitat into grasslands. These can create fragmented habitat and barriers to wildlife movement, particularly where large swaths of the landscape have been changed to habitat dominated by non-native species. Wildland fires are a natural part of the ecosystem, but also can have increased risk of anthropogenic causes near industrial activity and roadways. Livestock and rangeland management also can impact golden eagles directly and indirectly. The intensity of grazing can change vegetation composition. Important resources, such as water sources, can be altered from grazing.

RFFAs would include mining and mineral development and exploration, utilities, infrastructure, and public purpose activities, geothermal exploration and development, restoration projects, livestock grazing, and dispersed recreation. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Wildland fires in this CESA may occur in the future, as would restoration projects, livestock grazing, and dispersed recreation. Of the 283,429 acres covered by the CESA, 88,910 acres of disturbance are associated with past, present, and RFFA disturbances, which is a disturbance of approximately 31 percent of the CESA.

Proposed Action

The Proposed Action would increase habitat disturbance in the CESA by 2,306 acres (less than one percent of the CESA). Most of this disturbance would be long-term and would be restored when operations are complete. The Proposed Action would result in a total cumulative disturbance of approximately 91,216 acres (approximately 32 percent of the CESA). Effects associated with human presence and noise would increase in the CESA during the life of the Project. Groundwater drawdown associated with quarry dewatering activities may affect water availability at surface water sites (Piteau 2023b). If impacts to springs are realized, impacts from the loss of a water source and foraging habitat would occur. Effects on golden eagles would be moderate, long-term, and localized.

North and South OSF Alternative

Cumulative impacts to eagles would be the same as described for the Proposed Action except that the North and South OSF Alternative would result in disturbance to 2,266 acres. Cumulative impacts to eagles are anticipated to be moderate, long-term to permanent, and localized.

No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Impacts to eagles would be negligible, short-term, and localized.

4.20.18.3 Bighorn Sheep and Mule Deer

The CESA for bighorn sheep and mule deer includes hunt unit 211 for 620,928 acres. Past and present disturbance has resulted from: mineral development and exploration projects; utilities, infrastructure, and

public purpose activities; roads; agriculture; geothermal exploration; dispersed recreation; and livestock grazing. Less than one acre of wildland fires has been documented in the CESA.

Impacts to desert bighorn sheep and mule deer can occur from activities such as mineral exploration and development, geothermal exploration, installation of utilities and infrastructure, and roads. Indirect effects from these activities include habitat loss, removal of vegetation, fragmentation of migration corridors, increased use and noise, and introduction of invasive species, and direct effects include displacement of individuals and collision with vehicles. Roads, utilities, and fences can be physical barriers to mule deer movement from summer and winter ranges, and along migration corridors. Operations and maintenance activities that cause movement and noise also can lead to behavioral changes in desert bighorn sheep and mule deer populations. Roads can be routed around high quality habitat and reduced speed limits can limit direct take. Fencing used to minimize impacts to desert bighorn sheep and mule deer, can fragment habitat. Sound-reduction technologies can minimize impacts from noise to desert bighorn sheep and mule deer. Reclamation can restore desert bighorn sheep and mule deer habitat after activities are complete. Past and present dispersed recreation activities can impact desert bighorn sheep and mule deer through habitat disturbance and removal. Additionally, similar to those described for wildlife, past and present livestock grazing within the CESA can alter vegetation abundance and influence dominant cover types especially around water resources.

RFFAs in the CESA would include mineral development and exploration projects; utilities, infrastructure, and public purpose activities; solar development; geothermal development and exploration, restoration projects, livestock grazing, and dispersed recreation. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Wildland fires in this CESA may occur in the future, as would restoration projects, livestock grazing, and dispersed recreation. These activities would lead to similar disturbances and impacts to desert bighorn sheep and mule deer as stated in past and present actions. Of the 620,928 acres covered by the CESA, 87,901 acres of disturbance are associated with past, present, and RFFA disturbances, which is a disturbance of approximately 14 percent of the CESA.

Proposed Action

Impacts from past, present, and RFFAs in combination with the Proposed Action would result in cumulative displacement and habitat fragmentation through disturbance and removal of habitat. The Proposed Action would increase habitat disturbance in the CESA by 2,306 acres (less than one percent of the CESA) and would result in a total cumulative disturbance of approximately 90,207 acres (approximately 15 percent of the CESA). Displacement and habitat fragmentation decreases survival rates of affected individuals to some degree and increases competition. The additional presence of roads may increase mortality from vehicle collisions. Disturbance within the CESA may lead to the establishment or spread of invasive weeds that may degrade bighorn sheep and mule deer habitat.

North and South OSF Alternative

Cumulative impacts to bighorn sheep and mule deer would be the same as described for the Proposed Action except that the North and South OSF Alternative would result in disturbance to 2,266 acres. Movement through the OPA would be altered by modified placement of OSFs and fencing around Tiehm's buckwheat designated critical habitat. Cumulative impacts to bighorn sheep and mule deer are anticipated to be minor, long-term to permanent, and localized.

No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Impacts to bighorn sheep and mule deer would be negligible, short-term, and localized.

4.20.19 Wild Horses and Burros

The CESA for wild horses and burros includes the Plan boundary and Silver Peak HMA, which encompasses 242,868 acres.

Past and present disturbance has resulted from: mineral development and exploration projects; utilities, infrastructure, and public purpose activities; roads and railroads; geothermal development; agriculture; dispersed recreation; and livestock grazing. Past activities that have affected wild horses and burros also include gather and removal operations. Gathers and removal of excess wild horses and burros reduces the population size and changes (at least temporarily), use and distribution patterns, and can impact genetic variability. Mineral exploration and development, as well as sand and gravel operations remove vegetation from lands that may be used as cover and forage area for wild horses and burros. Surface disturbance can fragment areas of wild horse and burro use. In addition, surface disturbance and vegetation clearing increase the likelihood of spreading noxious weeds and non-native invasive species, which may further reduce available foraging area. Noise and increased human activity from these operations may displace herds to adjacent areas. Impacts to wild horses and burros from utilities, infrastructure, and public purpose activities generally are limited to the initial construction of the utilities and infrastructure. These impacts include vegetation removal, which may reduce foraging areas, and the potential spread of noxious weeds and non-native invasive species. During construction, noise and increased human activity may displace herds to adjacent areas. However, after construction is completed and once revegetation reestablishes on disturbed areas, impacts from utilities would be reduced substantially. Impacts from roads on wild horses and burros includes the potential for increased vehicle-related mortalities, and potential displacement from increased human presence. In addition, vegetation is cleared for the roads, which decreases foraging areas to a minor extent. Vehicles traveling on the roads also may spread noxious weeds and non-native invasive species, which would affect foraging areas.

RFFAs include similar disturbances that are already occurring within the CESA, as well as solar development projects. Mining claims and fluid mineral leases without existing permit applications may or may not be developed in the future. Impacts from solar projects would be similar to other projects that reduce forage through disturbance, increase the likelihood of noxious and non-native weed spread, and displace herds. Wildland fires in this CESA may occur in the future, as would restoration projects, livestock grazing, and dispersed recreation. Vegetation restoration activities within the CESA could have short-term effects on wild horses and burros by exposing them to treatments that could harm their health, interfere with their movements, cause changes in vegetation that could alter the carrying capacity of the HMAs, or limit their access to water, which could ultimately affect their genetic health. Long-term vegetation management activities would improve the amount and quality of forage, and potentially increase the carrying capacity of the HMAs. These activities would lead to similar disturbances as those described for past and present actions. Completion of gather operations to reduce population size, achieve the AML, remove excess wild horses and burros from outside the HMA, and implement population growth suppression (fertility control) can be expected to occur.

Of the 242,868 acres covered by the CESA, 32,945 acres of disturbance are associated with past, present, and RFFAs, which is a disturbance of approximately 14 percent of the CESA.

4.20.19.1 Proposed Action

Cumulative effects to wild horses and burros would primarily be related to habitat loss, habitat fragmentation, and animal displacement. The few wild horses and burros that occur in the CESA would continue to occupy their respective ranges and breed successfully. The Proposed Action would increase disturbance to wild horse and burro habitat by an additional 2,306 acres (approximately one percent of the CESA) resulting in a total cumulative disturbance of approximately 35,251 acres (approximately 15 percent of the CESA). Pending completion of successful reclamation, the incremental additional effects to wild horses and burros as a result of the Proposed Action would be short- to long-term in nature. The reclaimed areas, and areas associated with habitat conversion, would be capable of supporting wild horse and burro use; however, forage production may change. Effects associated with human presence and noise would incrementally increase in the CESA during the life of the Proposed Action. Groundwater drawdown associated with proposed dewatering operations is not anticipated to result in a long-term reduction in the amount and extent of available surface water (e.g., springs) within the groundwater drawdown contour (Piteau 2023b). The contribution of the Proposed Action to these effects on wild horses and burros would be minor, long-term to permanent, and localized and would be reduced following completion of operations and final reclamation.

4.20.19.2 North and South OSF Alternative

Cumulative impacts to wild horses and burros would be the same as described for the Proposed Action. Total cumulative disturbance in the CESA would be 35,211 acres (approximately 15 percent of the CESA). Cumulative impacts to wild horses and burros would be minor, localized, and long-term to permanent.

4.20.19.3 No Action Alternative

Under the No Action Alternative, previously permitted activities and the other past, present, and RFFAs would continue to occur. No additional cumulative impacts beyond the past, present, and RFFAs would occur. Impacts to wild horses and burros would be negligible, temporary, and localized.

4.21 Mitigation and Monitoring

Mitigation measures, as determined applicable, are identified in this section by resource. The mitigation measures described below would be completed by and financially covered by Ioneer.

4.21.1 Proposed Action

Threatened and Endangered Species – TE-01
Mitigation Measure: Ioneer would conduct preconstruction clearance surveys for Tiehm's buckwheat prior to surface disturbance in designated critical habitat. Surveys would be completed by qualified botanists and in accordance with a protocol reviewed and approved by the BLM. Surveys would include surveying for Tiehm's buckwheat plants in areas proposed for surface disturbance in designated critical habitat. Surveys would be completed no more than two weeks (14 calendar days) prior to surface disturbing activities. Results would be provided to the BLM for review prior to surface disturbing activities occurring.

Effectiveness of Mitigation: Completing preconstruction surveys for Tiehm's buckwheat in designated critical habitat would prevent potential direct impacts to individual Tiehm's buckwheat plant species that may have established outside of known subpopulations.

Impacts of Mitigation: There are no impacts anticipated as a result of monitoring and reporting preconstruction clearance surveys.

Water Resources – WR-01
Mitigation Measure: Potential impacts on surface water resources from the drawdown of the groundwater table could occur if hydrologically sourced from the regional groundwater aquifer. The mitigation would include the development and implementation of a surface water monitoring and contingency mitigation plan. The surface water monitoring and contingency mitigation plan would include quarterly monitoring of surface water resources within the maximum extent of the predicted 10-foot groundwater drawdown contour and its one-mile buffer. Ioneer would provide the collected data to the BLM annually to determine if additional mitigation would be required. If monitoring indicates that flow reductions in surface waters are occurring, and that these reductions are likely the result of Proposed Action drawdown, Ioneer would be responsible for implementing mitigation at the affected surface water resource to enhance or replace the impacted surface water resource. Site specific mitigation would occur as outlined in the surface water monitoring and contingency mitigation plan and would depend on the site-specific conditions. Mitigation could include various measures (e.g., flow augmentation, on-site or off-site improvements, etc.), and methods for providing a new water source or improving an existing water source such as:

- Installation of a water supply pump in an existing well (e.g., monitoring well) (assumed approximately 0.75 acre of surface disturbance to implement);
- Installation of a new water production well (assumed approximately 0.20 acre of surface disturbance to implement);
- Piping from a new or existing source (assumed approximately 0.40 acre of surface disturbance to implement);
- Installation of a guzzler (assumed approximately 0.72 acre of surface disturbance to implement);

- Enhanced development of an existing seep to promote additional flow (assumed approximately 0.70) acre of surface disturbance to implement); or

- Fencing or other protection measures for an existing surface water resource to maintain flow (assumed approximately 0.20 acre of surface disturbance to implement).

Monitoring and reporting would continue until the BLM determines there are no longer water drawdown impacts from the Proposed Action. Ioneer would be responsible for acquiring all water rights that may be required for successful mitigation.

Effectiveness of Mitigation: This measure would provide for identification of potential flow-related impacts to surface water resources as a result of Proposed Action groundwater drawdown and trigger implementation of mitigation measures as specified in the surface water monitoring and contingency mitigation plan. The mitigation would be designed to be specific to the use and impact of loss of flow of each surface water site.

Impacts of Mitigation: There are 32 springs and five stock water rights within the maximum extent of the predicted 10-foot groundwater drawdown contour and its one-mile buffer. There would be no impacts anticipated from quarterly monitoring surface water resources on public land. If mitigation is triggered and required, impacts would require some level of surface disturbance to implement the mitigation measure. If mitigation is required at all surface water resources, assuming the mitigation with the largest amount of disturbance proposed (i.e., 0.75 acre per site), total surface disturbance associated with mitigation would be approximately 28 acres and would occur within the maximum extent of the predicted 10-foot groundwater drawdown contour and its one-mile buffer. Surface disturbance would occur on up to 28 acres of the vegetation communities described in Section 3.14 and impacts would be similar to those described in Section 4.14. All springs, except one, were surveyed to have flow less than one gpm; SP-17 had the highest flow, at 8.26 gpm (BLM 2024r). If pumping is necessary for mitigation, it is anticipated that most sites would be supplemented with about one gpm which would result in negligible impacts to the aquifer.

Water Resources – WR-02
Mitigation Measure: Ioneer would be responsible for monitoring groundwater levels between the quarry and existing groundwater and surface water rights within the maximum extent of the predicted 10-foot groundwater drawdown contour and its one-mile buffer. Adverse impacts to groundwater wells and water rights would be monitored and mitigated, as required by the NDWR. Monitoring and mitigation for impacts to groundwater wells and water rights would depend on the actual impact and site-specific conditions and could include a variety of measures. Methods for addressing impacts to groundwater wells and water rights may include:

- For wells, mitigation could include lowering the pump, deepening an existing well, drilling a new well, or providing a replacement water supply of equivalent yield and general water quality.

- For surface water rights, mitigation could include providing a replacement water supply of equivalent yield and general water quality.

Effectiveness of Mitigation: This mitigation measure would effectively identify any adverse impacts to water wells and water rights from the Proposed Action and the mitigation options outlined are anticipated to effectively mitigate adverse impacts.

Impacts of Mitigation: Impacts of mitigation could include surface disturbance if new water sources need to be drilled. This is anticipated to be less than 0.5 acre. Since rate of use of water rights would not change, no additional impacts are anticipated. Surface disturbance would occur in the vegetation communities described in Section 3.14 and impacts would be similar to those described in Section 4.14.

Wildlife Resources – WL-01
Mitigation Measure: The Access Road and Infrastructure Corridor reclamation seed mix would include Indian ricegrass (*Achnatherum hymenoides*) and desert globemallow (*Sphaeralcea ambigua*) to provide additional forage for pale kangaroo mouse and provide other wildlife species habitat. Indian ricegrass and

desert globemallow are species native to Nevada and previously found along the Access Road and Infrastructure Corridor during biological baselines completed (EM Strategies 2020c).

Effectiveness of Mitigation: Including these two species in the reclamation seed mix for disturbance that occurs along this corridor would assist with reestablishing the habitat that was present prior to construction of the Proposed Action, as well as provide additional forage for pale kangaroo mouse.

Impacts of Mitigation: Including Indian ricegrass and desert globemallow in the reclamation seed mix for the Access Road and Infrastructure Corridor would not result in any additional impacts and would assist with reclaiming the area back to the habitat that was present prior to implementation of Proposed Action surface disturbance.

Wildlife Resources – WL-02
Mitigation Measure: Increased human activity may cause wildlife, including big game species avoidance of the NDOW Silver Peak 04-guzzler, limiting access to water. Groundwater use and drawdown may impact surface water sites used by wildlife; however, guzzlers are not affected by drawdown since they are either sourced by precipitation of manually filled. As mitigation, Ioneer would establish two guzzlers (outside of Tiehm's buckwheat designated critical habitat) to address potential impacts to water sources used by wildlife, including big game species. NDOW Silver Peak 04 (Cave Springs) Guzzler would be relocated and one new guzzler would be established east of the OPA and within the maximum extent of the predicted 10-foot groundwater drawdown contour and its one-mile buffer. Ioneer would relocate and rebuild the Cave Springs guzzler and build an additional new guzzler based on recommendations from NDOW and the BLM. Both guzzlers would be established during the four-year construction period of the Proposed Action.

Effectiveness of Mitigation: Moving the existing guzzler away from Proposed Action surface disturbance and activity would attract wildlife use away from the Project. Creating a new guzzler, also away from the Proposed Action surface disturbance, would mitigate potential effects to wildlife if surface water sites are impacted by groundwater drawdown from the Project.

Impacts of Mitigation: Installing two guzzlers is estimated to result in approximately 1.44 (0.72 each) acres of surface disturbance east of the OPA and within the maximum extent of the predicted 10-foot groundwater drawdown contour and its one-mile buffer. Installation of each guzzler would include creation of a level dirt pad measuring 45 feet by 16 feet, apron collection system not to exceed 80 by 40 feet, up to five 2,300-gallon storage tanks to hold a maximum total of 11,500 gallons when full, one steel drinker one foot by two feet, and square pipe rail fence up to 100 feet by 100 feet. Surface disturbance would occur on up to 1.44 acres of the vegetation communities described in Section 3.14 and impacts would be similar to those described in Section 4.14.

4.21.2 North and South OSF Alternative

In addition to the monitoring and mitigation described for the Proposed Action, the following would be applicable to the North and South OSF Alternative.

Wildlife Resources – WL-03
Mitigation Measure: Ioneer would install a bat gate at ES-3480 to promote public safety and protect bat habitat within the OPA. Ioneer would be responsible for installing the bat gate in coordination with NDOW and BLM.

Effectiveness of Mitigation: By installing a bat gate, bat habitat would remain intact while public safety considered. Bat species would be able to continue to use the habitat available in the adit.

Impacts of Mitigation: No direct impacts to bat species are anticipated from the installation of a bat gate at ES-3480. The bat gate would allow bat species to continue to access the habitat at the adit. There would be no new surface disturbance as the bat gate would be constructed within the adit entrance which is previously disturbed.

4.21.3 No Action Alternative

No additional monitoring or mitigation is proposed under the No Action Alternative.

4.22 Residual Impacts

4.22.1 Unavoidable Adverse Impacts

Unavoidable adverse impacts from the Proposed Action, North and South OSF Alternative, and No Action Alternative would be anticipated to the resources outlined below from facilities remaining as post-reclamation features (**Table 4-8**). No unavoidable adverse impacts would be anticipated to impact the following resources: air quality and climate change, environmental justice, social and economic values, transportation and access, and wetland and riparian areas.

Table 4-8 Unavoidable Adverse Impacts

Resource	Proposed Action	North and South OSF Alternative	No Action Alternative
Cultural Resources	Removal of up to 12 NRHP-eligible cultural resources from surface disturbance, impacts to three NRHP-eligible cultural resources from vibration, and impacts to two NRHP-eligible cultural resources from changes to the visual and auditory environment. Loss of up to 140 cultural resources that are not eligible for the NRHP.	Removal of up to 16 NRHP-eligible cultural resources from surface disturbance, impacts to NRHP-eligible one cultural resource from vibration, and impacts to two NRHP-eligible cultural resources from changes to the visual and auditory environment. Loss of up to 140 cultural resources that are not eligible for the NRHP.	None identified.
Geology and Minerals	The resource would be permanently removed during quarrying.	Same as the Proposed Action.	None identified.
Hazardous Materials and Waste	Residual adverse effects from the use of hazardous materials would depend on the substance, quantity, timing, location, and response involved in the event of an accidental spill or release.	Same as the Proposed Action.	None identified.
Land Use and Realty	Communication Tower 3 would remain post-reclamation. Ioneer may co-own this tower with a major cellular service provider which may require submittal and approval of a ROW application. Permanent reduction of 383 acres for future land use.	Same as the Proposed Action, except permanent reduction of up to 211 acres.	None identified.
Livestock Grazing	Permanent reduction of up to 383 acres of foraging habitat associated with up to 15 AUMs. Permanent economic impacts associated with the loss of AUMs.	Permanent reduction of up to 211 acres of foraging habitat associated with eight AUMs. Permanent economic impacts associated with the loss of AUMs.	None identified.
Native American Traditional Values	Permanent reduction of vegetation and wildlife habitat. Potential permanent impact to Cave Spring from loss of water. Permanent change to the viewshed. Unevaluated sites potentially associated with sacred sites that cannot be avoided would be mitigated under the HPTP.	Same as the Proposed Action, except permanent reduction of up to 211 acres.	None identified.
Recreation	Permanent reduction of up to 383 acres of area that could be used for recreation, including 58 acres of permanent disturbance to semi-primitive motorized recreational areas. Thirty-two acres of permanent disturbance to LWC328 and 224 acres of permanent disturbance to LWC338. Permanent reduction of 366 acres to OHV restricted areas.	Permanent reduction of up to 211 acres, including 22 acres in semi-primitive motorized recreational areas. Permanent disturbance to 155 acres of designated limited to existing roads and trails, and 48 acres that are limited to existing roads and trails and closed to competition events. Permanent disturbance to 28 acres of	None identified.

Resource	Proposed Action	North and South OSF Alternative	No Action Alternative
	Permanent change to the viewshed from the Silver Peak WSA.	LWC328 and 114 acres of LWC338. permanent change to the viewshed from the Silver Peak WSA.	
Soils	Permanent reduction of up to 383 acres of soils.	Permanent reduction of up to 211 acres of soils.	None identified.
Threatened and Endangered Species	Permanent reduction of up to 279 acres of potential BSSG habitat and permanent conversion of shrub to grassland habitat. Permanent reduction of 383 acres of potential monarch butterfly habitat. Potential increase in foraging habitat for monarch butterfly from quarry lake. Permanent alteration to pollinator habitat, permanent alteration to overland flow and runoff to some subpopulations , and permanent reduction of 97 acres of Tiehm's buckwheat designated critical habitat.	Same as the Proposed Action, except permanent reduction of up to 132 acres of potential BSSG habitat and permanent reduction of 211acres of monarch butterfly habitat, and permanent reduction of 45 acres of Tiehm's buckwheat designated critical habitat.	None identified.
Vegetation	Permanent reduction of up to 383 acres of vegetation. Potential permanent impacts to Mojave fishhook cactus individuals pending location as well as permanent surface disturbance to 102 acres of potential habitat.	Same as the Proposed Action, except permanent reduction of up to 211 acres of vegetation and direct disturbance to one sagebrush cholla.	None identified.
Visual Resources	Permanent change to the viewshed from both the reclaimed and permanent features.	Same as the Proposed Action.	None identified.
Water Resources	Drawdown from dewatering would occur, and wells in the OPA would experience up to 300 feet during the operating period with recovery taking approximately 60 years. Potential impact to surface features from reduction in groundwater for more than 200 years. Four surface water stock rights, and one underground stock water right located within the predicted maximal 10-foot drawdown contour could be impacted. One surface stock water right, one underground stock water right, and nine underground irrigation rights within the supply wells buffer area could be impacted. A post-quarrying quarry lake would be created that would take 60 years to reach equilibrium.	Same as the Proposed Action.	None identified.
Wildlife	Permanent reduction of up to 383 acres of potentially suitable habitat for wildlife species. Addition of potential habitat from the quarry lake. Permanent increased competition for surface water if impacts from dewatering are realized. Removal of one adit.	Same as the Proposed Action, except permanent reduction of up to 211 acres of potentially suitable habitat for wildlife species.	None identified.
Wild Horses and Burros	Permanent reduction of up to 383 acres of foraging habitat.	Permanent reduction of up to 211 acres of foraging habitat.	None identified.

4.22.2 Irreversible and Irretrievable Impacts

The irreversible and irretrievable commitment of resources for the Proposed Action, North and South OSF Alternative, and the No Action Alternative are provided in **Table 4-9**. Irreversible and irretrievable

commitments of resources were not identified for the following resources: air quality and climate change, environmental justice, hazardous materials and solid waste, land use and realty, social and economic values, transportation and access, and wetland and riparian areas.

Table 4-9 Irreversible and Irretrievable Commitment of Resources

Resource	Proposed Action	North and South OSF Alternative	No Action Alternative
Cultural Resources	Removal of up to 12 NRHP-eligible cultural resources from surface disturbance, impacts to three NRHP-eligible cultural resources from vibration, and impacts to two NRHP-eligible cultural resources from changes to the visual and auditory environment. Loss of up to 140 cultural resources that are not eligible for the NRHP.	Removal of up to 16 NRHP-eligible cultural resources from surface disturbance, impacts to NRHP-eligible one cultural resource from vibration, and impacts to two NRHP-eligible cultural resources from changes to the visual and auditory environment. Loss of up to 140 cultural resources that are not eligible for the NRHP.	None identified.
Geology and Minerals	The resource would be permanently removed during quarrying.	Same as the Proposed Action.	None identified.
Livestock Grazing	Permanent reduction of up to 383 acres of foraging habitat.	Permanent reduction of up to 211 acres of foraging habitat.	None identified.
Native American Traditional Values	Permanent reduction of vegetation and wildlife habitat. Potential permanent impact to Cave Spring from loss of water. Permanent change to the viewshed. Unevaluated sites potentially associated with sacred sites that cannot be avoided would be mitigated under the HPTP.	Same as the Proposed Action, except permanent reduction of up to 211 acres.	None identified.
Recreation	Permanent reduction of up to 383 acres of area that could be used for recreation.	Permanent reduction of up to 211 acres.	None identified.
Soils	Permanent reduction of up to 383 acres of soils.	Permanent reduction of up to 211 acres of soils.	None identified.
Threatened and Endangered Species	Permanent reduction of up to 279 acres of potential BSSG habitat, 383 acres of potential monarch butterfly habitat, and permanent reduction of 97 acres of Tiehm's buckwheat designated critical habitat,	Same as the Proposed Action, except permanent reduction of up to 132 acres of potential BSSG habitat, 211 acres of monarch butterfly habitat, and permanent reduction of 45 acres of Tiehm's buckwheat designated critical habitat.	None identified.
Vegetation	Permanent reduction of up to 383 acres of vegetation.	Same as the Proposed Action, except permanent reduction of up to 211 acres of vegetation.	None identified.
Visual Resources	Permanent change to the viewshed from both the reclaimed and permanent features.	Same as the Proposed Action.	None identified.
Water Resources	A quarry lake would be created that would take 60 years to reach near steady-state.	Same as the Proposed Action.	None identified.
Wildlife	Permanent reduction of up to 383 acres of potentially suitable habitat for wildlife species. Removal of one adit.	Same as the Proposed Action, except permanent reduction of up to 211 acres of potentially suitable habitat for wildlife species.	None identified.
Wild Horses and Burros	Permanent reduction of up to 383 acres of foraging habitat.	Permanent reduction of up to 211 acres of foraging habitat.	None identified.

4.22.3 Relationship of Short-Term Uses and Long-Term Productivity

The relationship of short-term uses and long-term productivity for the Proposed Action, North and South OSF Alternative, and the No Action Alternative are provided in **Table 4-10**. Impacts from short-term use and long-term productivity were not identified for the following resources: air quality and climate change, cultural resources, environmental justice, geology and minerals, hazardous materials and solid waste, land use and realty, Native American Traditional Values, recreation, social and economic values, and visual resources.

Table 4-10 Relationship of Short-term Uses and Long-term Productivity

Resource	Proposed Action	North and South OSF Alternative	No Action Alternative
Livestock Grazing	2,306 acres of vegetation removed. Creating a long-term impact and change in the productivity of the site and forage availability once reclaimed.	Same as the Proposed Action, except 2,266 acres of vegetation removed.	15 acres of vegetation removed and reclaimed.
Soils	2,306 acres of soils removed. Creating a long-term impact and change in soil composition and productivity.	Same as the Proposed Action, except 2,266 acres of soils removed.	15 acres of soils removed and reclaimed.
Threatened and Endangered Species	1,064 acres of potential BSSG habitat, 2,306 acres of potential monarch butterfly habitat, and up to 354 acres of Tiehm's buckwheat designated critical habitat removed. Creating a long-term impact and change in habitat.	Same as the Proposed Action, except 776 acres of potential BSSG habitat, 2,266 acres of potential monarch butterfly habitat, and up to 191 acres of Tiehm's buckwheat designated critical habitat removed. Creating a long-term impact and change in habitat.	15 acres of habitat removed and reclaimed.
Vegetation	2,306 acres of vegetation removed. Creating a long-term impact and change in the productivity of the site and forage availability once reclaimed.	Same as the Proposed Action, except 2,266 acres of vegetation removed.	15 acres of vegetation removed and reclaimed.
Water Resources	Dewatering of up to 650 gpm. Creating a long-term impact on groundwater quantity and recovery.	Same as the Proposed Action.	None identified.
Wildlife	2,306 acres of habitat removed. Creating a long-term impact and change in the productivity of the site and forage availability once reclaimed. Removal of one adit.	Same as the Proposed Action, except 2,266 acres of habitat removed.	15 acres of habitat removed and reclaimed.
Wild Horses and Burros	2,286 acres of vegetation removed in Silver Peak HMA. Creating a long-term impact and change in the productivity of the site and forage availability once reclaimed.	Same as the Proposed Action, except 2,164 acres of vegetation removed in Silver Peak HMA.	15 acres of vegetation removed and reclaimed.

5.0 Consultation, Coordination, and Public Involvement

5.1 Consultation and Coordination with Agencies and Tribal Governments

This section describes the specific actions taken by the BLM to consult and coordinate with Native American tribes, cooperating agencies, and other government agencies. Various federal laws require the BLM to consult with Native American tribes, SHPO, USFWS, and USEPA, and cooperating agencies during the NEPA decision-making process. In addition to formal scoping, the BLM implemented collaborative outreach and a public involvement process that included inviting agencies to be cooperative partners for the EIS NEPA process.

The BLM is currently consulting with SHPO to prepare a MOA between the BLM and SHPO. Ioneer is working with the BLM and SHPO to develop HPTP as described in Section 2.1.13.3.

The BLM initiated formal consultation with the USFWS through the preparation and submittal of a Biological Assessment (BLM 2024b) that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. The BLM has consulted with the USFWS on the North and South OSF Alternative for the Rhyolite Ridge Lithium-Boron Project. The BLM prepared a Biological Assessment (BLM 2024b) which analyzed effects of the North and South OSF Alternative to Tiehm's buckwheat and its designated critical habitat. The USFWS issued a Biological Opinion on September 4, 2024, in which the USFWS concluded that the activities considered in the biological opinion are not likely to jeopardize the continued existence of Tiehm's buckwheat or result in the destruction or adverse modification of its critical habitat (USFWS 2024) (**Appendix E**).

5.2 Government-to-Government Consultation with Native American Tribes

Tribal consultation is ongoing. A summary of consultation to date is provided below and in **Table 5-1**.

The BLM contacted the following tribal governments during the EIS process including the Big Pine Paiute Tribe of the Owens Valley, Bishop Paiute Tribe, Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation, Te-Moak Tribe of Western Shoshone Indians of Nevada, Ely Shoshone Tribe of Nevada, Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada, Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada, Yomba Shoshone Tribe of the Yomba Reservation, Nevada, and Timbisha Shoshone Tribe.

On January 29, 2020, the BLM TFO sent letters via certified mail to official tribal representatives of the Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada, Timbisha Shoshone Tribe, and Yomba Shoshone Tribe of the Yomba Reservation, Nevada to inform them of the Project and to request any comments or questions they may have regarding the Project.

On February 11, 2020, five tribal representatives from the Timbisha Shoshone Tribe accompanied the BLM on a visit to the Project. During the site visit, the tribal representatives expressed concern about impacts to prehistoric cultural resources and inquired about impacts to bighorn sheep and Tiehm's buckwheat. Tribal representatives stated that avoidance of cultural resources is preferred over mitigation.

On June 23, 2020, representatives from the Timbisha Shoshone Tribe and the Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada met with representatives of Ioneer and the BLM at the Project to tour the area and discuss the Project and potential impacts. In a letter to the BLM dated June 26, 2020, the Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada indicated that two areas contained specific sacred items and should be avoided by the Project activities. Tribal monitors during ground-disturbing activities and another meeting with Ioneer to further discuss concerns were requested.

From September 2021 to October 2022, BLM met with Bishop Paiute Tribe, Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada, and Timbisha Shoshone Tribe to discuss the Project and others.

After a pause on the Project due to the pending listing of the Tiehm's buckwheat to the Endangered Species List and subsequent revision of the Plan, the BLM reinitiated a scoping period. Scoping letters were sent to

the Big Pine Paiute Tribe of the Owens Valley, the Bishop Paiute Tribe, the Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation, the Te-Moak Tribe of Western Shoshone Indians of Nevada, the Ely Shoshone Tribe of Nevada, the Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada, the Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada, and the Yomba Shoshone Tribe of the Yomba Reservation, Nevada on December 19, 2022. Additional letters and emails were sent to all nine tribes on January 27, 2023, with an email sent to the Inter-Tribal Council of Nevada on February 1, 2023. The BLM carried out follow up consultation with the Big Pine Paiute Tribe of the Owens Valley, Bishop Paiute Tribe, Timbisha Shoshone Tribe, and Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada from February 3, 2023, through April 26, 2023. The BLM also followed up with the Western Shoshone Defense Project from February 3 through April 26, 2023. Prior to this, the BLM met on different occasions with the Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada, the Timbisha Shoshone Tribe, and the Bishop Paiute Tribe to discuss this Project as well as others.

Scoping comments were received from the Big Pine Paiute Tribe of the Owens Valley and Timbisha Shoshone Tribe. The Western Shoshone Defense Project also provided comments. Concerns included impacts to sacred sites, restricted access to traditional resource areas, degradation of cultural and biotic landscapes within traditional territory, potential effects to cultural properties, inadvertent discovery of human remains, and impacts to culturally significant wildlife and plant resources.

The BLM emailed the Tribes on April 27, 2023, regarding an upcoming field visit. Follow up letters were sent to the same Tribes on May 17, 2023, inviting them to become cooperating agencies. Several tribes have shown interest in increasing their involvement in the Project. To date none have agreed to become a cooperating agency, although they have requested government-to-government meetings. Follow-up consultation with the Timbisha Shoshone Tribe, including Project area visits, were completed on April 27, 2023, June 20, 2023, June 26, 2023, and November 9, 2023. The BLM met with the Bishop Paiute Tribe on August 8, 2023, to discuss cooperating agency status. A follow-up discussion occurred on January 30, 2024, and a cooperating agency MOU was provided to the Bishop Paiute Tribe for consideration. No response from the tribe was received by BLM after the cooperating agency MOU was provided and discussed.

The BLM provided copies of the cultural resource reports to the tribes on April 11, 2024. On April 18, 2024, the BLM provided each tribe a draft of the Memorandum of Agreement between the Bureau of Land Management-Tonopah Field Office, the Nevada State Historic Preservation Office, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada for review and comment. The BLM sent follow-up emails to the tribes on May 1, 2024, regarding receipt and review of the MOA. As part of the Environmental Justice Outreach Plan, BLM contacted each tribe by email inviting additional input on the Project on April 26, 2024.

The BLM sent letters to the Fort Independence Paiute Tribe, Lone Pine Paiute Shoshone Tribe, and Walker River Paiute Tribe on May 28, 2024, informing them of the Project and inviting consultation. The Fort Independence Paiute Tribe accepted the invitation to consult on July 30, 2024. No response has been received by the BLM from the Lone Pine Paiute Shoshone Tribe and Walker River Paiute Tribe.

The HPTP and MDP developed for the Project were sent to the Big Pine Paiute Tribe of the Owens Valley, the Bishop Paiute Tribe, the Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation, the Te-Moak Tribe of Western Shoshone Indians of Nevada, the Ely Shoshone Tribe of Nevada, the Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada, the Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada, the Timbisha Shoshone Tribe, and the Yomba Shoshone Tribe of the Yomba Reservation, Nevada for review on June 12, 2024.

The BLM met with the Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada and the Timbisha Shoshone Tribe at the Project to visit unevaluated sites discussed in the Draft EIS on June 18, 2024.

On July 10, 2024, the BLM provided the Bishop Paiute Tribe, Ely Shoshone Tribe of Nevada, and Fort Independence Paiute Tribe a draft of the MOA between the BLM-Tonopah Field Office, the Nevada SHPO, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County,

Nevada for review and comment. The BLM sent follow-up emails to the tribes on August 20, 2024, regarding receipt and review of the MOA.

On August 16, 2024, the BLM met on site with the Timbisha Shoshone Tribe to visit Cave Spring and unevaluated sites discussed in the Draft EIS. The geotechnical testing area was also visited to discuss concerns that the drilling impacted a cultural site. The location of the site was visited, and no damage was observed.

On August 19, 2024, the BLM met with the Timbisha Shoshone Tribe and the Duckwater Shoshone Tribe of Duckwater Reservation, Nevada and visited the Cave Spring site and unevaluated sites discussed in the Draft EIS.

On August 29, 2024, a virtual meeting was held with the BLM and representatives of the Timbisha Shoshone Tribe, the Fort Independence Paiute Tribe, and the Duckwater Shoshone Tribe of Duckwater Reservation, Nevada to discuss the Project. The acoustic properties the Cave Spring were discussed.

The BLM is currently coordinating an additional consultation meeting with the Bishop Paiute Tribe. Tribal consultation and coordination efforts will continue throughout the Project.

Table 5-1 Tribal Consultation/Coordination

Tribe	Date	Details
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	01/29/2020	Scoping Letter from the BLM.
Timbisha Shoshone Tribe	01/29/2020	Scoping Letter from the BLM.
Yomba Shoshone Tribe of the Yomba Reservation, Nevada	01/29/2020	Scoping Letter from the BLM.
Timbisha Shoshone Tribe	02/11/2020	Five tribal representatives attended Project area visit.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	06/23/2020	Project area visit.
Timbisha Shoshone Tribe	06/23/2020	Project area visit.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	06/26/2020	Letter requesting avoidance of sensitive areas, presence of tribal monitors during ground-disturbing activities, and further consultation
Timbisha Shoshone Tribe	09/15/2021	Meeting between the BLM and the Timbisha Shoshone Tribe regarding Battle Mountain District Office projects. Rhyolite Ridge discussed.
Timbisha Shoshone Tribe	03/22/2022	Meeting between the BLM and the Timbisha Shoshone Tribe regarding Battle Mountain District Office projects. Rhyolite Ridge discussed.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	03/25/2022	Coordination meeting(s) with Duckwater Shoshone Tribe Chairman Graham regarding a proposed site visit that was implemented on March 25, 2022, resulting in re-staking for avoidance of areas of cultural significance.
Timbisha Shoshone Tribe	04/19/2022	The BLM presented project updates with the Timbisha Shoshone Tribe Council on April 19, 2022, which included e-planning information in the summary.
Bishop Paiute Tribe	04/26/2022	BLM met with the Bishop Paiute Council on April 26, 2022 to present on the Battle Mountain District Office and why the District is expanding its sphere of influence with respect to both the Rhyolite Ridge and Esmeralda 7 Solar proposals.
Timbisha Shoshone Tribe	10/21/2022	Wilfred Nabahe (BLM) and Prudence Compton (BLM) met with the Timbisha Shoshone Tribe and provided an update on mine permitting activity in the TFO, and the stage of each project, including Rhyolite Ridge.

Tribe	Date	Details
Timbisha Shoshone Tribe	10/21/2022	Email from Wilfred Nabahe (BLM) to Margaret Cortez (Timbisha Shoshone Tribe) with a list of projects in the TFO in pre-NEPA or NEPA. Rhyolite Ridge included.
Big Pine Paiute Tribe of the Owens Valley	12/19/2022	Scoping Letter from BLM. Correspondence included a link to the Project's ePlanning website, direct links to register for the Zoom meetings, and a copy of the news release.
Bishop Paiute Tribe	12/19/2022	Scoping Letter from BLM. Correspondence included a link to the Project's ePlanning website, direct links to register for the Zoom meetings, and a copy of the news release.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	12/19/2022	Scoping Letter from BLM. Correspondence included a link to the Project's ePlanning website, direct links to register for the Zoom meetings, and a copy of the news release.
Ely Shoshone Tribe of Nevada	12/19/2022	Scoping Letter from BLM. Correspondence included a link to the Project's ePlanning website, direct links to register for the Zoom meetings, and a copy of the news release.
Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada	12/19/2022	Scoping Letter from BLM. Correspondence included a link to the Project's ePlanning website, direct links to register for the Zoom meetings, and a copy of the news release.
Te-Moak Tribe of Western Shoshone Indians of Nevada	12/19/2022	Scoping Letter from BLM. Correspondence included a link to the Project's ePlanning website, direct links to register for the Zoom meetings, and a copy of the news release.
Timbisha Shoshone Tribe	12/19/2022	Scoping Letter from BLM. Correspondence included a link to the Project's ePlanning website, direct links to register for the Zoom meetings, and a copy of the news release.
Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation	12/19/2022	Scoping Letter from BLM. Correspondence included a link to the Project's ePlanning website, direct links to register for the Zoom meetings, and a copy of the news release.
Yomba Shoshone Tribe of the Yomba Reservation, Nevada	12/19/2022	Scoping Letter from BLM. Correspondence included a link to the Project's ePlanning website, direct links to register for the Zoom meetings, and a copy of the news release.
Big Pine Paiute Tribe of the Owens Valley	01/27/2023	Letters and consultation emails from BLM to affected tribes regarding the updated Rhyolite Ridge POO and request for tribal consultation and input.
Bishop Paiute Tribe	01/27/2023	Letters and consultation emails from BLM to affected tribes regarding the updated Rhyolite Ridge POO and request for tribal consultation and input.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	01/27/2023	Letters and consultation emails from BLM to affected tribes regarding the updated Rhyolite Ridge POO and request for tribal consultation and input.
Ely Shoshone Tribe of Nevada	01/27/2023	Letters and consultation emails from BLM to affected tribes regarding the updated Rhyolite Ridge POO and request for tribal consultation and input.
Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada	01/27/2023	Letters and consultation emails from BLM to affected tribes regarding the updated Rhyolite Ridge POO and request for tribal consultation and input.
Te-Moak Tribe of Western Shoshone Indians of Nevada	01/27/2023	Letters and consultation emails from BLM to affected tribes regarding the updated Rhyolite Ridge POO and request for tribal consultation and input.
Timbisha Shoshone Tribe	01/27/2023	Letters and consultation emails from BLM to affected tribes regarding the updated Rhyolite Ridge POO and request for tribal consultation and input.
Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation	01/27/2023	Letters and consultation emails from BLM to affected tribes regarding the updated Rhyolite Ridge POO and request for tribal consultation and input.
Yomba Shoshone Tribe of the Yomba Reservation, Nevada	01/27/2023	Letters and consultation emails from BLM to affected tribes regarding the updated Rhyolite Ridge POO and request for tribal consultation and input.
Inter-Tribal Council of Nevada	02/01/2023	Email from BLM to Inter-Tribal Council of Nevada Inc's Tribal/State Liaison, Clifford Banuelos for the proposed Rhyolite Ridge Project update for the ITCN Environmental Manager's Meeting held on February 3, 2023 in Reno at the ITCN Headquarters.

Tribe	Date	Details
Big Pine Paiute Tribe of the Owens Valley	02/02/2023	Letter expressing opposition to the Project, acknowledges ongoing consultation, and resource concerns including Tiehm's buckwheat, water, plants, and wildlife.
Timbisha Shoshone Tribe	02/03/2023	Letter requesting a 30-day extension of the scoping period.
Timbisha Shoshone Tribe	02/15/2023	BLM TFO Timbisha Shoshone Tribe Council Meeting Update. Rhyolite Ridge public scoping period extension discussed.
Bishop Paiute Tribe	02/16/2023	Email from the BLM to Meryl Picard (Bishop Paiute Tribe) with details regarding a site visit scheduled for February 23, 2023 to meet with Ioneer onsite, followed by a meeting with the BLM to consult/communicate or ask questions with the TFO.
Bishop Paiute Tribe	02/22/2023	Email from the BLM to Meryl Picard (Bishop Paiute Tribe) postponing February 23 site visit due to winter storm advisory.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	02/24/2023	Email from BLM to Chairman Warren Graham requesting a call to schedule a coordination meeting or field visit to discuss tribal concerns.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	02/28/2023	Email from Chairman Graham regarding availability for a call.
Timbisha Shoshone Tribe	03/03/2023	Letter expressing resource concerns including impacts to springs, plants, water, wildlife, tribal resources, contamination, vibration and noise, soil, and environmental justice.
Bishop Paiute Tribe	03/06/2023	Email from the BLM to Meryl Picard (Bishop Paiute Tribe) to schedule a site visit (originally scheduled for February 23 but postponed due to winter storm advisory). BLM proposed March 16, 2023.
Bishop Paiute Tribe	03/13/2023	Email from the BLM to Meryl Picard postponing the March 16, 2023 site visit due to an access road closure.
South Fork Band	04/03/2023	Email from the BLM to South Fork Band regarding not attending the presentation to their Council due to winter weather and providing the updated project status list with e-planning accessibility for the proposed Rhyolite Ridge Project.
Timbisha Shoshone Tribe	04/18/2023	Email from BLM to Timbisha Shoshone Tribe administrator regarding Battle Mountain District, TFO Project Status Updates in preparation for April 19, 2023 meeting.
Bishop Paiute Tribe	04/22/2023	Email chain regarding the BLM pre-meeting with Tribal Administrator and upcoming meeting with council on April 26, 2023.
Big Pine Paiute Tribe of the Owens Valley	04/27/2023	Follow up action item email from the BLM to known participants for the April 27, 2023 field meeting to share Ioneer contact information.
Big Pine Paiute Tribe of the Owens Valley	04/27/2023	Coordination email/Outlook invitations to affected Tribes for implementation of a field meeting for consultation/ communication with Ioneer and the BLM TFO Field Manager held on April 27, 2023.
Bishop Paiute Tribe	04/27/2023	Follow up action item email from the BLM to known participants for the April 27, 2023 field meeting to share Ioneer contact information.
Bishop Paiute Tribe	04/27/2023	Coordination email/Outlook invitations to affected Tribes for implementation of a field meeting for consultation/ communication with Ioneer and the BLM TFO Field Manager held on April 27, 2023.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	04/27/2023	Coordination email/Outlook invitations to affected Tribes for implementation of a field meeting for consultation/ communication with Ioneer and the BLM TFO Field Manager held on April 27, 2023.
Ely Shoshone Tribe of Nevada	04/27/2023	Coordination email/Outlook invitations to affected Tribes for implementation of a field meeting for consultation/ communication with Ioneer and the BLM TFO Field Manager held on April 27, 2023.
Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada	04/27/2023	Coordination email/Outlook invitations to affected Tribes for implementation of a field meeting for consultation/ communication with Ioneer and the BLM TFO Field Manager held on April 27, 2023.
Te-Moak Tribe of Western Shoshone Indians of Nevada	04/27/2023	Coordination email/Outlook invitations to affected Tribes for implementation of a field meeting for consultation/ communication with Ioneer and the BLM TFO Field Manager held on April 27, 2023.
Timbisha Shoshone Tribe	04/27/2023	Follow up action item email from BLM to known participants for the April 27, 2023 field meeting to share Ioneer contact information.

Tribe	Date	Details
Timbisha Shoshone Tribe	04/27/2023	Coordination email/Outlook invitations to affected Tribes for implementation of a field meeting for consultation/ communication with Ioneer and the BLM TFO Field Manager held on April 27, 2023.
Timbisha Shoshone Tribe	04/27/2023	Field consultation/Project Area visit including BLM and Ioneer
Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation	04/27/2023	Coordination email/Outlook invitations to affected Tribes for implementation of a field meeting for consultation/ communication with Ioneer and the BLM TFO Field Manager held on April 27, 2023.
Yomba Shoshone Tribe of the Yomba Reservation, Nevada	04/27/2023	Coordination email/Outlook invitations to affected Tribes for implementation of a field meeting for consultation/ communication with Ioneer and the BLM TFO Field Manager held on April 27, 2023.
Big Pine Paiute Tribe of the Owens Valley	05/17/2023	Letters sent by the BLM to affected Tribes for an invitation request for additional opportunity to communicate/consult in proposed Microsoft Teams or Zoom on a monthly basis.
Bishop Paiute Tribe	05/17/2023	Letters sent by the BLM to affected Tribes for an invitation request for additional opportunity to communicate/consult in proposed Microsoft Teams or Zoom on a monthly basis.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	05/17/2023	Letters sent by the BLM to affected Tribes for an invitation request for additional opportunity to communicate/consult in proposed Microsoft Teams or Zoom on a monthly basis.
Ely Shoshone Tribe of Nevada	05/17/2023	Letters sent by the BLM to affected Tribes for an invitation request for additional opportunity to communicate/consult in proposed Microsoft Teams or Zoom on a monthly basis.
Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada	05/17/2023	Letters sent by the BLM to affected Tribes for an invitation request for additional opportunity to communicate/consult in proposed Microsoft Teams or Zoom on a monthly basis.
Te-Moak Tribe of Western Shoshone Indians of Nevada	05/17/2023	Letters sent by the BLM to affected Tribes for an invitation request for additional opportunity to communicate/consult in proposed Microsoft Teams or Zoom on a monthly basis.
Timbisha Shoshone Tribe	05/17/2023	Letters sent by the BLM to affected Tribes for an invitation request for additional opportunity to communicate/consult in proposed Microsoft Teams or Zoom on a monthly basis.
Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation	05/17/2023	Letters sent by the BLM to affected Tribes for an invitation request for additional opportunity to communicate/consult in proposed Microsoft Teams or Zoom on a monthly basis.
Yomba Shoshone Tribe of the Yomba Reservation, Nevada	05/17/2023	Letters sent by the BLM to affected Tribes for an invitation request for additional opportunity to communicate/consult in proposed Microsoft Teams or Zoom on a monthly basis.
Timbisha Shoshone Tribe	06/20/2023	Field consultation/Project Area visit including BLM and Ioneer
Timbisha Shoshone Tribe	06/26/2023	Meeting with the Timbisha Shoshone Tribal Council and THPO and BLM.
Bishop Paiute Tribe	08/08/2023	Meeting between Scott Distel (BLM) and Brian Adkins (Environmental Director at Bishop Paiute Tribe) regarding cooperating agency status and government to government coordination and consultation. Follow up discussion via email between Brian and Scott on January 30, 2024 regarding Project update and status. No response from tribe received by BLM after cooperating agency MOU was provided and discussed.
Timbisha Shoshone Tribe	11/09/2023	Field consultation/Project Area visit including BLM and Ioneer
Big Pine Paiute Tribe of the Owens Valley	04/11/2024	Consultation letters and copies of the cultural resources reports prepared for the Project were sent to the tribes.
Bishop Paiute Tribe	04/11/2024	Consultation letters and copies of the cultural resources reports prepared for the Project were sent to the tribes.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	04/11/2024	Consultation letters and copies of the cultural resources reports prepared for the Project were sent to the tribes.
Ely Shoshone Tribe of Nevada	04/11/2024	Consultation letters and copies of the cultural resources reports prepared for the Project were sent to the tribes.
Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada	04/11/2024	Consultation letters and copies of the cultural resources reports prepared for the Project were sent to the tribes.

Tribe	Date	Details
Te-Moak Tribe of Western Shoshone Indians of Nevada	04/11/2024	Consultation letters and copies of the cultural resources reports prepared for the Project were sent to the tribes.
Timbisha Shoshone Tribe	04/11/2024	Consultation letters and copies of the cultural resources reports prepared for the Project were sent to the tribes.
Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation	04/11/2024	Consultation letters and copies of the cultural resources reports prepared for the Project were sent to the tribes.
Yomba Shoshone Tribe of the Yomba Reservation, Nevada	04/11/2024	Consultation letters and copies of the cultural resources reports prepared for the Project were sent to the tribes.
Big Pine Paiute Tribe of the Owens Valley	04/18/2024	Draft of the Memorandum of Agreement Between the Bureau of Land Management-Tonopah Field Office, the Nevada State Historic Preservation Office, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada submitted for review and comment via certified mail.
Bishop Paiute Tribe	04/18/2024	Draft of the Memorandum of Agreement Between the Bureau of Land Management-Tonopah Field Office, the Nevada State Historic Preservation Office, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada submitted for review and comment via certified mail.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	04/18/2024	Draft of the Memorandum of Agreement Between the Bureau of Land Management-Tonopah Field Office, the Nevada State Historic Preservation Office, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada submitted for review and comment via certified mail.
Ely Shoshone Tribe of Nevada	04/18/2024	Draft of the Memorandum of Agreement Between the Bureau of Land Management-Tonopah Field Office, the Nevada State Historic Preservation Office, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada submitted for review and comment via certified mail.
Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada	04/18/2024	Draft of the Memorandum of Agreement Between the Bureau of Land Management-Tonopah Field Office, the Nevada State Historic Preservation Office, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada submitted for review and comment via certified mail.
Te-Moak Tribe of Western Shoshone Indians of Nevada	04/18/2024	Draft of the Memorandum of Agreement Between the Bureau of Land Management-Tonopah Field Office, the Nevada State Historic Preservation Office, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada submitted for review and comment via certified mail.
Timbisha Shoshone Tribe	04/18/2024	Draft of the Memorandum of Agreement Between the Bureau of Land Management-Tonopah Field Office, the Nevada State Historic Preservation Office, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada submitted for review and comment via certified mail.
Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation	04/18/2024	Draft of the Memorandum of Agreement Between the Bureau of Land Management-Tonopah Field Office, the Nevada State Historic Preservation Office, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada submitted for review and comment via certified mail.
Big Pine Paiute Tribe of the Owens Valley	04/22/2024	Tribe received the 04/18/24 MOA transmittal on 4/22/24.
Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada	04/22/2024	Tribe received the 04/18/24 MOA transmittal on 4/22/24.
Te-Moak Tribe of Western Shoshone Indians of Nevada	04/22/2024	Tribe received the 04/18/24 MOA transmittal on 4/22/24.
Timbisha Shoshone Tribe	04/22/2024	Tribe received the 04/18/24 MOA transmittal on 4/22/24.
Big Pine Paiute Tribe of the Owens Valley	04/26/2024	Email from Matt Fockler (BLM Socioeconomic and Environmental Justice Lead for BLM Nevada State Office) regarding the Rhyolite Ridge Lithium-Boron Project and inviting input on the Draft EIS.

Tribe	Date	Details
Bishop Paiute Tribe	04/26/2024	Email from Matt Fockler (BLM Socioeconomic and Environmental Justice Lead for BLM Nevada State Office) regarding the Rhyolite Ridge Lithium-Boron Project and inviting input on the Draft EIS.
Inter-Tribal Council of Nevada	04/26/2024	Email from Matt Fockler (BLM Socioeconomic and Environmental Justice Lead for BLM Nevada State Office) regarding the Rhyolite Ridge Lithium-Boron Project and inviting input on the Draft EIS.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	04/26/2024	Email from Matt Fockler (BLM Socioeconomic and Environmental Justice Lead for BLM Nevada State Office) regarding the Rhyolite Ridge Lithium-Boron Project and inviting input on the Draft EIS.
Ely Shoshone Tribe of Nevada	04/26/2024	Email from Matt Fockler (BLM Socioeconomic and Environmental Justice Lead for BLM Nevada State Office) regarding the Rhyolite Ridge Lithium-Boron Project and inviting input on the Draft EIS.
Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada	04/26/2024	Email from Matt Fockler (BLM Socioeconomic and Environmental Justice Lead for BLM Nevada State Office) regarding the Rhyolite Ridge Lithium-Boron Project and inviting input on the Draft EIS.
Te-Moak Tribe of Western Shoshone Indians of Nevada	04/26/2024	Email from Matt Fockler (BLM Socioeconomic and Environmental Justice Lead for BLM Nevada State Office) regarding the Rhyolite Ridge Lithium-Boron Project and inviting input on the Draft EIS.
South Fork Band	04/26/2024	Email from Matt Fockler (BLM Socioeconomic and Environmental Justice Lead for BLM Nevada State Office) regarding the Rhyolite Ridge Lithium-Boron Project and inviting input on the Draft EIS.
Timbisha Shoshone Tribe	04/26/2024	Email from Matt Fockler (BLM Socioeconomic and Environmental Justice Lead for BLM Nevada State Office) regarding the Rhyolite Ridge Lithium-Boron Project and inviting input on the Draft EIS.
Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation	04/26/2024	Email from Matt Fockler (BLM Socioeconomic and Environmental Justice Lead for BLM Nevada State Office) regarding the Rhyolite Ridge Lithium-Boron Project and inviting input on the Draft EIS.
Yomba Shoshone Tribe of the Yomba Reservation, Nevada	04/26/2024	Email from Matt Fockler (BLM Socioeconomic and Environmental Justice Lead for BLM Nevada State Office) regarding the Rhyolite Ridge Lithium-Boron Project and inviting input on the Draft EIS.
Big Pine Paiute Tribe of the Owens Valley	05/01/2024	Email from Andrew Monastero (BLM) to Tribes regarding receipt of the MOA and review.
Bishop Paiute Tribe	05/01/2024	Email from Andrew Monastero (BLM) to Tribes regarding receipt of the MOA and review.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	05/01/2024	Email from Andrew Monastero (BLM) to Tribes regarding receipt of the MOA and review.
Ely Shoshone Tribe of Nevada	05/01/2024	Email from Andrew Monastero (BLM) to Tribes regarding receipt of the MOA and review.
Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada	05/01/2024	Email from Andrew Monastero (BLM) to Tribes regarding receipt of the MOA and review.
Te-Moak Tribe of Western Shoshone Indians of Nevada	05/01/2024	Email from Andrew Monastero (BLM) to Tribes regarding receipt of the MOA and review.
Timbisha Shoshone Tribe	05/01/2024	Email from Andrew Monastero (BLM) to Tribes regarding receipt of the MOA and review.
Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation	05/01/2024	Email from Andrew Monastero (BLM) to Tribes regarding receipt of the MOA and review.
Yomba Shoshone Tribe of the Yomba Reservation, Nevada	05/06/2024	Certified letter sent from the BLM transmitting the draft MOA.
Fort Independence Paiute Tribe	05/28/2024	Certified letter sent from the BLM regarding the Rhyolite Ridge Lithium-Boron Project and invitation for tribal consultation.
Lone Pine Paiute Shoshone	05/28/2024	Certified letter sent from the BLM regarding the Rhyolite Ridge Lithium-Boron Project and invitation for tribal consultation.
Walker River Paiute	05/28/2024	Certified letter sent from the BLM regarding the Rhyolite Ridge Lithium-Boron Project and invitation for tribal consultation.
Bishop Paiute Tribe	06/03/2024	BLM mailed letter regarding declining request for extension of the public comment period. The letter also stated that tribal consultation under Section 106 of the NHPA continues throughout the NEPA

Tribe	Date	Details
		process and is not dependent on the public review and comment period. As such, these efforts can and will continue.
Timbisha Shoshone Tribe	06/03/2024	BLM mailed letter regarding declining request for extension of the public comment period. The letter also stated that tribal consultation under Section 106 of the NHPA continues throughout the NEPA process and is not dependent on the public review and comment period. As such, these efforts can and will continue.
Timbisha Shoshone Tribe	06/11/2024	Email from David Dick (BLM) coordinating a site visit to the Rhyolite Ridge Lithium-Boron Project on June 18, 2024 with Ms. Campbell.
Timbisha Shoshone Tribe	06/11/2024	Email from David Dick (BLM) coordinating a site visit to the Rhyolite Ridge Lithium-Boron Project on June 18, 2024 with Chairperson Cortez.
Timbisha Shoshone Tribe	06/12/2024	Email from Ms. Campbell to David Dick (BLM) asking to reschedule the June 18, 2024 site visit.
Timbisha Shoshone Tribe	06/13/2024	Email from David Dick (BLM) to Ms. Campbell and Chairperson Cortez regarding site visit specifics and site access for the June 18, 2024 site visit.
Big Pine Paiute Tribe of the Owens Valley	06/12/2024	HPTP and MDP sent certified mail for review
Bishop Paiute Tribe	06/12/2024	HPTP and MDP sent certified mail for review.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	06/12/2024	HPTP and MDP sent certified mail for review.
Ely Shoshone Tribe of Nevada	06/12/2024	HPTP and MDP sent certified mail for review.
Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada	06/12/2024	HPTP and MDP sent certified mail for review.
Te-Moak Tribe of Western Shoshone Indians of Nevada	06/12/2024	HPTP and MDP sent certified mail for review.
Timbisha Shoshone Tribe	06/12/2024	HPTP and MDP sent certified mail for review.
Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation	06/12/2024	HPTP and MDP sent certified mail for review.
Yomba Shoshone Tribe of the Yomba Reservation, Nevada	06/12/2024	HPTP and MDP sent certified mail for review.
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	06/18/2024	The BLM met with Warren Graham and Margaret Cortez at the Rhyolite Ridge Project to visit unevaluated sites discussed in the Draft EIS. The group visited Cave Spring and a rock shelter. A third site was not able to be visited due to time. Cave Spring and its acoustic qualities and geotechnical disturbance were discussed. Follow up actions for the BLM include continuing site visits as requested by the Tribes, addressing potential issues caused by sound on Cave Spring, and checking on issues from geotechnical testing.
Timbisha Shoshone Tribe	06/18/2024	The BLM met with Warren Graham and Margaret Cortez at the Rhyolite Ridge Project to visit unevaluated sites discussed in the Draft EIS. The group visited Cave Spring and a rock shelter. A third site was not able to be visited due to time. Cave Spring and its acoustic qualities and geotechnical disturbance were discussed. Follow up actions for the BLM include continuing site visits as requested by the Tribes, addressing potential issues caused by sound on Cave Spring, and checking on issues from geotechnical testing.
Bishop Paiute Tribe	06/24/2024	Email from Brian Adkins (Bishop Paiute Tribe) to BLM requesting to have government to government consultation.
Bishop Paiute Tribe	06/25/2024	Email from David Dick (BLM) responding to Brian Adkins (Bishop Paiute Tribe) email to coordinate a meeting to conduct consultation.
Bishop Paiute Tribe	07/10/2024	Draft of the MOA between the BLM-Tonopah Field Office, the Nevada SHPO, and Ioneer Rhyolite Ridge LLC, Regarding the

Tribe	Date	Details
		Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada submitted for review and comment via certified mail.
Ely Shoshone Tribe of Nevada	07/10/2024	Draft of the MOA between the BLM-Tonopah Field Office, the Nevada SHPO, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada submitted for review and comment via certified mail.
Fort Independence Paiute Tribe	07/10/2024	Draft of the MOA between the BLM-Tonopah Field Office, the Nevada SHPO, and Ioneer Rhyolite Ridge LLC, Regarding the Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada submitted for review and comment via certified mail.
Yomba Shoshone Tribe of the Yomba Reservation, Nevada	07/22/2024	Email from Andrew Monastero (BLM) to Tribes regarding receipt of the MOA and review.
Fort Independence Paiute Tribe	07/30/2024	Conference call between Sean Scruggs (Fort Independence Paiute Tribe) and BLM TFO where Fort Independence Paiute Tribe accepted invitation to consult on the Rhyolite Ridge Lithium-Boron Project.
Timbisha Shoshone Tribe	08/16/2024	Tribal representatives with the Timbisha Shoshone Tribe met with the BLM to visit Cave Spring (CrNV-64-078511) and a rock shelter across the canyon to discuss the site's association. One other rock shelter was also visited. The geotechnical testing location was visited to discuss concerns that the drilling impacted a cultural site. The location of the site was visited, and no damage was observed.
Timbisha Shoshone Tribe	8/19/2024	Tribal representatives with the Timbisha Shoshone Tribe and Duckwater Shoshone Tribe of Duckwater Reservation, Nevada met with the BLM and visited the rock shelters near Cave Springs. Tribal representatives indicated how the two rock shelters would have been used and requested that these sites be combined into one. Two other unevaluated rock shelters were visited.
Duckwater Shoshone Tribe of Duckwater Reservation, Nevada	8/19/2024	Tribal representatives with the Timbisha Shoshone Tribe and Duckwater Shoshone Tribe of Duckwater Reservation, Nevada met with the BLM and visited the rock shelters near Cave Springs. Tribal representatives indicated how the two rock shelters would have been used and requested that these sites be combined into one. Two other unevaluated rock shelters were visited.
Bishop Paiute Tribe	08/20/2024	Email from Andrew Monastero (BLM) to Tribes regarding receipt of the MOA and review.
Fort Independence Paiute Tribe	08/20/2024	Email from Andrew Monastero (BLM) to Tribes regarding receipt of the MOA and review.
Fort Independence Paiute Tribe	08/29/2024	Virtual call with tribal representatives of the Timbisha Shoshone Tribe, Fort Independence Paiute Tribe, and Duckwater Shoshone Tribe of Duckwater Reservation, Nevada, and BLM TFO representatives to discuss the Project. The acoustic properties of Cave Spring were discussed. The Fort Independence Paiute Tribe requested a future site visit to Cave Spring.
Timbisha Shoshone Tribe	08/29/2024	Virtual call with tribal representatives of the Timbisha Shoshone Tribe, Fort Independence Paiute Tribe, and Duckwater Shoshone Tribe of Duckwater Reservation, Nevada, and BLM TFO representatives to discuss the Project. The acoustic properties of Cave Spring were discussed. The Fort Independence Paiute Tribe requested a future site visit to Cave Spring.
Duckwater Shoshone Tribe of Duckwater Reservation, Nevada	08/29/2024	Virtual call with tribal representatives of the Timbisha Shoshone Tribe, Fort Independence Paiute Tribe, and Duckwater Shoshone Tribe of Duckwater Reservation, Nevada, and BLM TFO representatives to discuss the Project. The acoustic properties of Cave Spring were discussed. The Fort Independence Paiute Tribe requested a future site visit to Cave Spring.

5.3 Cooperating Agencies

This section lists agencies/counties that were invited to be cooperating agencies and note which ones accepted the role. In addition, agencies participating as cooperating agencies under existing Memorandums of Understanding are outlined below. A cooperative agency is any federal, state, or local government agency or Native American tribe that enters into formal agreement with the lead federal agency to help develop an environmental analysis. To prepare this EIS, BLM coordinated with the following entities: Department of Energy, USEPA, USFWS, NDOW, NDEP, NDF, Esmeralda County, and Nye County.

5.4 Public Involvement

Public participation in the EIS process occurs at four specific points: scoping period, review of the Draft EIS, availability of the Final EIS, and issuance of the ROD.

5.4.1 Scoping

The formal public scoping process began with a news release on December 19, 2022, and publication of a Notice of Intent in the Federal Register on December 20, 2022. The BLM invited the public to submit comments during the public scoping period from December 20, 2022 through January 19, 2023. The Notice of Intent and the news release notified the public of the BLM's intent to prepare an EIS, provided information about the Proposed Action, described the purpose of the public scoping process, identified methods to provide comments, and provided contact information for questions regarding the Project. The news release advertised two public scoping meetings that were to be held virtually on January 4 and 5, 2023. The BLM also advertised the public scoping meetings through the BLM's ePlanning website.

The BLM issued a press release on January 4, 2023, notifying the public that the public scoping period for the Project would be extended by two weeks through February 3, 2023. The BLM further extended the scoping period for an additional 30 days through March 6, 2023, in response to additional requests from a cooperating agency and a consulting Tribe. A press release was issued to notify the public of the additional extension.

The BLM hosted two virtual public scoping meetings, which were held on January 4 and 5, 2023. The public scoping meetings gave agencies, organizations, the public, and other interested parties an opportunity to learn and ask questions about the Project and to share issues and concerns with the BLM. The BLM gave a presentation regarding the NEPA process and then Ioneer provided an overview of the Project. After the presentation, the BLM and Ioneer answered written and oral questions to encourage open and informal dialog between the public and agency representatives. The BLM provided a Project overview on the ePlanning website describing the Project and the public scoping process and the detailed Plan. Instructions on how to provide comments were included on the ePlanning website in the presentation and were discussed during the meetings. Following the meetings, the BLM posted videos of the virtual public meetings on the ePlanning website. By the close of the scoping period, 95 comment documents had been received. The BLM reviewed the scoping comments and the Draft EIS was prepared.

5.4.2 Draft EIS Comment Period

A 45-day Draft EIS comment period was initiated by publication of a Notice of Availability of the Draft EIS in the Federal Register on April 19, 2024. Public meetings were held to inform the public of the Project, answer questions, and inform the public of how to comment. An in person meeting was held on May 6, 2024 in Dyer, Nevada and a second in person meeting was held on May 7, 2024 in Tonopah, Nevada. Both occurred from 5 to 7 PM. A virtual public meeting was held on May 9, 2024 at 1:00 PM. All public comments received on the Draft EIS were reviewed and considered in the drafting of the Final EIS. Comments with responses are provided in **Appendix A**.

5.4.3 Final EIS Availability Period/ROD

A 30-day Final EIS availability period will be initiated by publication of a Notice of Availability for the Final EIS in the Federal Register. At the end of the 30-day availability period a ROD will be prepared and issued. The Final EIS/ROD will cite the conclusions regarding the environmental effects and appropriate mitigation measures for the selected alternative.

Appendix A: Public Comments and Responses

The NOA for the Draft EIS was published in the Federal Register on April 19, 2024, at which time the 45-day comment period commenced and ended on June 3, 2024. The BLM held three public comment meetings: (1) May 6, 2024 at the Dyer Community Center, (2) May 7, 2024, at the Tonopah Town Hall in Tonopah, Nevada, and May 9, 2024 as a virtual meeting. A total of 15,622 comment letters from agencies, businesses, organizations, and interested parties were received on the DEIS via mail, email, or the Rhyolite Ridge ePlanning website. All comments on the DEIS that were received were read and given careful consideration. Each comment was included in a comprehensive database, analyzed for its content, and appropriate responses were prepared. In some cases, the comments provided information or suggested changes that were incorporated into this FEIS.

The table below presents all comments that were received on the DEIS. The table includes the comment letter number, commenter name, the specific comment, and the BLM's response to the comment. Comments were generally transcribed verbatim in order to retain the originality of the comments received. In responding to comments, every effort was made to address all questions, concerns, and other points presented by the commenter on the Project. The "Response" provided, in many cases, refers to information already contained in the DEIS, and provides an explanation or clarification using this information to respond to the comment. Where the comment has resulted in a change in the FEIS text, this is indicated in the response. The responses also note where statements are made that are not specific comments on the DEIS.

Comment Letter No.	Comment Number	Comment	Response
Sarah Alonso – April 17, 2024			
1	1.1	I am against the lithium mine that is proposing to destroy Tiehm's Buckwheat habitat. As a Nevada resident, we should be preserving this plant instead of developing an open pit mine.	Comment noted.
Undisclosed – April 17, 2024			
2	2.1	Why on earth do you need this lithium mine when electric car purchases are going down the drain?? Car lots are PACKED full of electric cars that people refuse to purchase. Let's keep this BLM land the way it is, just leave it alone. SO MANY wildlife and plant life will be negatively affected if this is approved. What a shame it would be. Do the right thing and say no to this lithium mine. Please.	Comment noted.
Undisclosed – April 17, 2024			
3	3.1	What a great proposal - lets get it happening	Comment noted.
Personal Information Requested to be Withheld – April 17, 2024			
4	4.1	My first choice is that this mining company should find a different location where there are no threatened or endangered species and less potential environmental and ecosystem damage; there are plenty of such locations in Nevada and neighboring states. Ecosystems are finely tuned interrelationships among plants, animals, invertebrates, microbiomes, and the geological landscape both above and below ground. Humans don't fully understand these complex relationships and have done untold ecological damage throughout history. This lithium mining plan will likely be just another in the litany of ecosystem destruction. Do we fully understand the role of the Tiehms Buckwheat plants in this place? Do we really care or want to know? Surely Nature placed them there for a reason! I applaud that the mining company wishes to minimize the damage to these plants, but I don't know if this is truly possible unless another area is chosen. I say leave them and their ecosystem alone! Find another location to mine for lithium, or move the mining area totally away from the acreage where the plants reside.	The Project proposes development of a locatable mineral resource. Relocation of the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the resource deposit is located. The North and South Overburden Storage Facility (OSF) Alternative was developed that relocates some proposed facilities outside of Tiehm's buckwheat critical habitat and further away from Tiehm's buckwheat plants and subpopulations to minimize disturbance in Tiehm's buckwheat critical habitat.
Jean Public – April 19, 2024			
5	5.1	the lithium boron mine was to use almost 8000 acres of nevada land for a boron mine. this is unacceptable. let this projeiteer buy land and mine it. private land. we dont want our national public landand nature destroyed like this for a local profiteer. this is an outlandish horrific anti environmental idea. itshoud lnot be permitted. blm is killing all nature. we must stop this viciousness at this killing nature agencyi am totally opposed tothis project i want to b ekept advised of the sneaky ways this vicious agency keeps these horrible anti nature projects alive. destroing all this land, what a horuror this is b kerbk1492)@aol.com	The Project proposes development of a locatable mineral resource. Relocation of the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the resource deposit is located. The North and South OSF Alternative was developed that relocates some proposed facilities outside of Tiehm's buckwheat critical habitat and further away from Tiehm's buckwheat plants and subpopulations to minimize disturbance in Tiehm's buckwheat critical habitat.
Karla Werning – April 22, 2024			
6	6.1	Lithium is hugely important, but not more so than protecting diverse life in Nevada. It is already difficult to survive in this harsh environment. The Tiehms buckwheat range is very small; it should ALL be off limits, completely protected.	The Proposed Action is consistent with the 1872 Mining Law, as amended, which confers a statutory right to enter upon public lands that are open to mineral entry to explore for and develop mineral deposits. The Project would implement applicant-committed environmental protection measures (ACEPMs) described in Section 2.1.13 of the Final EIS to reduce impacts to Tiehm's buckwheat, as well as Tiehm's buckwheat protection plans for the Proposed Action and North and South OSF Alternative. The Tiehm's buckwheat protection plans have been attached to the Threatened and Endangered Species Supplemental Environmental Report (SER).
Undisclosed – April 22, 2024			
7	7.1	This project should definitely proceed without further delay. The plan is reasonable and the tradeoffs are definitely acceptable.	Comment noted.
Personal Information Requested to be Withheld – April 24, 2024			
8	8.1	I support Ioneer's Rhyolite Ridge project because it will provide good paying jobs for rural Nevada and ensure the U.S. will not depend on a foreign source of lithium to make electric batteries. A robust environmental regulatory U.S. process will also ensure that the global environment will not be diminished.	Comment noted.
Eric Johnson – April 24, 2024			
9	9.1	Amphibian populations are declining worldwide, and amphibians are experiencing high extinction rates due to habitat loss, climate change, chytrid fungus, pollutants, pesticides, and invasive species. Amphibians are the most threatened class of vertebrates. Long-term amphibian monitoring should be conducted to ensure that the Rhyolite Ridge Lithium Boron Mine Project does not affect amphibians, such as the California toad and western toad. Long-term stormwater and groundwater quality monitoring should also be conducted.	Sections 3.18.1.5 and 3.18.2.5 of the EIS describe existing conditions of amphibians. Sections 4.18.1 and 4.20.18 describes impacts from the Proposed Action and alternatives to amphibians. Additional details are provided in the Wildlife Resources SER. Long-term amphibian monitoring is not included as part of the Proposed Action. Impacts to amphibians are anticipated to occur from Project dewatering operations. The Proposed Action does include

Comment Letter No.	Comment Number	Comment	Response
		Amphibian Refuge supports the Rhyloite Ridge Lithium-Boron Mine Project. Lithium and boron are essential metals needed for sustainable energy technologies, such as lithium use in batteries and boron use in electric motors. The United States cannot be limited to just foreign sources for such metals. Reduction of greenhouse gas emissions through the use of sustainable energy technologies will benefit amphibians by reducing climate change impacts. Thank you for this opportunity to comment. References: Catenazzi, A. 2015. State of the World's Amphibians. Annual Review of Environment and Resources, 40: 91-119. Collins, J.P., and M.L. Crump. 2009. Extinction in Our Times: Global Amphibian Decline. New York, NY: Oxford University Press.Kolbert, E. 2014. The Sixth Extinction, an Unnatural History. New York, NY: Bloomsbury. Luedtke et al. 2023. Ongoing Declines for the World's Amphibians in the Face of Emerging Threats. Nature, Volume 622, 12 October 2023, 308-314. McCallum, M.L. 2007. Amphibian Decline or Extinction? Current Declines Dwarf Background Extinction Rate. Journal of Herpetology, Volume 41, Number 3, pp. 483-491.	mitigation and monitoring for water resources and wildlife resources related to groundwater use and drawdown in Section 4.21 of the EIS.
Jonathan Price – April 24, 2024			
10	10.1	I support mining of lithium and boron at the Rhyolite Ridge project. Ioneer Ltd. has invested in preservation of the Tiehm's buckwheat and has committed to continued funding for its preservation. If Ioneer were not allowed to go forward with mining, there would be little or no protection for the plant. One wildland fire could easily eliminate the buckwheat in the Rhyolite Ridge area. That is, Ioneer's plan for mining will protect the buckwheat.	Comment noted.
Paul Rudik – April 24, 2024			
11	11.1	I / We. Paul Rudik and family and investors, are excited about what is happening at INR in the GOOD Old USA???? (our cousins) please move forward with this important project for the future and the people of US ???? Buckwheat is in the best hands it has ever been in. Cheers Paul Rudik and Family of Investors from Australia ????	Comment noted.
Angela Villavicencio – April 25, 2024			
12	12.1	Hello, I have attached some comments for the Rhyolite Ridge Lithium-Boron Mine Project. Please let me know if you have any questions or require any additional information. Thank you, Angela Villavicencio	Comment noted.
	12.2	Dear committee members, I am writing to you as a concerned stakeholder regarding the Rhyolite Ridge Lithium-Boron Mine Project in Esmeralda County, Nevada. I'm currently a student at Arizona State University and was asked to find a project that interested us. As someone who values the conservation of our environment and the sustainable use of natural resources, I believe it is crucial to carefully consider the potential impacts of this project on both the local ecosystem and the broader environment. I recognize the importance of lithium and boron as key components in various industries, however, it is essential to ensure that their extraction does not come at the expense of our environment's health and integrity. There were a few concerns that came to mind when reading the draft EIS. In section 3.18.1.1 regarding aquatic species, I think it's imperative that further analysis of the area is conducted. The section states that there is a possibility that these aquatic species occur here because there's potential habitat. I really urge project managers to do a thorough research into this before proceeding	Occurrences of aquatic species and potential habitat in the analysis area and vicinity are discussed in Sections 3.18.1.1 and 3.18.1.2. Additional details are provided in the Wildlife Resources SER. Whether aquatic species occur or not, ACEPMs would be implemented as discussed in Section 2.1.13 of the Final EIS that would limit impacts to potential habitat. Mitigation is discussed in Section 4.21 of the Final EIS and includes monitoring of surface water resources and mitigation of impacts.
	12.3	I also believe that there should be more concern for the avian species of this area, especially the 36 that are protected under the Migratory Bird Treaty Act. If there is a potential that water usage will affect these migratory birds then this project needs to reconsider how to mitigate this problem. This also brings up concern for the 22 non-special status mammal species and 15 reptile species. In conclusion, I urge the project managers to monitor and address environmental impacts throughout the project's lifecycle continually. I encourage the project managers to explore opportunities for implementing innovative technologies that can minimize the project's ecological footprint and enhance its overall sustainability. Thank you for taking the time to read my comments and considering my input on this important matter. I look forward to seeing the results of the development of the Rhyolite Ridge project. I would Sincerely, Angela Villavicencio	Impacts to wildlife are discussed in Sections 4.18 and 4.20.18 of the Final EIS and would be negligible to moderate depending on impacts to water resources. Mitigation is discussed in Section 4.21 of the Final EIS and includes monitoring of surface water and groundwater resources and mitigation of impacts. A Bird and Bat Conservation Strategy and an Eagle Conservation Plan (ECP) have been prepared for the Project to reduce impacts to golden eagles, migratory birds, bats, and other avian species that may potentially be impacted by the Project. Additional detail on impacts to wildlife can be found in the Wildlife Resources SER.
David Hagh – April 25, 2024			
13	13.1	Hello Mr. Distel, I am a senior student at ASU Polytechnic. As part of my Ecosystem Management and Planning Class, the teacher is making us participate in the NEPA process by commenting on an EIS. I have chosen your Rhyolite Ridge Lithium-Boron Mine Project to comment on, and have attached my stakeholder letter to this email. Looking forward to your thoughts on it. Regards, David Hagh	Comment noted.
13	13.2	**Rhyolite Ridge Lithium-Boron Mine Project - Stakeholder Comment** 4/25/24	The EIS has been prepared consistent with the National Environmental Policy Act (NEPA) and analyzes and discloses the environmental impacts of the Project. The EIS discusses impacts to Native American traditional values in

Comment Letter No.	Comment Number	Comment	Response
		Dear Scott Distel, I am writing to you to state my opinion on the recent proposal by your agency to build a lithium-boron mine in Rhyolite Ridge. Judging from what I've read in your EIS, the mine will be a great help to the economy of the surrounding area and for Nevadans for sure, however there are numerous other problems that could arise from this endeavor. This includes things like environmental damage and hidden costs to the populace. While it is true that the construction of the Lithium-Boron mine has the potential to both create jobs and generate plenty of profit that would greatly help an area of Nevada in the long run, this would also lead to the destruction of a pristine environment where numerous species of Nevada wildlife live. The process of digging the mine would create a massive leveled area miles across, leaving the land uninhabitable for the animals that reside in that area such as ocelots and eared quetzals. This habitat destruction could also damage sacred Native American sites nearby, which would lead to a major issue with Native relations in Nevada in the future. Furthermore, it's highly possible that the construction of this mine is not even legal under NEPA. There are multiple stakeholders in this project besides myself, such as conservationists, native residents, rock climbers, nature enthusiasts, and small businesses. NEPA requires that any project must take into consideration the environmental impact of any major construction on both the local fauna and the human residents. If any danger is discovered to either, the mine In short, I believe that although the construction of the lithium-boron mine in Rhyolite Ridge may bring great economical profits to an area in Nevada suffering from depression, I believe that the environmental damage it would cause, the sacredness of the site to Native Americans, and the possible costs to the local residents convinces me to lobby against the project. Unless my fears about the mine construction are assuaged, I believe this lithium-boron mine project should be stopped, or at the very least rethought very heavily. construction may have to be delayed indefinitely. In short, I believe that although the construction of the lithium-boron mine in Rhyolite Ridge may bring great economical profits to an area in Nevada suffering from depression, I believe that the environmental damage it would cause, the sacredness of the site to Native Americans, and the possible costs to the local residents convinces me to lobby against the project. Unless my fears about the mine construction are assuaged, I believe this lithium-boron mine project should be stopped, or at the very least rethought very heavily. Regards, David Hagh	Sections 4.8 and 4.20.8, impacts to local populations in Sections 4.10 and 4.20.10, and impacts to wildlife in Sections 4.18 and 4.20.18. Consultation with Native American tribes has been conducted as described in Section 5.2 of the EIS and is ongoing.
Sarah Raney – April 25, 2024			
14	14.1	Good evening! I am writing with regard to the Rhyolite Ridge Lithium-Boron Mine Project. As a stakeholder, and as a student studying biology and ecosystem management, I am deeply invested in potential impacts to ecosystems and their wildlife populations, as well as potential environmental injustices. Due to this, I am concerned about the risk the mine could pose to endangered species in the area. Although the EIS states that the project was designed to avoid impacts to Tiehm's buckwheat in the area, it then says that the plant's environment could be affected in critical ways; I am concerned that these impacts would pose a significant threat to this endangered species, particularly when it comes to this area as the plant is native to Nevada.	An alternative to the Proposed Action, the North and South OSF Alternative, was developed that relocates proposed facilities to minimize disturbance in Tiehm's buckwheat critical habitat to the extent possible. Impacts to Tiehm's buckwheat are discussed in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER.
14	14.2	I am also concerned about the potential that this project would add to a long history of environmental injustice and environmental racism, as the counties examined were all low-income and several had Native populations residing in them. Thank you for your time and consideration!	Environmental Justice communities, including minority, low-income, and American Indian or Alaska Native are described in Section 3.3 and impacts are described in Sections 4.3 and 4.20.3. Section 5.2 of the EIS describes the government-to-government consultation details and timeline that has occurred with consulting Tribes.
Dylan Rodvik – April 29, 2024			
15	15.1	Hello, Please see the attached document for my comment on the Rhyolite Ridge Lithium-Boron Project DEIS. Thank you. [Attachment: Rodvik_Public Comment_Rhyolite Ridge.pdf]	Comment noted.
58	58.1	Please see the provided PDF	Comment noted.
15 and 58	15.2 and 58.2	Dear Scott Distel and Randy Martin, I am writing to express my concerns and provide input regarding the Draft EIS (DEIS) for the proposed Rhyolite Ridge Lithium-Boron Mine, and its potential impact on the natural systems of Nevada, particularly with regards to Tiehm's buckwheat and Monarch butterflies. As considerations are made for the Final EIS (FEIS) of this project, I wanted to point out the potentially unrecognized symbiotic associations of these two species on an endemic scale, and the importance of considering the risk of a snowball decline for both species in the FEIS. As noted in the DEIS, Tiehm's buckwheat (Eriogonum tiehmii) is an Endangered Speciest Act (ESA) listed endemic plant species found only in the Rhyolite Ridge area of Nevada. The DEIS notes that Tiehm's buckwheat plays a vital role in its ecosystem, providing food and habitat for a diverse range of pollinators, including bees and butterflies. The DEIS also notes that "Pollinator diversity was found to be greater in Tiehm's buckwheat sites than surrounding areas" and that "pollinator community in the Tiehm's buckwheat population are composed of species that are more rare" (3.12.3). Among these pollinators are Monarch butterflies (Danaus plexippus), which are an ESA candidate species addressed in the DEIS, and are known to have strong associations with other native species of buckwheat (SOURCE). Given that "Tiehm's buckwheat is the dominant insect pollinated plant species in its habitat where it occurs" (3.12.3), I believe that the potential for higher than expected declines in both species may result from this project if the interdependence of these species is not fully understood and mitigated for. Alternative B of the DEIS is claimed to be the least impactful to these species, however it poses to remove 20% of Tiehm's buckwheat habitat, and has been identified as a disturbance to Monarch butterfly migrations between Nevada and California. While the DEIS does provide a comprehensive overview of the impacts to Monarch butterflies as a result of Milkweed loss, it fails to address	Impacts to Tiehm's buckwheat and monarch butterfly, including impacts to pollinators and host plants, are discussed in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER. Monarch butterfly was not observed during pollinator studies, nor during baseline field surveys. Although the monarch butterfly may be a potential pollinator of Tiehm's buckwheat, the current available scientific data does not show monarch butterfly is uniquely associated with Tiehm's buckwheat as opposed to any other butterfly species.

Comment Letter No.	Comment Number	Comment	Response
		how the loss of Tiehms buckwheat will impact these migrations as well as local Monarch butterfly populations. The disruption of these two species could have cascading effects on other plant and animal species in the area. I urge the BLM, USWFS, and Ioneer Mining to investigate and consider the potential impacts of the Rhyolite Ridge Lithium-Boron Mine on associations between Tiehm's buckwheat and Monarch butterflies while creating the FEIS. It is essential to prioritize the preservation of these species and their habitats for the well-being of future generations and the integrity of our ecosystem. Thank you for taking the time to address these concerns and for your commitment to environmental stewardship. Sincerely, Dylan Rodvik [Attachment 77368 Federal Register/Vol. 87, No. 241/Friday, December 16, 2022/Rules and Regulations]	
Personal Information Requested to be Withheld – May 6, 2024			
16	16.1	I am impressed with the steps Ioneer is taking to mitigate environmental concerns while developing our important resource – lithium and boron. Metals necessary to meet climate goals. For a climate and electric goals to be taken seriously we need USA and local sources of these metals to be developed.	Comment noted.
Theresa and Karl Moller – May 6, 2024			
17	17.1	We want to thank Ioneer for involving the community in this process. I hope that you are going to route the traffic through Cage Springs and not bother the Hot Box area.	Section 4.9 of the EIS describes access to the Hot Box area. Cave Springs Road through the Operational Project Area (OPA) would remain open to the public, and use of the access road from the Proposed Action would not close visitor access and associated recreation at the Fish Lake Valley Springs (Hot Box).
Bill Kirby – May 6, 2024			
18	18.1	Please reconsider an alternate route to the mine site that reduces traffic on Hwy 264, which is used heavily by agricultural and school traffic. A secondary route from Hot Ditch Road to Hwy 773, then on to Hwy 6, would accomplish this and save the mining company a lot of fuel.	This alternate route was considered but eliminated from detailed analysis. A description of the alternative and rationale for eliminating the alternative is provided in the EIS in Appendix C.
Harold Campbell – May 5, 2024			
19	19.1	Re: The DEIS for loneer's Rhyolite Ridge Project I am writing in support of permitting loneer's Rhyolite Ridge Lithium-Boron Project in Esmeralda County, NV. I have lived in Reno since 1998 and strongly believe that Nevada's mineral resources should be developed to benefit both the state and the country. I recently became aware of the Rhyolite Ridge project through a report on Channel 2 News in Reno and felt it was important to express my support for the project. According to their website, loneer will be operating in an environmentally responsible way with little to no lasting impact on the land. In fact, loneer will be leaving much of the lithium-boron ore untouched in order to protect the endangered Tiehm's buckwheat plant. Because of the unique nature of the ore, lithium and boron will be recovered in large vats without the need for leach pads, tailings dams or tailings ponds resulting in no possibility of any ground water contamination. Sulfuric acid, necessary to process the ore, will be produced on site. A by-product of this process is heat, which will be converted to electricity providing more than enough power to operate the entire facility for the life of the mine. Not only will the Rhyolite Ridge mine be energy independent, but the surplus electricity can also potentially be sold to the local power grid. Development of Rhyolite Ridge, and other Nevada mining operations, will help to make the US less dependent on unreliable and/or hostile foreign countries and provide a reliable supply chain for materials needed to boost domestic production of batteries for a cleaner, more energy efficient future. The economic impact on Nevada and Esmeralda County from sales taxes, property taxes and Net Proceeds of Mines revenue will range from approximately $600,000 in the first year of construction to between $5.2 to $11 .6 million during the estimated 26 years of lithium-boron production. The operation will create 500 jobs during the construction phase and 350 jobs over the more than 26-year life of the mine. The median annual income, plus benefits, for loneer employees will be about $141,00 In summary, this project is a rare win-win opportunity to capitalize on Nevada's mineral wealth that will benefit the county, state and our nation with little to no lasting impact on the environment. Thank you for your time reviewing my comments. Kind Regards, Harold Campbell	Comment noted.

Comment Letter No.	Comment Number	Comment	Response
Louis and Joyce Rossi – May 9, 2024			
20	20.1	Dear Mr. Distel, We are writing in support of permitting loneer's Rhyolite Ridge Lithium-Boron Project in Esmeralda Co. NV. We are long-time Nevada residents, having lived in Reno since the ear1y 1960s. We recently became aware of the Rhyolite Ridge Lithium-Boron project through a three-part report on Channel 2 News in Reno. Since then, we have downloaded and read through loneer's Draft Environmental Impact Report. We support development of the mine for the following reasons: • We are impressed by loneer's commitment to mine in an environmentally responsible way with little impact on the land, ground water and the endangered Tiehm's buckwheat plant. • The unique characteristics of the Rhyolite Ridge deposit will allow for extraction of lithium using much less water when compared with other lithium deposits and most other metal mines. • Recovery of lithium from the mineralized rock will be by the vat leach process meaning there will be no leach pads, tailings ponds or tailings dams and therefore no chance of ground water contamination. • A weak sulfuric acid solution, needed to dissolve lithium from the ore, will be produced on site. The heat produced as a by-product of sulfuric acid production will supply more than enough energy to power the entire operation for the life of the mine, making it completely independent of Nevada's power grid. • Currently, the US depends on importing lithium, mainly from Argentina, Chile, China and Russia making our country dependent on imports from unreliable nations and creating a supply chain which can be interrupted at any time. Production of the lithium-boron minerals from the Rhyolite Ridge deposit will provide a reliable supply chain for materials needed to boost domestic production of batteries for a cleaner, more energy efficient future. • The European Union, Canada, Australia and China have all listed lithium as critical to their own nation's development of future energy needs resulting in a reduction of their exports of lithium and an increase in worldwide competition for importing this critical mineral. • Once the project is in production, it will increase domestic lithium production by 400% and provide enough lithium to power 370,000 vehicles per year for over 20 years. • The financial impact on Nevada and Esmeralda County will be enormous. The project will employ up to 500 people during the construction phase, with 350 people employed over the life of production. The median annual income of loneer's employees, including a generous benefits package, will be approximately $141,000. • Financial benefits to Esmeralda County from sales taxes, property taxes and Net Proceeds of Mines revenue will range from approximately $600,000 in the first year of construction to between $5.2 to $11.6 million during the estimated 26 years of lithium-boron production. In summary, this project is a rare win-win opportunity to capitalize on Nevada's mineral wealth that will benefit the county, state and our nation with little to no lasting impact on the environment. Thank you for your time reviewing our comments. Sincerely, Louis and Joyce Rossi	The Project's economic effects are discussed in Sections 4.10 and 4.20.10 of the EIS and in the Social and Economic Values SER.
Ken Ellzey – April 28, 2024			
21	21.1	As a Nevada resident, I support Ioneer's Rhyolite Ridge Project. I believe the project will bring economic growth and foster the energy transition, while protecting Nevada's environment.	The Project's economic effects are discussed in Sections 4.10 and 4.20.10 of the EIS and in the Social and Economic Values SER.
Economic Development Authority – April 29, 2024			
22	22.1	Please add our letter of public comment to the review of the Draft EIS for the Ioneer project. Best Regards Paul Miller Executive Director Southwest Central Regional Economic Development Authority (SWCREDA)	Comment noted.
22	22.2	May 1, 2024 Ioneer Public Comment for Draft EIS and Community Engagement The Southwest Central Regional Development Authority (SWCREDA) is pleased to offer this letter of support for Public Comment for the Draft EIS and Community Engagement of Ioneer's Rhyolite Ridge Lithium/Boron Development in Esmeralda County. The Ioneer developers are long-time members of the Dyer, Silver Peak, Goldfield, and Tonopah communities, Ioneer and their local team have proven to be faithful environmental stewards and respected community members. They have cultivated and earned a strong, positive reputation as a mine development that can be trusted with both the county and business leaders within the community.	Comment noted.

Comment Letter No.	Comment Number	Comment	Response
		I have reviewed the Operational Environmental Protection Measures disclosed in the Mine Plan of Operations, which is also part of the Draft EIS. Ioneer's commitment to Tiehm's Buckwheat flower, Air Quality, Cultural Resources, Water Resources, Materials and Waste Management and so many other very important local resources including wildlife and avian species are all covered and addressed to provide the best practices to protect and provide the safety measures above and beyond the requirements. Rhyolite Ridge will provide important economic benefits for the local region, the state of Nevada, and the United States. The Rhyolite Ridge Project will create family-supporting jobs in rural Nevada, employing approximately 350 people while the mine operates, and 500 people during the construction phase. The expected $54 million of labor income during construction and $38 million of annual labor income during operations will be transformational. Once in operation, Rhyolite Ridge is expected to generate between $13 million and $31 million in annual fiscal tax revenue for state and local governments. The impact will immediately make a positive economic impact for all of Esmeralda and Northern Nye County and is in complete alignment with the goals of our office, this project directly supports significant and long-lasting positive economic development and community investments for our region, including the following: • Creation of new, skilled jobs for the region's workforce and support regional economic development opportunities. • Advancement of diversity, equity, inclusion, and access within the project and future workforce, amongst suppliers/vendors, and within the region. • Facilitation and support of community-driven betterment projects. Investing In the Community Ioneer has remained committed to engaging the local community since the commencement of planning for the Rhyolite Ridge Project began six years ago in Fish Lake Valley, Ioneer has sought, at every opportunity, to address any environmental and socio-economic challenges. On behalf of SWCREDA, I would like to express our strong and full support for this project. I am very excited about the opportunity to expand our local economic development opportunities and support the advancement of creating a vibrant economy. Sincerely, Paul Miller Executive Director, SWCREDA Southwest Central Regional Economic Development Authority Serving Nye and Esmeralda Counties Office - 775-727-0716 Cell – 775-482-4533 swcreda@gmail.com	
Genevieve Kennerly, Andrea Kennerly – April 29, 2024			
23	23.1	I strongly oppose this project being carried out. It will greatly damage the natural environment, specially impacting the plant Eriogonum tiehmii. E. tiehmii is recognized as endangered and the execution of this project would likely lead to its permanent extinction. The theoretical rewards of this project going forward are minimal and it is not in the interests of American citizens to allow entire species to be eradicated. I personally am horrified that the BLM would consider allowing a company to drive any plant or animal to extinction, when our natural world is one of the greatest American treasures. It would be an eternal shame to allow Ioneer to execute the proposed Rhyolite Ridge project and I hope that BLM can recognize that. Again, I strongly oppose the Ioneer Rhyolite Ridge project. [Attachment: 2022-27225.pdf]	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the Endangered Species Act (ESA), the BLM has initiated formal consultation with the U.S. Fish and Wildlife Service (USFWS) through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
Parker Lloyd – April 29, 2024			
24	24.1	Society depends on balance of social, economic, and environmental demands. Each depends on the other, and ultimately this is a matter of the balance being destroy in favor economic gain. Lithium can be mined elsewhere, but Tiehm's buckwheat can only grow in one spot in the entire world. Thousands of people agree that is a higher priority.	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. The Project proposes development of a locatable mineral resource. Relocation of the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the resource deposit is located. The North and South OSF Alternative was developed that relocates some proposed facilities outside of Tiehm's buckwheat critical habitat and further away from Tiehm's buckwheat plants and subpopulations to minimize disturbance in Tiehm's buckwheat critical habitat.
Jack Desai – May 1, 2024			
25	25.1	The Rhyolite Ridge Lithium-Boron Project will help Ioneer to produce critical energy materials. It would be a great asset for the local economy and surrounding areas. It woultrantud bring in more people and workers to the area which in turn will bring in more revenue for the surrounding communities. Your full cooperation in advancing this project will be highly appreciated by the entire Hawthorne community.	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.

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Joe Barnes – May 1, 2024						
26	26.1	Section	Page Number	Section	Please see the comment matrix files I am attaching for the DEIS and Wildlife SER. My comments represent input from the U.S. Fish and Wildlife Service's Migratory Bird Program, and relate primarily to potential golden eagle impacts. [Attachments: 20240501_rr_EIS_comment_form_FWS_jb.docx; 20240501_rr_WildlifeSER_comment_form_FWS_jb.docx]	Comment noted.
	26.2	3.1.3.2	3-13	Avian Species; Golden Eagle paragraph 1	FWS recommends adding loss of territory as a potential impact from disturbance. I recommend adding language to the third sentence in this paragraph: "Breeding pairs of golden eagles with territories (nests) within these buffers may be subject to disturbance resulting in a loss of annual productivity or territory loss."	Revision made to Section 3.2.2.2 in the Wildlife Resources SER and in Section 4.18.1.2 in the Final EIS.
	26.3	3.1.3.2	3-13	Avian Species; Golden Eagle; paragraphs 2-4	It is possible that site-specific conditions (e.g., topographic shielding) may contribute to FWS agreeing to modify the appropriate disturbance buffers for eagles. However, considerations to that extent have not been shown to apply for golden eagle territories 9 and 10. In addition to line-of-sight considerations, the type of disturbance, presence of suitable foraging habitat, likely home range information, loss of suitable habitat, and other factors are considered.	This statement is a direct reference from Section 4.2 Activity Buffer of the Golden Eagle Protection Best Practices, Nevada Mineral Exploration and Mining Industry (August 2018) document. Therefore, no edit made.
	26.4	3.1.3.2	3-14	Fig. 3-2	Please explain why nest occupancy (in-use) information is presented from 2021 in this figure dated 2024-02-21. I recommend all golden eagle nests be shown without inferring in-use status since that condition changes annually. As the FWS has indicated during previous reviews, survey efforts prior to 2024 have not been conducted in a way that would provide accurate information relating to nest use status or territory occupancy.	Figure revised to show previously identified golden eagle nests by quarter section per Ioneer's Draft Eagle Conservation Plan (Ioneer 2023b). Nest use from 2021 has been removed.
	26.5	3.1.3.2	3-15	Avian Species; Golden Eagle; first paragraph of the page	Please update the notation of potential impacts from blasting. In addition to disruption of nesting success and productivity, and foraging, disturbance may also result in loss of breeding territories.	Revision made to Section 3.2.2.2 of the Wildlife Resources SER and Section 4.18.1.2 of the Final EIS.
	26.6	3.1.3.2	3-15	Avian Species; Golden Eagle; second paragraph of the page	While an ECP is under development, there is no finished version that meets FWS's expectations at this time, so it is not possible to determine how adherence to an ECP will reduce impacts to golden eagles.	The first sentence has been revised to remove the first statement of reducing impacts to golden eagles. Ioneer has voluntarily prepared the ECP and the ACEPMs as committed to by Ioneer in the ECP were included in the impacts analysis (Ioneer 2023). The September 2023 version was made available during drafting of the EIS. The EIS discloses that Ioneer is working to refine the ECP with the USFWS.
	26.7	3.1.3.2	3-15	Avian Species; Golden Eagle; third paragraph of the page	While the amount of total surface disturbance from the project (Operational Project Area = 6,369 acres) may be small in relation to the entire 10-mile survey area surrounding the project, it is not an insignificant amount of disturbance as it relates to adjacent golden eagle territories. Territory-holding adult golden eagles in Nevada are year-round residents with very high site fidelity and strong territory defense behaviors, so it is generally not possible in a relatively dense project-area population for individuals to simply forage elsewhere. In addition to other forms of direct disturbance, localized reduction of home range size, foraging habitat, prey base, etc. all contribute to potential impacts to individual golden eagle territories which can impact reproduction or cause territory loss.	Surface disturbance associated with the Proposed Action and alternatives would occur within the OPA as described in Section 2.1 and 2.2 of the EIS. Sentence revised to "Any reduction in prey base could impact golden eagles, including reproduction and territory use" in Section 4.18.1.2 of the EIS.
	26.8	4.18.1.2	4-40	Golden Eagle: first paragraph	While I understand an Eagle Conservation Plan is in development, please fully consider the range of disturbance impacts to golden eagles for this project. For golden eagle territories 9 and 10, topographic position (and relative shielding from project development) is a consideration when FWS considers potential disturbance impacts but disturbance in the form of habitat loss, reduced home range size, loss of foraging areas, and reduced prey base can all impact golden eagles and result in breeding and territory loss. There is no evidence that topographic shielding on the order seen for this project will substantially reduce direct disturbance, or disturbance in the form of habitat loss that may result in breeding impacts or territory loss. FWS regulations managing the Bald and Golden Eagle Protection Act (BGEPA) are based on a Preservation Standard "consistent with the goals of maintaining stable or increasing breeding populations in all eagle management units, and the persistence of local populations throughout the geographic range of each species (USFWS 2016)." Loss of golden eagle breeding territories and reduced breeding success are both forms of take under the BGEPA.	Impacts to golden eagles from habitat loss, reduction of home range, loss of foraging areas, and reduced prey base are described in Section 4.18.1.2. Additionally, this section has been updated per the previous comment.
	26.9	4.18.1.2	4-40	Golden Eagle: third paragraph	While an ECP is under development, there is no finished version that meets FWS's expectations at this time, so it is not possible to determine how adherence to an ECP will reduce impacts to golden eagles.	The first sentence has been revised to remove the first statement of reducing impacts to golden eagles. Ioneer has voluntarily prepared the ECP and the ACEPMs as committed to by Ioneer in the ECP were included in the impacts analysis (Ioneer 2023). The September 2023 version was made available during drafting of the EIS. The EIS discloses the Ioneer is working to refine the ECP with the USFWS.

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	26.10	4.18.1.2	4-41	Wildlife Resources: Golden Eagle: fourth paragraph	While the amount of total surface disturbance from the project (Operational Project Area = 6,369 acres) may be small in relation to the entire 10-mile survey area surrounding the project, it is not an insignificant amount of disturbance as it relates to adjacent golden eagle territories. Territory-holding adult golden eagles in Nevada are year-round residents with very high site fidelity and strong territory defense behaviors, so it is generally not possible in a relatively dense project-area population for individuals to simply forage elsewhere. In addition to other forms of direct disturbance, localized reduction of home range size, foraging habitat, prey base, etc. all contribute to potential impacts to individual golden eagle territories which can impact reproduction or cause territory loss. As defined in this DEIS, a "moderate, long-term to permanent, and localized" impact to golden eagles indicates a likelihood of measurable impacts to the golden eagle population which is contrary to FWS's management preservation standard with regards to maintaining a stable or increasing population under the BGEPA. Please clarify that the area of surface disturbance includes the full Operational Project Area (6,369 acres).	Surface disturbance associated with the Proposed Action and alternatives would occur within the OPA as described in Sections 2.1 and 2.2 of the EIS. The EIS disclosed impacts from proposed surface disturbance, which is 2,306 acres for the Proposed Action and 2,271 acres for the North and South OSF Alternative. Ioneer is not proposing surface disturbance of the entire Plan of Operations (Plan) boundary.
	26.11	4.20.18.2	4-74	Cumulative Effects Analysis: Golden Eagles – Proposed Action paragraph	Please clarify why the increase in disturbance in the CESA is expected to be 2,306 acres as opposed to the Operational Project Area (OPA) of 6,369 acres. Given the exploration and other activities that are planned to occur within the OPA I recommend this be used to calculate the increase in habitat disturbance here, and throughout the document as necessary. When considering the duration of impacts to golden eagles, disturbance would be expected throughout the life of the project. Please recharacterize disturbance as long-term instead of "short-term" as noted in the effects duration.	Surface disturbance associated with the Proposed Action and alternatives would occur within the OPA as described in Sections 2.1 and 2.2 of the EIS. The EIS disclosed impacts from proposed surface disturbance, which is 2,306 acres for the Proposed Action and 2,271 acres for the North and South OSF Alternative. Exploration acres have been included in these totals. Ioneer is not proposing surface disturbance of the entire Plan boundary. The duration of cumulative effects to golden eagles was reviewed and revised to long-term.
	26.12	4.20.18.2	4-74	Cumulative Effects Analysis: Golden Eagles – Proposed Action paragraph	Please clarify how the OPA might change in the North and South OSF Alternative compared to the Proposed Alternative. In terms of disturbance to golden eagles, I believe the more appropriate area to be considered is the OPA and not the 2,271 acres of new surface disturbance as it is characterized in the DEIS for this alternative. As noted for the Proposed Action, please revise impacts from this alternative to be "moderate, long-term, and localized."	Surface disturbance associated with the Proposed Action and alternatives would occur within the OPA as described in Sections 2.1 and 2.2 of the EIS. The EIS disclosed impacts from proposed surface disturbance, which is 2,306 acres for the Proposed Action and 2,271 acres for the North and South OSF Alternative. Exploration acres have been included in these totals. Ioneer is not proposing surface disturbance of the entire Plan boundary and the Plan boundary is the same under the Proposed Action and North and South OSF Alternative. The intensity of cumulative effects to golden eagles was reviewed and revised to moderate.
Undisclosed – May 2, 2024						
27	27.1	I am concerned that this proposed mine may harm sage grouse and their habitats. Sage grouse are declining and need greater protection. Please avoid sage grouse habitat or, if this is not possible, then require effective compensatory habitat mitigation. I think removing livestock grazing from degraded BLM lands would be good mitigation. Thank you.				The EIS describes sage-grouse use of the area and sage-grouse habitat in Section 3.12.1. Impacts to sage-grouse are addressed in Sections 4.12 and 4.20.12.1. Additional details are provided in the Threatened and Endangered Species SER.
Personal Information Requested to be Withheld – May 3, 2024						
28	28.1	Please do not allow the Ioneer mine to be built. This project has been rushed through over the objections of the American people and the scientific community. We can't solve one ecological crisis by making another; how long are we going to kick the can down the road? Tiehm's buckwheat might survive climate change, but it can't do that if it's destroyed by the mine. I am asking you from the bottom of my heart to act with the consent of the governed, not as an appendage of an Australian mining company.				The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
Ian Goldsmith – May 4, 2024						
29	29.1	The Rhyolite Ridge Lithium-Boron project will provide a domestic source which provide enough lithium to power 370,000 vehicles per year for over 20 years. This domestic supply of lithium is critical to achieving goals envisioned in the Infrastructure Investment and Jobs Act. Ioneer has developed an extraction and processing plan which will be done in an environmentally responsible manner.				Comment noted.
Ruth Carraher – May 6, 2024						
30	30.1	Please see attached files - word document and pdf. [Attachements: RR_RACcomments_DEIS_05-06-2024.docx; RR_RACcomments_DEIS_05-06-2024.pdf]				Comment noted.

Comment Letter No.	Comment Number	Comment	Response
30	30.2	Attention: Rhyolite Ridge Lithium-Boron Mine Project - DOI-BLM-NV-B020-2021-0020-EIS Dear Mr. Distel: I am submitting these comments in support of Ioneer developing the Rhyolite Ridge Lithium-Boron project. The company, Ioneer, is proposing the construction of a quarry and the facilities to process the Li-B mineralized rock. Ioneer has conducted all required baseline surveys/reviews and has developed and submitted a Plan of Operations to the Bureau of Land Management (BLM). The review by the BLM has assessed 57 additional alternatives prior to the proposed action published in the DEIS. This proposed action is based on Ioneer working closely with the BLM and USFWS, with county and state agencies, with local communities, and with 7 indigenous tribes in Nevada. The USGS, in researching those minerals deemed to be critical, used the criteria of non-fuel mineral, element or substance which has a high risk of supply chain disruption and serves essential function in energy technologies. Because of the use of lithium for battery storage the USGS includes lithium on the list of critical minerals. The Rhyolite Ridge Lithium-Boron project in Esmeralda County Nevada will provide minerals critical to meeting the goals envisioned in the Infrastructure Investment and Jobs Act. Rhyolite Ridge will provide enough lithium to power 370,000 vehicles per year for over 20 years. Once the project is in production it will increase domestic lithium production by 400%. Additionally, the boron produced from this project will meet goals envisioned by the CHIPS and Science Act. Boron is being used and is part of the development of future, more efficient computer chips and semiconductors. Boron is also be used in smart phone and computer touch screens, in medicinal grade glass vials, in abrasives, cleaning products, insecticides, and insulation. Production of the lithium-boron minerals from Rhyolite Ridge deposit will provide a reliable supply chain for materials needed to boost domestic production of batteries for our new energy (clean/green/electrification future) economy. The USA depends on importing lithium from Argentina, Chile, China, Russia and small amounts from several other nations. This makes our nation dependent upon a supply chain which can be interrupted at any time, and depends on imports from unreliable nations. Also, the European Union, Canada, Australia and China have all listed lithium as critical to their own nation's development of future energy needs, so there will be reduction of their exports of lithium and an increase in worldwide competition for importing this critical mineral. Ioneer coordinated closely with the BLM and USFWS on protection for the Tiehm's Buckwheat. An "Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat" was developed for this project incorporating protections for Tiehm's Buckwheat present in the area. Project features were redesigned and relocated to minimize impact on the buckwheat. In regards to the Tiehm's Buckwheat I personally have spent over 250 days on the ground and, though not a botanist, I did note that Tiehm's Buckwheat preferentially grows in areas disturbed by boron mining from the early 1900s and the disturbed areas from 1980s boron exploration. This was also noted in the DEIS 4.20.12.3 "Tiehm's buckwheat has colonized several soil sample trenches that are estimated to be between 40 and 80 years old in subpopulations 1, 2, 3, 4, and 6". Characteristics of the lithium-boron mineralized rock allow for extraction of the lithium using much less water when compared with other lithium ore bodies. The production plan will not utilize leach pads, but will be conducted with vat leaching, and no tailings dams will be needed. The leachant needed to extract the lithium from the rock will be manufactured on-site, with the heat produced from this process will be to power used a steam turbine generator. Enough power will be generated to operate the facility independent of the local power grid in Esmeralda County. Federal, state, and county agencies, along with 9 indigenous tribes and the local communities of Dyer, Silver Peak and Goldfield were included in the review of the plans to identify/assess potential impacts of the development. The project will employ up to 500 people during the construction phase, with 350 people employed over the life of production. During production employees will have a median annual income of $141,000. Esmeralda County will see financial benefits with revenues from various taxes, Net Proceeds of Mines, ranging from approximately $600,000 in the first year of construction to between $5.2 to $11.6 million during production. Esmeralda County revenues have averaged $5,191,000 from 2020 through 2022, this will increase county revenues during production by 100% to 200% (accessesmeralda.com/county_office/auditor_recorder/financial_reports.php) per year. Off-Take Agreements are in place with car manufacturers and battery manufacturers. Several of these agreements are with Nevada based companies which will use the lithium product from Rhyolite Ridge for manufacturing of batteries in the state of Nevada. In the interest of full disclosure I am acknowledging my interest in the Rhyolite Ridge Project: I, along with 2 other geologists, staked the claims on the project and vended them to Paradigm Minerals USA LLC in 2016. Sincerely, Ruth A. Carraher	The Project's economic effects are discussed in Sections 4.10 and 4.20.10 of the EIS. Tiehm's buckwheat habitat preferences are described in the EIS in Section 3.12.3 and in the Threatened and Endangered Species SER.
Undisclosed – May 9, 2024			
31	31.1	This mine would desecrate Newe homelands. It would cause pollution and threaten endangered plants. Say no to this mine.	In-depth analyses of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with Federal Lands Policy and Management Act (FLPMA), National Historic Preservation Act (NHPA), and NEPA. Section 4.8 of the EIS contains the analysis as related to Native American Traditional Values. Government-to-government consultation and coordination for the Project was initiated in 2020

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			and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts.
Emma Rosen – May 7, 2024			
32	32.1	I am strongly against the proposed lithium mine on Rhyolite Ridge. I was born and raised in Nevada and natural spaces like these are what makes our state special and unique, not to mention the impact on water quality and the endangered buckwheat. The proposed plan would almost certainly put at risk the very existence of the buckwheat which is endemic to Nevada. Even the alternative would be majorly disruptive to the little habitat that the buckwheat inhabits. I have been to Rhyolite Ridge surveying Pinyon Jays and these special charismatic, and threatened birds also call this mountain range home. I would like to see this acknowledged as a potential impact as well. Besides the impact on these specific species the mine would destroy the local ecosystem and the natural beauty of the mountain. Although the mine would only exist for 23 years the impacts would devastate the mountain, water, and endangered and threatened species. For these reasons I am strongly against the proposed mine and I believe the best option is the NO ACTION ALTERANTIVE. NO to environmentally costly mining. YES to life, to ecosystems, and to beauty. Not to mention that the proposed project would reduce access to PUBLIC land, and its indigenous stewards are against this project. I stand in solidarity with the true and original inhabitants of the land.	The EIS evaluates effects to Tiehm's buckwheat in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Impacts to pinyon jay are analyzed in the EIS in Sections 4.18 and 4.20.18 and detailed further in the Wildlife Resources SER. For safety of the public, the active mine area would be fenced with controlled access. Areas within the Plan boundary but outside the active mine area would remain available for public use. The public would be able to continue to travel along Cave Springs Road through the OPA. An escort would be provided as described in Sections 4.6.1 and 4.13.1. Impacts to public access are described in the EIS in Sections 4.13 and 4.20.13 and further detailed in the Transportation and Access SER.
Personal Information Requested to be Withheld – May 7, 2024			
33	33.1	I've been following the Rhyolite Ridge Project for a little while and I am impressed with the way that Ioneer has been handling the project. There's always a sense of hesitancy when controversial matters are introduced around mining. I was impressed with the pause that was taken by Ioneer when Tiehm's buckwheat became a larger topic and then the steps they took in planning to mitigate destroying the species. There are a lot of great responses from the local community as well. At the meeting this evening, all their ducks were in a row. Its clear Ioneer has been heavily involved in listening to local concerns and making sure the needs of the communities would be met, including hundreds of quality jobs. Mining in Nevada has come a long way and has become much more responsible. I support the Rhyolite Ridge Lithium-Boron Project proposed by Ioneer. This will be an excellent opportunity for the local community for decades to come. I support Ioneer and the steps they've taken to construct, operate, and reclaim this resource so far in a responsible way. It's clear the community supports the project as well.	Comment noted.
Chloe Novak – May 7, 2024			
34	34.1	I was lucky enough to spend summer of 2023 in the Silver Peak Range assisting on a floristic inventory research project. I have hiked hundreds of miles throughout the range, meticulously documenting the incredible diversity of plant species that occur there. All of them – not just Tiehm's buckwheat – are unquestionably threatened by a project of this magnitude, regardless of the alternative presented. The discoveries we made in the Silver Peak Range were truly astounding – in many instances, we recorded plants that had previously only been known from California, or thought to be endemic to other mountain ranges. One plant species that occurs directly within the planned open pits – regardless of the alternative – is the Munz's mariposa lily, *Calochortus kennedyi* variety munzli. This population will be completely extirpated under any of the alternatives presented. Through the depletion of groundwater, introduction of invasive species, deterrence of native fauna though 24 hour lights, noise, and dust disturbance, it is not an exaggeration to say that the entire Silver Peak Range and its constituent ecosystems will be irreparably destroyed if this mine proceeds. All to make an Australian billionaire even richer at the expense of our amazing public lands.	As described in the EIS in Section 3.14, baseline vegetation surveys occurred throughout the Plan boundary. Baseline surveys documented *Calochortus* species. *Calochortus kennedyi* variety *munzii* is not a Nevada BLM special status plant species or Nevada Division of Natural Heritage (NDNH) watchlist species. Impacts to vegetation resources, including from invasive plants, from development of the Project are described in Sections 4.14 and 4.20.14 of the EIS and detailed further in the Vegetation Resources SER. Impacts to water resources are described in Sections 4.16 and 4.20.16 of the EIS. Impacts to wildlife are described in Sections 4.12, 4.18, 4.20.12, and 4.20.18 of the EIS.
Peri Lee Pipkin – May 7, 2024			
35	35.1	I'm concerned about water use in the Fish Lake Valley, this project will create a dust bowl in Dyer, which already faces water overdraw issues. This will compromise the way of life in the valley & harm the endemic fish, toad, and snail that live there, along with several rare and state listed endangered species, such as the sodaville milkvetch. The footprint of the mine is too close to the sacred Cave Springs and will destroy the sacred valley it lies in. Additionally, this project will create dust & make pollination of the buckwheat near impossible, dooming the species to extinction	Water resource impacts were modeled for the Project and included an evaluation of the cumulative uses of water in the Fish Lake Valley. Impacts to water resources are described in Sections 4.16 and 4.20.16 of the EIS and described further in the Water Resources and Geochemistry SER. Impacts to air quality and climate change are analyzed in Sections 4.1 and 4.20.1 of the EIS and described further in the Air Quality and Climate Change SER. Baseline vegetation surveys were conducted throughout the Plan boundary and Sodaville milkvetch was not encountered. See Sections 4.12, 4.14, 4.20.12, and 4.20.14 for analysis of impacts to special status plant species. Consultation with local tribes is ongoing. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation would continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures

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			would be developed in consultation with the affected Tribes to reduce or eliminate impacts.
	35.2	I'm not anti-mining, I think this project is sited improperly – too close to special biodiversity and cultural sites that make Esmeralda County unique & biodiverse. Additionally, the labor force (migrant men/day laborers) will cause the valley to see increased crime & violence. This project must be re-sited to protect the area culture, water, and biodiversity.	The Project proposes development of a locatable mineral resource. Relocation of the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the resource is located. Impacts from increased population associated with the Project are described in Sections 4.10 and 4.20.10 of the EIS and in the Social and Economic Values SER.
Timothy Kennedy – May 7, 2024			
36	36.1	The Silver Peak Range, Fish Lake Valley, and "Rhyolite Ridge" and all species of flora and fauna that exist there need to be protected. We cannot keep removing species of the Jenga tower that is our ecosystem and expect it to remain stable. It's not "one flower," its every species before, and every species after. We have to draw the line now.	The Project incorporates ACEPMs described in Section 2.1.13 of the EIS to reduce impacts to plants and wildlife. The EIS evaluates effects to vegetation including Tiehm's buckwheat, and wildlife in Sections 4.12, 4.14, 4.18, 4.20.12, 4.20.14 and 4.20.18. Additional details are provided in the Threatened and Endangered Species, Vegetation Resources, and Wildlife Resources SERs. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
Peri Lee Pipkin – May 9, 2024			
37	37.1	Hi all, I am a botanist that has been working in the Silver Peaks for the past several years to compile a floristic inventory of the Silver Peak Range and surrounding valleys in Esmeralda County. My flora will head to publication this year, and has locations of several rare plants that occur in and around the project area, as well as groundwater dependent plants that occur in the Fish Lake Valley near the site of water extraction. How can I submit my data and in what format so that it is considered in the environmental impact report and so that these other rare plants are not lost? Thank you for your time, Peri Lee	As described in the EIS in Section 3.14, baseline vegetation surveys occurred throughout the Plan boundary. Impacts to vegetation resources, including impacts from invasive plants, from development of the Project are described in Sections 4.14 and 4.20.14 of the EIS and detailed further in the Vegetation Resources SER. Impacts to water resources are described in Sections 4.16 and 4.20.16 of the EIS. Additionally, in response to this comment, the BLM responded via email on May 15, 2024, with directions on how to provide data.
Gary Parks – May 10, 2024			
38	38.1	Re: The DEIS for loneer's Rhyolite Ridge Project Dear Mr. Distel, I am writing in favor of permitting loneer's Rhyolite Ridge Lithium-Boron Project in Esmeralda County, NV. I am a strong believer in developing America's natural resources rather than relying on foreign sources for critical minerals that will keep our economy strong. Currently, the US depends on importing lithium mainly from Argentina, Chile, China and Russia making our country dependent on imports from unreliable nations and creating a supply chain which can be interrupted at any time. Production of the lithium and boron minerals from the Rhyolite Ridge deposit will provide a reliable supply chain for materials needed to boost domestic production of batteries for our future green energy economy. loneer, like all western mining companies, will operate under very strict environmental regulations that will protect the land, water and wildlife. As an example, loneer will be leaving valuable lithium-boron ore in the ground to protect the endangered Tiehm's buckwheat. The unique characteristics of the Rhyolite Ridge deposit will allow for extraction of the lithium and boron using much less water when compared with other lithium deposits. Recovery of lithium from the mineralized rock will be by the vat leach process meaning there will be no leach pads, tailings pond or tailings dams and no chance of groundwater contamination. Once the project is in production, it will increase domestic lithium production by 400% and provide enough lithium to power 370,000 vehicles per year for over 20 years. The boron produced from this project will be used in items such as smart phone and computer touch screens, in production of semiconductors, in medicinal grade glass vials, in abrasives, cleaning products, insecticides, and insulation. The project will bring high-paying mining jobs to Esmeralda County, employing up to 500 people during the construction phase and 350 people during the 26 years of production. During production employees will have a median annual income of approximately $141,000. Thank you for taking the time to read my comments. Hopefully the Rhyolite Ridge deposit will soon be in production, benefiting Esmeralda County, Nevada and the Nation. Sincerely, Gary Parks	Comment noted.
My-Lan Le – May 10, 2024			
39	39.1	Hello, I am submitting my comment requesting that the environmental consulting firm selected for monitoring Tiehm's Buckwheat as well as for dust monitoring be publicized upon decision. Thank you, My-Lan Le	The selection of contractors for implementing monitoring would not impact the outcome of the NEPA analysis; therefore, are not discussed in the EIS.

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Nancy Wolverson – May 10, 2024			
40	40.1	Re: The DEIS for loneer's Rhyolite Ridge Project Dear Mr. Distel, This letter is written in support of permitting loneer's Rhyolite Ridge Lithium-Boron Project in Esmeralda Co. NV. I am a retired geologist, a graduate of UNR and a resident of Nevada from 1979-1989 and then again from 2005-present. I am familiar with lithium deposits in general and have reviewed the DEIS and news related to the project since development activities were initiated. I support development of the mine for the following reasons: • I am impressed by loneer's commitment to mine in an environmentally responsible way with little impact on the land, ground water and the endangered Tiehm's buckwheat plant. • The unique characteristics of the Rhyolite Ridge deposit will allow for extraction of lithium using much less water when compared with other lithium deposits and most other metal mines. • Recovery of lithium from the mineralized rock will be by the vat leach process with no leach pads, tailings ponds or tailings dams, and therefore ground water contamination is minimized. • A weak sulfuric acid solution, needed to dissolve lithium from the ore, will be produced on site. The heat produced as a by-product of sulfuric acid production will supply more than enough energy to power the entire operation for the life of the mine, making it independent of Nevada's power grid. • Currently, the US depends on importing lithium, mainly from Argentina, Chile, China and Russia, making our country dependent on imports from generally unreliable nations, thus creating a supply chain which can be interrupted at any time. Production of the lithium-boron minerals from the Rhyolite Ridge deposit will provide a reliable domestic supply chain for materials needed to boost domestic production of batteries for a cleaner, more energy efficient future. • The European Union, Canada, Australia and China have all listed lithium as critical to energy needs of their own nations, resulting in a reduction of their exports of lithium, and an increase in worldwide competition for this critical mineral. • Once the project is in production, it will increase domestic lithium production by 400% and provide enough lithium to power approximately 370,000 vehicles per year for at least 20 years. • The Boron produced from this project will be used in items such as touch screens for smart phones and computers and in the production of semiconductors, medicinal grade glass vials, abrasives, cleaning products, insecticides, and insulation. • The financial impact on Nevada and Esmeralda County will be significant. The project will employ up to 500 people during the construction phase, and then 350 people throughout the life of production. The median annual income of loneer's employees, including a generous benefits package, will be approximately $141,000. • Financial benefits to Esmeralda County from sales taxes, property taxes and Net Proceeds of Mines revenue will range from approximately $600,000 in the first year of construction to between $5.2 to $11.6 million during the estimated 26 years of planned lithium-boron production. This is significant for a small population rural county. In summary, this project is a rare win-win opportunity to capitalize on Nevada's mineral wealth to the benefit of the county, state and our nation, with minimal environmental impact. Thank you for your time reviewing my comments. Kind regards, Nancy J. Wolverson	Comment noted.
Ann Carpenter – May 15, 2024			
41	41.1	I provide this attachment, a signed PDF of a letter of support for the ioneer Rhyolite Ridge Project in Esmeralda Co, NV [Attachment: RR_draft-comments_ioneer_AC.pdf]	Comment noted.
41	41.2	**RE: Comments on Rhyolite Ridge Lithium-Boron Mine Project DOI-BLM-NV-8020-2021-0020-EIS** Dear Mr. Distel: I. Introduction **ioneer** is proposing to develop an operation for the Rhyolite Ridge lithium-boron deposit in Esmeralda County, Nevada. This operation will produce two elements needed to meet the goals envisioned in **the Infrastructure Investment and Jobs Act of 2023**. As well, this mine operation will lower reliance on foreign sources for lithium, a critical mineral needed to meet our expanding needs as we advance electrification in the US and abroad. The U.S. Department of Energy's January 2023 announcement of the conditional loan commitment, through the DOE Loan Programs Office, to the Rhyolite Ridge Project (ioneer) will advance domestic production of the critical mineral, lithium. This will boost the U.S. battery supply chain[1]. I am submitting these comments on the Draft Environmental Impact Statement (DEIS) for the Rhyolite Ridge Project, published by the Tonopah Field Office of the Bureau of Land Management, Battle Mountain District. The DEIS was published on April 2024. And, importantly, I provide my strong support for ioneer's Rhyolite Ridge Project. I am a 40+ year mineral development professional, and I have extensive experience with the National Environmental Policy Act (NEPA), the U.S. Mining Law, and the BLM's surface management regulations at 43 CFR Subpart 3809 governing locatable minerals and mining activities pursuant to the U.S. Mining Law. I focus on integrating permitting, engineering studies and community engagement in mineral development efforts in the United States as well as overseas. **ioneer** has taken a very thoughtful, measured, and detailed approach to their engineering, permitting and importantly community engagement efforts. They have advanced solid community and stakeholder engagement efforts in the region, engaging early and often with a broad spectrum of stakeholders. They have responded to concerns raised, adjusted mine plans, and met with stakeholders to ensure concerns were addressed in a timely fashion. I cannot imagine any circumstance in which delaying approval for this project to proceed with production of lithium and boron would make any sense for the environment, the local and regional communities, the State of Nevada, and the country at large.	Comment noted.

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		[1] https:/lwww.energy.gov/lpo/articles/lpo-announces-conditional-commitment-ioneer-rtwolite-ridge-advance-domestic-produdion	
41	41.3	**The Country's Stated Commitment** The Biden-Harris Administration has stated its commitment to increase the domestic supply of critical minerals[2], to strengthen the nation's battery supply chain, and to electrify the transportation sector thus reducing our reliance on fossil fuels and most importantly on a foreign supply of raw materials. Worldwide demand for lithium is expected to increase dramatically soon and that demand has exceeded global production as of 2023[3]. In addition to electrifying the transportation sector, lithium will be important to the development and implementation of safe and reliable battery energy storage systems allowing for commercial applications to store energy from renewable resources (proven inconsistent energy sources) for the transition to reliable green, low carbon power-grid stability, commercial applications, and individual homes, to name a few. [2] https://crsreports.congress.gov/product/pdf/R/R47982/1 [3] https://www.statista.com/statistics/452025/projected-total-demand-for-lithium-globally	Comment noted.
41	41.4	**Addressing Concerns Raised-Committed Environmental Protection Measures** **ioneer** worked closely with the BLM and other state and federal agencies to reduce impacts that were identified in the permitting processes, including to these key areas: the endangered Tiehm's Buckwheat that grows in the area; water usage; and concerns identified related to the local electrical grid.	Comment noted.
41	41.5	Tiehm's Buckwheat Tiehm's Buckwheat is found on 10 acres of ground within the project area of 7,166 acres. **ioneer** has committed to a revised quarrying plan that will have no direct impact to the Tiehm's buckwheat's subpopulations. And the company has committed to multiple measures regarding the Tiehm's buckwheat critical habitat as outlined in the EIS. An illustration of their commitments is the ongoing (several years) operation of a greenhouse and the propagation of this buckwheat to begin to address the regrowing of this plant.	Comment noted.
41	41.6	Water Usage **ioneer** has developed a production plan that reduces the amount of water needed during operations. **ioneer's** lithium processing recycles and reuses the water in its system with much less water losses (such as lithium produced by evaporation).	Comment noted.
41	41.7	Power Generation The processing of the lithium-boron ore requires the use of acid which will be produced on site by an acid generating plant. This plant will produce enough heat and steam to generate all the electricity required to operate all the planned facilities.	Comment noted.
41	41.8	**Socioeconomic Benefits** With over 40 years of mineral development expertise to rely on, I have first-hand experience with the types of socioeconomic impacts and benefits associated with a multiyear mining project. Since 2001 I have studied sustainable development in mining projects across the world. **ioneer** has been an industry leader in the Esmeralda region with their strong community engagement and sustainability efforts at their Rhyolite Ridge project. Section 4.20 in the DEIS focuses on Social and Economic Conditions for this project. This operation will create a broad diversity of high-paying jobs and will generate local and state tax revenues that will benefit Esmeralda County and the State of Nevada for at least +20 years-all while implementing strong environmental protection measures. For those who will be directly employed at the operation the median annual income will be $141,000. From construction to the end of mine life the number of employees or contractors will range from 350-500. For Esmeralda County financial benefits (revenue) including sales taxes, property taxes and Net Proceeds of Mines will range from approximately $600,000 in the first year of construction to between $5.2 to $11.6 million during production. This will be a significant benefit to Esmeralda County where the average revenue stream for 2020 through 2022 was approximately $5,191,000 million (accessesmeralda .com/county_ office/auditor _recorder/financial_reports. php) per year. An additional benefit relates to the county road crossing the project area-this will be upgraded and maintained by **ioneer**.	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.
41	41.9	**Conclusions** The Rhyolite Ridge project will accomplish significant objectives: • Advance innovative environmental, energy generation, and community engagement processes. • Boost the development and construction of a mine in support of a green energy economy while supporting diverse, well-paying mining jobs and paying a broad spectrum of local, county, and state taxes. • Provide a reliable, domestic supply chain for the critical mineral lithium helping the country decrease its dangerous reliance on foreign sources. • Meet the goals of the **Infrastructure Investment and Jobs Act of 2023**. Approving this permit is the best choice, for the local economies and communities, for the state of Nevada and for the nation. I support this project, and recommend the BLM complete the NEPA process as quickly as possible so development can begin ASAP late in 2024, helping the communities in the region to benefit from a solid mineral development project-jobs, taxes, diversified opportunities, and environmental protections. ioneer and its community outreach programs have identified concerns, immediately addressed these, and built alternatives into their mine plan(s). There are no valid reasons to delay or deny approval of this nationally significant project. There have been vocal activists speaking out against this project, and these folks are largely not from the general area and definitely not connected with how their opposition will negatively impact the local and/or regional communities. I was at a recent BLM public meeting for the Rhyolite Ridge DEIS where I saw over a dozen people in attendance against the project-from California, Oregon or elsewhere. They stuck to themselves, with members of the Center for Biological Diversity (CBD) members in the midst. None of them attempted to reach out to local community members to discuss their opposition, and importantly find out from community members what the mine means to the locals. I am deeply concerned about a permitting process that does not foster and require all to have strong community outreach processes at their core. CBD has been a vocal 'activist' (opposition) group against this mine project and yet they are not required to meet with and get to know local community-stakeholder members and engage more deeply with all involved. I am deeply concerned by a	Public involvement opportunities for the Project have been conducted according to NEPA, Council on Environmental Quality (CEQ) regulations, and the BLM NEPA Handbook.

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		process that allows an 'activist' group who is not from the area/ the community have such negative impacts to a mining project's development WITHOUT also being required to engage deeply with all stakeholders ... their 'activism' (opposition) has deep, lasting negative impacts on communities where mining projects are being proposed and permitted. Thank you for this opportunity to submit these comments on the DEIS for this important project. Please do not hesitate to contact me if you have any questions about my comments. These are my comments alone, supported by my over 4-decade career as a mineral development professional with a focus on sustainable development, community engagement, and project development. Sincerely yours, Ann Carpenter Mineral Development Professional	
Deserea Langley – May 9, 2024			
42	42.1	I do not support the building of this mine in Tonopah, Nevada. It would have devastating effects on the natural environment for decades to come. Further, why are we opening foreign owned extractive industries to populate lands in the United States. there population will not have to deal with the effects, they will simply be making profit over the communities who will face the impacts. The BLM should actively consult with the local Native American populations in the area to understand the cultural importance of this area. Our homeland's have been targeted for too long and our families and communities are forced to deal with the environmental degradation and health disparities left from these mines.	The Project is consistent with the 1872 Mining Law, as amended, which confers a statutory right to enter public lands open to mineral entry to explore for and develop mineral deposits. The Project would implement ACEPMs described in Section 2.1.13 of the EIS to reduce impacts. Government-to-government consultation and coordination was initiated in 2020 and will continue through the life of the Project. The EIS Sections 3.8. 4.8, 4.18.8, 5.0, and the Native American Traditional Values SER discuss the consultation process.
42	42.2	Further, why would you move forward on a mining project where there is no adequate amounts of water to sustain the community. Inviting the mining industry into the area will not only pollute the land but the water resources. i do not support moving forward on this project.	Water resource impacts were modeled for the Project and included an evaluation of the cumulative uses of water in the Fish Lake Valley and Project impacts on water quantity. Impacts to water resources are described in Sections 4.16 and 4.20.16 of the EIS. Additional analysis is presented in the Water Resources and Geochemistry SER.
Undisclosed – May 9, 2024			
43	43.1	If the project does not get approval to proceed, who will be responsible for ensuring that Thiem's Buckwheat survives and prospers? Will the habitat be fenced off to protect the plant and its habitat?	The EIS includes analysis of the No Action Alternative and its impacts to Tiehm's buckwheat in Sections 4.12.3 and 4.20.12.
Cameron Mayer – May 10, 2024			
44	44.1	Per the "water use at Rhyolite Ridge" fact sheet on the Ioneer website, no effect is anticipated on local water balance in adjacent Fish Lake Valley, which is already critically over appropriated. When a single entity (Ioneer in this case) is using, at peak, 4,100 acre feet of water per year in one of the driest places in the country, any anticipation of negligible or no impact is simply hard to fathom. Furthermore, an open pit mine of the magnitude described in the draft Environmental Impact Statement, with a depth of over 900 feet, must have the potential to significantly disrupt water paths and flow patterns in an area (Silver Peak Range) that is currently largely intact in this respect.	Water resource impacts were modeled for the Project and included an evaluation of the cumulative uses of water in the Fish Lake Valley. Impacts to water resources are described in Sections 4.16 and 4.20.16 of the EIS and included analysis of the impact of the quarry on groundwater. Additional analysis is presented in the Water Resources and Geochemistry SER.
	44.2	I also have concerns regarding the potential for adverse impacts to people and wildlife caused by airborne dust from retired pivots and fallowed fields in Fish Lake Valley. It has been seen at other locales, such as nearby Owens Lake in the Owens Valley, that even a powerful agency with comparatively a lot of resources, like the Los Angeles Department of Water and Power (LADWP), that is in a way committed and tied-in long-term to dust mitigation strategies as part of a comprehensive extraction process, can and often fails to effectively ensure adequate reduction in the interest of broader public safety. Therefore there is reason to have little faith that Ioneer can achieve a significantly better outcome with the Rhyolite Ridge project.	Surface disturbance and water use associated with the Proposed Action and alternatives are described in Section 2.1 and 2.2 of the EIS. The impacts to air quality and climate change are described in Sections 4.1 and 4.20.1 and detailed in the Air Quality and Climate Change SER.
	44.3	Most importantly, the proposed direct impact to 354 acres, or 39% of the 910 acres of critical habitat designated by the U.S. Fish and Wildlife Service for Tiehm's Buckwheat, a species endemic to 10 acres of the Silver Peak Range in Esmeralda County, Nevada, is inconsistent to the proper stewardship of this rare plant long into the future. Projected restoration carried out by setting aside and then infilling with "suitable soil salvaged and stockpiled during construction and operation", while additionally leaving 97 acres, or 11%, of critical habitat with permanent and unreclamated disturbance is furthermore inconsistent and questionable as to its feasibility, with Tiehm's Buckwheat being uniquely adapted to grow in soils with high lithium and boron levels. Additionally, the likelihood of adverse impacts caused by dust stirred up during both construction and operation, in combination with the potential for unintended spray of sulfuric acid used in the processing of ore is also not consistent with the proper care and stewardship of imperiled species.	The EIS evaluates effects to Tiehm's buckwheat in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. As described in Section 2.0 of the EIS, sulfuric acid use would occur within the processing facility and ACEPMs would be implemented to reduce dust impacts. The North and South OSF Alternative includes dust monitoring in Tiehm's buckwheat designated critical habitat.
	44.4	Lastly, the loss of public access to the site of the proposed action for recreational and other public uses is inconsistent with the intention of the Federal Land Management and Policy Act of 1976, which in part directs the Bureau of Land Management as such that "the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use."	The Project's consistency with FLPMA, land use plans, and impacts to land use, access, and recreation are discussed in the EIS in Sections 4.6, 4.9, 4.20.6, and 4.20.9. For safety of the public, the active mine area would be fenced with controlled access. Areas within the Plan boundary but outside the active mine area would remain available for public use. Public would be able to continue to travel along Cave Springs Road through the OPA. An escort would be provided as described in Sections 4.6.1 and 4.13.1.
David Gray – May 13, 2024			
45	45.1	The real primary concern with this project is in the market fundamentals for its product. The alleged demand for lithium is artificial. It is promoted by a false science narrative with the supposed need to "decarbonize" the economy. This is based upon an incorrect premise that carbon dioxide has any role in climate trends. The very premise is based upon the disingenuous science that carbon - an element - is the same as carbon dioxide - a gas molecule. The party line narrative that global warming - climate change (which is it?) is actually occurring or has not been greatly exceeded in the past by natural influences not related to human activity - is just agendized gaslighting fostered by corrupted science. Moreover, the narrative is being fueled by force - government mandates and	Comment noted.

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		propaganda. The fundamentals of a healthy free market have been hijacked with this politically driven coercion and ill effects will beset the market due to this corrupting influence. The subsidization of the Rhyolite Ridge Project by this politically driven government interference into the free market is a red flag for a Solyndra style boondoggle. While a truly free market will create some demand for the lithium and boron products, the viability of the Project should be supported in so far as it is truly economic in a free society. The false climate change/global warming narrative, the government subsidized and coerced distortions of actual demand in a free market are threatening to be a house of cards for the markets of this product. Having expressed these fundamental concerns, it is also a given that Ioneer should have the freedom to engage or attempt to engage in productive economic activity with this project in a free market, without the absurdities of ginned up threatened species, in-vogue social politics, and the deep pocket grafting that is encouraged by such government interference.	
American – May 13, 2024			
46	46.1	I appreciate this opportunity to provide comments on this important proposed action and NEPA process. At the outset, I believe that this and other federal planning and NEPA analysis processes should actively consider how the proposed action and alternatives may add to or help solve the climate and extinction crises. These overlapping crises pose an existential threat to humanity and the health of the biosphere. On the climate crisis, please review the attached IPPC report. This report summarizes the overwhelming international scientific consensus on the severity of the climate crisis and the urgent need to phase out the use and development of fossil fuels. On the extinction crisis, there are an increasing number of scientific reports on the rapid loss of biological diversity and how this loss undermines the stability, resilience, and productivity of the ecosystems upon which life on Earth depends. Overall, this compelling science demonstrates the urgent need for bold and innovative solutions. Questions arise like: how can fossil fuel use be reduced and replaced by clean, renewable energy sources? How can any destruction, degradation, or fragmentation of wildlife habitat be avoided, reduced, or successfully mitigated? How could construction materials be sourced from sustainable producers and practices? How could the use of any toxic chemicals be replaced by safer alternatives? How could gains in energy and water conservation be achieved? How could any harmful invasive plants be prevented, controlled, reduced, or eradicated? Please consider these questions in moving forward. On this specific proposed action, I know that mining is important to help fight the climate crisis but I am also worried that this mining may cause the extinction of a unique plant species. It would be tragic if in solving one crisis we make another one worse. If there are feasible alternative locations for this mining, then those should be used. If this mining proceeds, then BLM should ensure that maximum protection is achieved for this unique plant species. There should be robust accountability and transparency in doing so. Thank you very much for your kind consideration of my comments and the attachment. [Attachments: Climate Change IPCC 2023 Summary Report.pdf]	The Project's impact on climate change and the impacts of climate change on the surrounding area are discussed in the EIS in Sections 4.1 and 4.20.1. Additional information, including information on the IPCC document is available in the Air Quality including Climate Change SER. The IPCC 2023 Summary Report referenced in this comment is a summary report of all the underlying IPCC Sixth Assessment Reports (AR6). As a result, the existing analysis in the Air Quality including Climate Change SER and the EIS provide the current citation and documentation for the IPCC analysis. Confirmation of appropriate citation for IPCC was made throughout the Air Quality including Climate Change SER and the EIS. Relocation of the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the resource is located. The Project would implement ACEPMs described in Section 2.1.13 of the EIS to reduce impacts to Tiehm's buckwheat and designated critical habitat. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
Janet and John Porn – May 7, 2024			
47	47.1	Sir; We are writing about the Rhyolite Ridge Mine permit for Ioneer LTD. It appears the company (Ioneer) has and is doing everything requested of it. Ioneer is working with all the affected parties to cooperate the best they can for all concerned. Taking responsibility for the mines proper operation is huge. Keeping the air, water and land clean, maintained and reuseable are every ones concern. It appears they are willing, capable, and able to do this. We are in favor of Ioneer Rhyolite Ridge Mine being allowed to operate. Thank you, Janet Porn John Porn Of course the land must be reclaimed by Ioneer when the mine stops operation.	Comment noted.
Debra Strickland, Nye County Board of Commissioners – May 7, 2024			
48	48.1	Subject: Rhyolite Ridge Lithium-Boron Mine Project. Dear Sir, The Nye County Board of County Commissioners respectfully would like to provide the following comment on the Rhyolite Ridge Lithium-Boron Project's Draft EIS, proposed to be developed by Rhyolite Ridge LLC (Ioneer). Nye County has had a long history with mining in the area and has been a primary driver for economic development across the region. Rhyolite Ridge will provide important economic benefits for the local region, the state of Nevada, and the United States. The Rhyolite Ridge Project will create family-supporting jobs in rural Nevada, employing approximately 350 people while the mine operates, and 500 people during the construction phase. The expected $54 million of labor income during construction and $38 million of annual labor income during operations will be transformational. Section 3-10 of the Draft EIS correctly states that "average weekly mining wages and salaries are among the highest for any industry in the Nevada non-metro counties". The Draft EIS estimates the total direct economic output to be $178 million during the construction phase and $125 million annually, once the mine is in operation. This level of long-term economic impact will be significant for nearby communities, Tribal and local businesses, and Nevada.	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.

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		Tonopah is one of the closest towns to the proposed operation, and as we expect that the area will also realize increased business due to the influx of workers who will purchase goods at our local stores, stay in our hotels and motels, and eat at our restaurants. As stated in Section 1-2 of the Draft EIS, the Project is also in conformance with the Tonopah Resource Management Plan, which contains the following objective: "Public lands located within the BLM TFO boundaries .. .include the following objective for locatable minerals (BLM 1997): To provide opportunity for exploration of locatable minerals such as gold, silver, copper, lead, zinc, molybdenum, etc. consistent with the preservation of fragile and unique resources in areas identified as open to the operation of the mining laws." Ioneer has been committed to engaging our community, as evidenced by providing regular updates to the Nye County Commission for the last 5 years. Ioneer has also consistently supported local charitable events in the Tonopah Area like the Nevada State Mining Championships and has financially supported several Tonopah High School students as they move on to higher education through their scholarship program. Thank you for your careful consideration. Sincerely, Debra Strickland, Chair Nye County Board of Commissioners	
Don Kaminski, Tonopah Town Board – May 8, 2024			
49	49.1	Dear Sir: The purpose of this letter is to express, on behalf of the Tonopah Town Board, our complete support for the Rhyolite Ridge Lithium-Boron project in Esmeralda County. The project has been proposed for development by Ioneer Rhyolite Ridge LLC (Ioneer) following the release of the project's DEIS. For many years, Ioneer representatives have provided regular updates to this body regarding their project and have sought input from the town board as well as the community at large. Because we are a mining community, we know how important it is for mining companies, whether in the development phase or the operational phase, to stay engaged with and support local communities: Ioneer has led by example in this regard. We have found them to be strong supporters of community and philanthropic causes and note that locally, Tonopah Main Street, Tonopah Historic Mining Park, and our annual Jim Butler Days celebration, to name only a few, have all benefited from their community engagement. We stand ready to support them as their project moves forward and know there will be considerable benefits for our community. From increases in population, to greater opportunities for support business and industry, the short and long-term benefits are tremendous. Do we believe their community engagement attitude will continue once they are fully operational? We absolutely do. In 2020 Ioneer introduced a scholarship program at Tonopah High School which has since granted more than $30,000 to graduating seniors. We were honored that the first slate of scholarship recipients was announced during a meeting of this Board in 2020; and we applaud Ioneer for their continued support of Tonopah High School graduates as they embark on their higher education journeys. Ioneer has also held regular and ongoing meetings with businesses and members of the Tonopah community to examine housing needs for their workforce by identifying the opportunity that awaits, collaboratively addressing the challenges, and helping to develop innovative plans. In short, their actions speak louder than their words, and we are excited they will be a cornerstone employer for our region for decades to come. According to the Draft EIS, the Project would add approximately 500 direct jobs during the construction phase, and 350 direct jobs during the quarrying and processing phase, along with hundreds more indirect and induced jobs - many of these are expected to be created here in Tonopah and last throughout the life of.the Project which spans more than two decades. Tonopah is thus expected to realize substantial financial benefits through increased commerce and related tax revenues. Accordingly, the Tonopah Town Board wholeheartedly expresses our support for the Rhyolite Ridge Lithium-Boron Project and encourages you to approve this project, which will be of tremendous benefit to our Town and the broader community. Sincerely, Jorie Eastley for- Don Kaminski Chairman Tonopah Town Board	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.
Glenn A. Gierzycki – May 13, 2024			
51	51.1	Re: The DEIS for the loneer Rhyolite Ridge Lithium-Boron Project Dear Mr. Distel, This letter is in support of the Rhyolite Ridge Lithium-Boron Project of loneer Ltd. In Esmeralda County, Nevada. Production from the Rhyolite Ridge Project will be a provide a needed boost to the mineral security of the United States. The United States has not proceeded with urgency in the past to secure the vital materials needed for a modern society. This lack of materials also applies to the needs of the US military. This project, built on American soil, by American workers, can provide some of those vital minerals.	Comment noted.

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		I believe this project can be built and managed in an environmentally safe manner while helping the national and local economies. The massive amount of scrutiny the project has received ensures that this will be a very environmentally sound mine. From the relatively small mining "footprint" to low water usage and a continuing commitment to the environment, the Rhyolite Ridge Project will be an asset that America needs. I believe this project is vital to the future of the United States, its military, its technology sector and all its people. I believe this project needs to be approved. As for me, I have lived in Reno for 45 years and have traveled extensively in the state, often on dirt roads in remote places. I do not believe that this project will harm the natural beauty of the state in any way. Sincerely,	
Chairwoman Margaret Cortez, Timbisha Shoshone Tribe; Scott Lake, Center for Biological Diversity; Ian Bigley, Earthworks; Kevin Emmerich, Basin and Range Watch; Fermina Stevens, Western Shoshone Defense Project; Laura Cunningham, Western Watersheds Project; John Hadder, Great Basin Resource Watch – May 17, 2024			
51	51.1	Dear Mr. Distel, Please find attached a request for an extension to the comment period on the Rhyolite Ridge Draft Environmental Impact Statement, DOI-BLM-NV-B020-2021-0020-EIS, from the Timbisha Shoshone Tribe, the Center for Biological Diversity, Great Basin Resource Watch, Western Shoshone Defense Project, Earthworks, Basin and Range Watch, and Western Watersheds Project. Thank you, Scott Scott Lake (he/his) Nevada Staff Attorney Center for Biological Diversity (802) 299-7495 slake@biologicaldiversity.org [Attachments: 240517_Coalition Extension Letter FINAL.pdf; Email from Scott Distel, BLM, to Doug Furtado, BLM, December 21, 2023]	Comment noted.
51	51.2	Re: Rhyolite Ridge Project DEIS Comment Period; Extension Request Dear BLM: The Timbisha Shoshone Tribe, Center for Biological Diversity, Great Basin Resource Watch, Western Shoshone Defense Project, Earthworks, Basin and Range Watch, and Western Watersheds Project hereby request a 45-day extension to the comment period for the Rhyolite Ridge Lithium-Boron Mine Project Draft Environmental Impact Statement (DEIS), DOI-BLMNV-B020-2021-0020-EIS. The current 45-day comment period is insufficient in light of the length and complexity of the DEIS and supporting documents. The DEIS itself is 230 pages long. In addition, BLM has included various aspects of its environmental analysis-including critical details about the project's design and environmental impacts-in 20 accompanying "supplemental" reports, which cumulatively total over 1,300 pages. A 45-day comment period does not provide the interested public, including the undersigned organizations, a sufficient opportunity to review these voluminous documents and offer meaningful, constructive feedback, and is therefore inconsistent with the clear and robust public participation requirements of the Federal Lands Policy and Management Act (FLPMA), and the National Environmental Policy Act (NEPA). Both FLPMA and NEPA emphasize and mandate public participation, "with their statutory framework largely in unison on such a requirement." *W. Watersheds Project v. Zinke*, 441 F. Supp. 3d 1042, 1069 (D. Idaho 2020). FLPMA Section 309(e) directs that: > In exercising his authorities under this Act, the Secretary, by regulation, shall establish procedures, including public hearings where appropriate, to give ... the public adequate notice and an opportunity to comment upon the formulation of standards and criteria for, and to participate in, the preparation and execution of plans and programs for, and the management of, public lands. 43 U.S.C. § 1739(e); *see also* 43 U.S.C. § 170l(a)(5) (FLPMA Section 102(a)(5)): "[I]t is the policy of the United States that ... the Secretary be required to establish comprehensive rules and regulations after considering the views of the general public . . . ."); 43 U.S.C. § 1712(f) (FLPMA Section 202(f)): "The Secretary shall allow an opportunity for public involvement and by regulation shall establish procedures, including public hearings where appropriate, to give . . . the public, adequate notice and opportunity to comment upon and participate in the formulation of plans and programs relating to the management of the public lands."). NEPA, meanwhile, aims to "ensure[ ] that the agency will inform the public that it has indeed considered environmental concerns in its decision-making process." *Balt. Gas & Elec. Co. v. Nat. Res. Def Council*, 462 U.S. 87, 97 (1983). To this end, federal agencies "must provide the public with sufficient environmental information, considered in the totality of circumstances, to permit members of the public to weigh in with their views and thus inform the agency decision making process." *Bering Strait Citizens for Responsible Res. Dev. v. U.S. Army Corps of Eng'rs*, 524 F.3d 938, 953 (9th Cir. 2008); *see also Trout Unlimited v. Morton*, 509 F.2d 1276, 1282 (9th Cir. 1974) (explaining that an EIS prepared under NEPA "should provide the public with information on the environmental impact of a proposed project as well as encourage public participation in the development of that information"); *Idaho Sporting Cong., Inc. v. Alexander*, 222 F.3d 562, 568 (9th Cir. 2000) (holding that the Forest Service violated NEPAs public participation requirements because SIRs were not presented at the earliest time possible, as NEPA requires, and because public participation procedures attached to the preparation of the SIRs were not as thorough as NEPA mandates).	The BLM responded on May 20, 2024, that the request was considered but no extension granted. The EIS is in conformance with CEQ and the Fiscal Responsibility Act (FRA), Division C, Title III, Section 321 – National Environmental Policy Act (NEPA) Amendments. The EIS was initiated in 2020 and has been prepared per the 2020 CEQ regulations. Public scoping was extended from 30 days to 76 days and occurred from December 20, 2022 to March 6, 2023. Public scoping meetings occurred January 4 and 5, 2023. The public comment period occurred from April 19, 2024 through June 3, 2024. Public comment meetings occurred May 6, 7, and 9, 2024. The Draft EIS and Supplemental Information Report (SIR) and SERs were available to the public during the public comment period on the BLM's EPlanning Website. The public participation periods including scoping and public comment have been included in the schedule per CEQ 1506.10, BLM Handbook H-1790-1, and the FRA.

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		It must be noted that the planning process for the Rhyolite Ridge project has not been carried out in a way that fosters informed decision-making and public participation. First, the process has been unreasonably rushed, with BLM's own staff remarking, "This is a very aggressive schedule that deviates from other project schedules on similar projects completed recently and concurrently at the District and State." Email from Scott Distel, BLM, to Doug Furtado, BLM, December 21, 2023.	
51	51.3	Second, BLM's public rollout of the DEIS was disorganized and confusing. BLM issued a press release on Friday, April 12, stating that BLM was "seeking public comment on a draft environmental impact statement for the proposed Rhyolite Ridge Lithium-Boron Mine Project." The press release also stated that "[p]ublication of the draft EIS for the proposed mine opens a 45-day public comment period, ending on May 27, 2024." However, BLM did not actually publish the DEIS on that date; nor did BLM issue the legally required notices in the Federal Register. In response to inquiries, BLM stated that it would not publish the DEIS for another week. However, four days later, on Tuesday, April 16, BLM surreptitiously posted the DEIS and accompanying SIRs on its eplanning website with no additional public notification. Again, BLM did not publish the federal register notice that must precede publication of a Draft EIS. Finally, on Friday, April 19th, BLM issued a federal register notice and revised its previously issued press release to state the correct comment deadline, running from the April 19th publication date. The unusual way in which the DEIS was presented to the public will undoubtedly lead to confusion as to the duration and subject matter of this comment period. As such, a 45-day extension is appropriate to ensure that all members of the interested public, including members of affected local communities and Native American Tribes, have a sufficient opportunity to provide meaningful and informative feedback to BLM on this highly impactful project. In conclusion, because of the length and technical complexity of the DEIS and supporting documents, as well as the unusual way that BLM has thus far conducted the Rhyolite Ridge permitting process, the Timbisha Shoshone Tribe and the undersigned groups request a 45-day extension of the comment period on the DEIS. Thank you, Chairwoman Margaret Cortez Timbisha Shoshone Tribe /s/ Scott Lake Scott Lake Nevada Staff Attorney Center for Biological Diversity P.O. Box 6205 Reno, NV 89513 (802) 299-7495 slake@biologicaldiversity.org Ian Bigley Earthworks Southwest Organizer (775) 772-8393 ibigley@earthworksaction.org Kevin Emmerich Basin and Range Watch Fermina Stevens Western Shoshone Defense Project Laura Cunningham California Director Western Watersheds Project John Hadder Executive Director Great Basin Resource Watch CC: Douglas Furtado, BLM Battle Mountain District Manager (dfurtado@blm.gov) Jon Raby, BLM Nevada State Director (jraby@blm.gov)	The BLM issued the press release on April 12, 2024, which stated “Publication of the draft EIS for the proposed mine opens a 45-day public comment period, ending on June 3, 2024.” The federal register Notice of Availability was issued on April 19, 2024. The public comment period occurred from April 19, 2024 through June 3, 2024. Public comment meetings occurred May 6, 7, and 9, 2024. The Draft EIS, SIR, and SERs were available to the public during the public comment period on the BLM’s EPlanning Website. The public comment period occurred for 45 days per CEQ 1506.10, BLM Handbook H-1790-1, and the FRA. The BLM responded on May 20, 2024, that the request was considered but no extension granted.
Timothy Hipp – May 14, 2024			
52	52.1	I am writing in STRONG SUPPORT of the Ioneer Lithium Project. Esmeralda County is the poorest county in the state of Nevada. Without this and other mines, the county will no longer be able support itself and will cease to exist. Ioneer is engaged with the community and gives frequent updates to the County Commissioners (I was one) as well as hosting community meeting in Fish Lake Valley. The future of our county should be determined by its residents and not outside environmentalists who have never stepped foot in the county.	Comment noted.
Carl Cash – May 15, 2024			
53	53.1	The USA needs Ryolyte Ridge lithium to become less dependent on foreign sources. Ioneer continues to expend every effort to act environmentally responsible. It seems the preservation of the Theims Buckwheat is dependent on Ioneer more than any other sources. I support approval of the EIS and issuance of a formal affirmative ROD.	Comment noted.
Brianna Hanson – May 15, 2024			
54	54.1	See Attached Letter Please	Comment noted.

Comment Letter No.	Comment Number	Comment	Response
54	54.2	RE: Comments on Rhyolite Ridge Lithium-Boron Mine Project DOI-BLM-NV-8020-2021-0020-EIS Dear Mr. Distel: **Introduction** **ioneer** is proposing to develop an operation for the Rhyolite Ridge lithium-boron deposit in Esmeralda County, Nevada. This operation will produce two elements needed to meet the goals envisioned in **the Infrastructure Investment and Jobs Act of 2023**. As well, this mine operation will lower reliance on foreign sources for lithium, a critical mineral needed to meet our expanding needs as we advance electrification in the US and abroad. The U.S. Department of Energy's January 2023 announcement of the conditional loan commitment, through the DOE Loan Programs Office, to the Rhyolite Ridge Project (ioneer) will advance domestic production of the critical mineral, lithium. This will boost the U.S. battery supply chain[1]. I am submitting these comments on the Draft Environmental Impact Statement (DEIS) for the Rhyolite Ridge Project, published by the Tonopah Field Office of the Bureau of Land Management, Battle Mountain District. The DEIS was published on April 2024. And, importantly, I provide my strong support for ioneer's Rhyolite Ridge Project. **ioneer** has taken a very thoughtful, measured, and detailed approach to their engineering, permitting and importantly community engagement efforts. They have advanced solid community and stakeholder engagement efforts in the region, engaging early and often with a broad spectrum of stakeholders. They have responded to concerns raised, adjusted mine plans, and met with stakeholders to ensure concerns were addressed in a timely fashion. I am the CEO of Pathfinder Tonopah and we have a brownfield copper (critical mineral) mine redevelopment project in the region, the Liberty Mine Complex. My team has extensive experience with the National Environmental Policy Act (NEPA), the U.S. Mining Law, and the BLM's surface management regulations at 43 CFR Subpart 3809 governing locatable minerals and mining activities pursuant to the U.S. Mining Law. We believe ioneer has presented a strong mine plan and we support the approval of this regionally important critical mineral mine development project in central-western Nevada. [1] https:/lwww.energy.gov/lpo/articles/lpo-announces-conditional-commitment-ioneer-rtwolite-ridge-advance-domestic-produdion	Comment noted.
54	54.3	**The Country's Stated Commitment** The Biden-Harris Administration has stated its commitment to increase the domestic supply of critical minerals[2], to strengthen the nation's battery supply chain, and to electrify the transportation sector thus reducing our reliance on fossil fuels and most importantly on a foreign supply of raw materials. Worldwide demand for lithium is expected to increase dramatically soon and that demand has exceeded global production as of 2023[3]. In addition to electrifying the transportation sector, lithium will be important to the development and implementation of safe and reliable battery energy storage systems allowing for commercial applications to store energy from renewable resources (proven inconsistent energy sources) for the transition to reliable green, low carbon power-grid stability, commercial applications, and individual homes, to name a few. [2] https://crsreports.congress.gov/product/pdf/R/R47982/1 [3] https://www.statista.com/statistics/452025/projected-total-demand-for-lithium-globally	Comment noted.
54	54.4	**Addressing Concerns Raised-Committed Environmental Protection Measures** **ioneer** worked closely with the BLM and other state and federal agencies to reduce impacts that were identified in the permitting processes, including to these key areas: the endangered Tiehm's Buckwheat that grows in the area; water usage; and concerns identified related to the local electrical grid.	Comment noted.
54	54.5	Tiehm's Buckwheat Tiehm's Buckwheat is found on 10 acres of ground within the project area of 7,166 acres. **ioneer** has committed to a revised quarrying plan that will have no direct impact to the Tiehm's buckwheat's subpopulations. And the company has committed to multiple measures regarding the Tiehm's buckwheat critical habitat as outlined in the EIS. An illustration of their commitments is the ongoing (several years) operation of a greenhouse and the propagation of this buckwheat to begin to address the regrowing of this plant.	Comment noted.
54	54.6	Water Usage **ioneer** has developed a production plan that reduces the amount of water needed during operations. **ioneer's** lithium processing recycles and reuses the water in its system with much less water losses (such as lithium produced by evaporation).	Comment noted.
54	54.7	Power Generation The processing of the lithium-boron ore requires the use of acid which will be produced on site by an acid generating plant. This plant will produce enough heat and steam to generate all the electricity required to operate all the planned facilities.	Comment noted.
54	54.8	**Socioeconomic Benefits** ioneer has been an industry leader in the Esmeralda region with their strong community engagement and sustainability efforts at their Rhyolite Ridge project. Section 4.20 in the DEIS focuses on Social and Economic Conditions for this project. This operation will create a broad diversity of high-paying jobs and will generate local and state tax revenues that will benefit Esmeralda County and the State of Nevada for at least +20 years-all while implementing strong environmental protection measures. ioneer through its permitting, engineering and community outreach efforts has identified concerns, immediately addressed these, and built alternatives into their mine plan(s). There are no valid reasons to delay or deny approval of this nationally significant project. For those who will be directly employed at the operation the median annual income will be $141,000. From construction to the end of mine life the number of employees or contractors will range from 350-500.	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.

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		For Esmeralda County financial benefits (revenue) including sales taxes, property taxes and Net Proceeds of Mines will range from approximately $600,000 in the first year of construction to between $5.2 to $11.6 million during production. This will be a significant benefit to Esmeralda County where the average revenue stream for 2020 through 2022 (accessesmeralda .com/county_ office/auditor _recorder/financial_reports. php) was approximately $5,191,000 million per year. An additional benefit relates to the county road crossing the project area-this will be upgraded and maintained by **ioneer**.	
54	54.9	**Conclusions** The Rhyolite Ridge project will accomplish significant objectives: • Advance innovative environmental, energy generation, and community engagement processes. • Boost the development and construction of a mine in support of a green energy economy while supporting diverse, well-paying mining jobs and paying a broad spectrum of local, county, and state taxes. • Provide a reliable, domestic supply chain for the critical mineral lithium helping the country decrease its dangerous reliance on foreign sources. • Meet the goals of the **Infrastructure Investment and Jobs Act of 2023**. Approving this permit is the best choice, for the local economies and communities, for the state of Nevada and for the nation. **ioneer** through its permitting, engineering and community outreach efforts has identified concerns, immediately addressed these, and built alternatives into their mine plan(s). I see no valid reasons to delay or deny approval of this nationally significant project. I provide this letter of support for this project. Approving this mine project will help the communities in the region to benefit from a solid mineral development project through jobs, taxes, diversified opportunities, and environmental protections. Thank you for this opportunity to submit these comments on the DEIS for this important project. Please do not hesitate to contact me if you have any questions about my comments. Sincerely, Brianna Hanson CEO Pathfinder Tonopah	Public involvement opportunities for the Project have been conducted according to NEPA, CEQ regulations, and the BLM NEPA Handbook.
William Helmer – May 17, 2024			
55	55.1	I am requesting that the comment period be extended at least 30 days beyond the current deadline of June 3, 2024. A 45 day comment period does not leave enough time for the public to analyze the proposed project. There was a long delay, and only a few meetings regarding the project. It is extremely important for the public to be allowed enough time to comment on a proposed mining project in a very environmentally sensitive area. Also, please post the time that comments are due. Usually comments are due at 11:59 pm on the due date, but not always. I have seen the time and the due date posted for other BLM NEPA projects. I will be submitting more comments later. Thank you.	The public comment period occurred from April 19, 2024 through June 3, 2024. Public comment meetings occurred May 6, 7, and 9, 2024. The Draft EIS, SIR, and SERs were available to the public during the public comment period on the BLM's EPlanning Website. The BLM responded on May 23, 2024, that the request was considered but no extension granted, as well as that public comments were due at 11:59 P.M. on June 3, 2024. The public comment period occurred for 45 days per CEQ 1506.10, BLM Handbook H-1790-1, and the FRA.
Dylan Rodvik – May 19, 2024			
56	56.1	Please see the PDF submission	Comment noted.
57	57.1	Please see the submitted PDF	Comment noted.
56 and 57	56.2 and 57.2	To whom it may concern at the BLM Battle Mountain District Office, I am writing today to convey my concerns and utilize the opportunity to provide public feedback regarding the Draft Environmental Impact Statement for the proposed Rhyolite Ridge Lithium Mine in Nevada, and the potentially harmful impacts on the otherwise undisturbed local ecosystems within the project area. My comment focuses in particular regards to the endemic Tiehm's buckwheat and Monarch butterfly populations. As BLM decision makers prepare to write the Final Environmental Impact Statement for the proposed project, I felt it warranted to highlight the potentially unrecognized interdependent relationships of these two species at a local and project scale level, as well as the unrecognized potential risk of a dual-species decline for both ESA species while preparing the Final Environmental Impact Statement of this proposed project. As highlighted in the Draft Environmental Impact Statement, Tiehm's buckwheat (Eriogonum tiehmii) is listed under the Endangered Species Act, which is noted as an endemic plant species found only in the Rhyolite Ridge area. The Draft Environmental Impact Statement is sure to claim that Tiehm's buckwheat plays an incredibly integral role in its local ecosystem, providing pollinator food sources and refuge habitat for a diverse range of pollinator insects, including native bees and migrational Monarch butterflies. The Draft Environmental Impact Statement also highlights that "Pollinator diversity was found to be greater in Tiehm's buckwheat sites than surrounding areas" and that "pollinator communities in the Tiehm's buckwheat populations are composed of species that are more rare" (3.12.3). Some of the pollinators listed as "rare" consist of Monarch butterflies (Danaus plexippus), which are an Endangered Species Act candidate species, and are well understood to have strong preferences towards other native species of buckwheat (Xerces Society n.d.). Given the identified understanding that "Tiehm's buckwheat is the dominant insect pollinated plant species in its habitat where it occurs"(3.12.3), I believed it is within good reason to suspect there is a potential for higher than anticipated reductions in both specie's populations as a result from the proposed project if the interdependence between these two species is not fully understood and adequate mitigations are not provided or available to them as part of the project implementation process. Alternative B of the Draft Environmental Impact Statement claims that it is the least harmful to these species. That being said, Alternative B poses to remove up to 20% of current Tiehm's buckwheat habitat, and has been recognized as a potential disruption for Monarch butterfly migrations between the state of Nevada and the state of California. Although the Draft Environmental Impact Statement does provide an extensive summary of the harms to Monarch butterfly migrations as a result of Milkweed (Asclepias syriaca) population degradation, I feel that it inadequately	Impacts to Tiehm's buckwheat and the monarch butterfly, including impacts to pollinators and host plants, are discussed in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER. The monarch butterfly was not observed during pollinator studies, nor during baseline field surveys. Although the monarch buttery may be a potential pollinator of Tiehm's buckwheat, the current available scientific data does not show monarch butterfly is uniquely associated with Tiehm's buckwheat as opposed to any other butterfly species.

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		addresses how the loss of Tiehm's buckwheat will impact the Monarch butterfly's migration patterns as well as endemic level Monarch butterfly population numbers. The disturbance of these two species could have a snowball impact on other animals and plant species in the area. I sincerely encourage Ioneer Mining, The USFWS, and BLM to spend resources to fully understand and investigate the potential harms of the Rhyolite Ridge Lithium Mine on symbiotic relationships between Tiehm's buckwheat and Monarch butterflies at an endemic level during the creation of the Final Environmental Impact Statement. It is critical to place emphasis on the conservation of these two species and their endemic habitats for the future well-being and the cohesion of our nation's ecosystems. I appreciate you taking necessary time to read and include these concerns in the Final Environmental Impact Statement, and for your dedication to managing our public lands for all people. Sincerely, Dylan Rodvik	
Dempster Drowley – May 20, 2024			
59	59.1	I support the Rhyolite Ridge Project in the interest of national security, jobs, and contribution to an anticipated electric energy future.	Comment noted.
Personal Information Requested to be Withheld – May 20, 2024			
60	60.1	Ioneer's Rhyolite Ridge project will provide good job opportunities in the community, and help support families. Ioneer has been actively working with the BLM, the Fish and Wildlife Service, and other stakeholders, to modify its plan to reduce impacts to Tiehm's buckwheat and habitat, and have gone above and beyond to establish a program to grow, re-seed and support the propitiation of Tiehm's buckwheat. I believe it will thrive far better into the future because of Ioneer's efforts. The actions of Ioneer are exactly the type of responsible corporate / mining company behavior which should be encouraged. Our country needs it own domestic supply of lithium. Rhyolite Ridge will drastically increase domestic production if this critical mineral. We need the entire supply chain for battery production to be sourced and located within the U.S. economic growth and national security require it. I support this mining project.	Comment noted.
Frank Prado – May 21, 2024			
61	61.1	Hello, My name is Frank Prado and I am a US citizen residing in Florida. For my profession, I strategically partner with healthcare executives to maximize their use of electronic medical records. Over the past year, artificial intelligence has been a cornerstone for future planning and clinician workflow enhancements. This has pushed me to learn more about emerging technologies and zooming out to understand how our country can best position ourselves for the developing AI revolution. The utilization of clean energy will be integral for future AI use-cases (e.g data center growth), and because the Rhyolite Ridge project is an avenue to mine a domestic lithium source, this will support the production of lithium-ion batteries to support the increased energy demand. Because of these downstream impacts, I am writing in support of the Rhyolite Ridge project. Developing clean energy sources such as lithium-ion batteries in conjunction with solar and wind energy sources will have a net positive impact on our climate and domestic economy when compared to traditional non-renewable energy sources. As a concerned citizen and advocate for the United States remaining an advanced and safe country for all, I will reiterate my position of support for the Rhyolite Ridge mining project. Respectfully, Frank Prado	Comment noted.
Not Provided – May 21, 2024			
62	62.1	The move to electric vehicles is a scam, aimed at being seen as green or "sustainable" when in reality the process of creating these vehicles is detrimental to the environment. As a US Citizen, a resident of Nevada, and American Indian, it is not hard to see that the ploy of shifting to EVs is just an excuse to keep car infrastructure alive. I do not agree that ripping into our mother earth and destroying land, vegetation, and ecosystems for the collection of natural resources is in the best interest of future generations to come. Especially for a company whose headquarters are not even from this country. Why should we destroy our natural resources that have been providing for its inhabitants for thousands of years to be ripped up to support foreign interests or the capitalist ideology. How about supporting across country hyper speed public transit rather than supporting consumer debt to buy the latest EV. Especially in this economy, do you really think people have the funds to buy a new car when they can't even afford homeownership or food? Thanks Biden.	Comment noted.
Personal Information Requested to be Withheld – May 22, 2024			
63	63.1	This project does not fully protect the buckwheat species that is endangered, and will damage or kill some portion of its habitat. It should therefore be denied unless it can fully protect the species.	Due to the location of the mineral resource, full avoidance of Tiehm's buckwheat critical habitat is not possible. The Proposed Action and alternative include ACEPMs and Buckwheat Protection Plans to reduce impacts to Tiehm's buckwheat. The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.

Comment Letter No.	Comment Number	Comment	Response
Thomas McDonald – May 22, 2024			
64	64.1	See Attached	Comment noted.
202	202.1	To Whom It May Concern: Attached is a comment my wife and I would like to submit regarding the Rhyolite Ridge Lithium-Boron Project in Esmeralda County. Thank you for your consideration, Tom McDonald	Comment noted.
64 and 202	64.2 and 202.2	RE: Rhyolite Ridge lithium-Boron Project Dear Sir, My wife and I currently own and operate 41 Burger Kings and three ACE Hardware stores in Southern Nevada. As Nevada business owners, we would like to submit a comment regarding the Rhyolite Ridge lithium-Boron Project in Esmeralda County, proposed to be developed by loneer Rhyolite Ridge LLC (loneer). Rhyolite Ridge will provide important economic benefits for the local region, the state of Nevada, and the United States. The Rhyolite Ridge Project will create family-supporting jobs in rural Nevada, employing approximately 350 people while the mine operates, and 500 people during the construction phase. The expected $54 million of labor income during construction and $38 million of annual labor income during operations will be transformational for the local region. Once in operation, Rhyolite Ridge is expected to generate between $13 million and $31 million in annual fiscal tax revenue for state and local governments. In addition to the significant economic benefits for Nevada, this project will also help the United States become less dependent on other countries for our supply of lithium, a vital mineral for the production of batteries and critical for achieving the goal we all have of promoting economical and reliable green energy. The Draft Environmental Impact Statement estimates the total direct economic output to be $178 million during the construction phase and $125 million annually, once the mine is in operation. This level of long-term economic impact will be significant for nearby communities, Tribal and local businesses, and Nevada. loneer is focusing on engaging with local, regional, Tribal, and state businesses to execute its large-scale industrial project, and as demonstrated by its decadelong presence in the Fish Lake Valley region, is committed to doing business locally. loneer has involved regional and state contractors at every step of the procurement process. Local and Tribal businesses will also naturally benefit from construction activity and other downstream economic development opportunities. Potential opportunities include hotels, B&Bs, lodging, restaurants, hardware stores, staging yards, waste disposals, and transportation needs. loneer has conducted and will continue to conduct outreach with multiple Tribal Nations to discuss community benefit opportunities, cultural resource monitoring, economic development partnerships and federal technical and workforce development opportunities. The Project will provide important and sustained economic development opportunities for the community in addition to substantial tax revenue to this economically challenged region of Nevada. Thank you for your consideration,	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.
John Rupp – May 23, 2024			
65	65.1	Attached are our comments regarding the draft EIS for Rhyolite Ridge. John D. Graham and John A. Rupp, Paul H. O'Neill School of Public and Environmental Affairs Indiana University Bloomington, IN 47405 rupp@indiana.edu (812) 345-9064	Comment noted.
	65.2	Comments of John D. Graham and John A. Rupp, Paul H. O'Neill School of Public and Environmental Affairs, Indiana University, Bloomington, Indiana* Qualifications of Commenters John D. Graham, Professor of Risk and Policy Analysis John D. Graham joined the Harvard School of Public Health as a post-doctoral fellow in 1983 and as an assistant professor in 1985. From 1990 to 2001, Graham founded and led the Harvard Center for Risk Analysis (HCRA). In 1995, Graham was elected president of the Society for Risk Analysis (SRA), an international membership organization of 2,400 scientists and engineers. In 2009, Graham received the SRA's Distinguished Lifetime Achievement Award, the Society's highest award for excellence. From 2001 to 2006, Professor Graham served a Senate-confirmed role in the George W. Bush administration as Administrator, Office of the Information and Regulatory Affairs, Office of Management and Budget. From March 2006 to July 2008, Graham was dean of the Frederick Pardee RAND Graduate School (PRGS) at the RAND Corporation in Santa Monica, California. He later served as Dean of the O'Neill School at IU until 2019, when he joined the full-time faculty. As a scholar, Professor Graham is an author of more than ten books and 200 scientific articles; he is also an elected fellow of the National Academy of Public Administration. His most recent book is entitled *The Global Rise of the Modern Plug-In Electric Vehicle: Public Policy, Innovation, and Strategy* (Elgar Publishing, UK, 2021). John R. Rupp, Clinical Associate Professor Emeritus	Qualifications and comments noted.

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		John R. Rupp, is Clinical Associate Professor Emeritus at the O'Neill School at Indiana, University. He began his career as a mineral exploration geologist at Salisbury & Dietz Company in Spokane, Washington. After service for Consolidated Resources of America in Cincinnati, Ohio, he joined Exxon Company USA as a production geologist in Midland, Texas. He then moved to IU where he served first as a senior research scientist at the Indiana Geological Survey and later as a full-time faculty member at the O'Neill School, where he helped design the energy-policy concentration in the MPA/MSES programs and taught courses on energy technology and policy. He is currently active as a consultant on a wide range of energy issues. **Recent Scholarship on Critical Minerals** In recent years, Professors Rupp and Graham engaged in collaborative research on the role of public policy in the development of critical minerals for the clean energy transition. In 2019 Professors Rupp and Graham published an assessment of the world's ability to mine the quantities of lithium necessary to meet the explosive demands from clean energy policies. They found that a surprising number of planned lithium mines in Asia, South America, Europe, and the USA were delayed or cancelled because of local community concerns about the adverse impacts of mining operations. They concluded that governments around the world need to enact additional incentives for local communities to serve as hosts of lithium mines. More recently, Professors Rupp and Graham were commissioned by the Wilson Center in Washington, DC to assess the capabilities of South America to meet the world's needs for expanded lithium supplies. Although South America has a privileged geological position in lithium reserves, Professor Rupp and Graham found substantial socio-political and governance barriers to the expansion of lithium mining, especially in Chile, Argentina, and Bolivia. They concluded that it would not be wise for the world to count on South America as the exclusive source of a dramatic increase in global lithium supplies. Most recently, Professors Rupp and Graham have formed a research team at IU to assess the progress and limitations of the nascent critical materials industry in the United States. The focus is on seven specific materials: cobalt, copper, graphite, lithium, manganese, neodymium, and nickel. All seven materials will play a crucial role in the electric vehicle transition for the next decade. Rupp, Graham, and student collaborators are building a database to track the progress of the United States in establishing mines and processing materials for these materials. One of the initial papers from this effort is now under peer review at a scientific journal. Additional papers are in the pipeline. This work is funded by the internal resources of Indiana University. **Comments on the Draft Environmental Impact Assessment for the Rhyolite Ridge Lithium-Boron Project in Nevada.** The comments below are strictly those of the authors and do not necessarily represent the positions of the O'Neill School or Indiana University. The comments were not funded or sponsored by any outside entity.	
	65.3	**Comment #1: The United States federal government, under recent Republican and Democratic presidents, has established a national priority to expand the mining and processing of critical minerals in the United States.** The last three US presidents (Barack Obama, Donald Trump, and Joe Biden) have had numerous policy disagreements. One issue where they are united is the national priority to expand the mining and processing of critical minerals in the United States. Each of the last three presidents has used executive-order authority to direct federal agencies to take the necessary steps to expand the mining and processing of critical minerals in the United States. The current administration is on record as stating that "The project represents another step by the Biden-Harris administration to support the responsible, domestic development of critical minerals to power the clean energy economy."	The decision to be made is based on the analysis of impacts as required by NEPA, CEQ regulations, and the BLM NEPA Handbook.
	65.4	**Comment #2: The United States Congress, with support from President Biden, has authorized the Departments of Energy and Defense to provide financial assistance (loans and grants) to stimulate the mining and processing of critical minerals in the United States.** The US Congress and President Biden have collaborated on new legislation that seeks to stimulate greater mining and processing of critical minerals in the United States. In the Inflation Reduction Act of 2022, for example, Congress authorized tax credits for costs of mining and processing the critical minerals used in clean energy technologies. Congress also provided the Department of Energy (DOE) with new budgetary authority to offer grants and loan guarantees to companies working to mine and process critical minerals in the United States. Congress has also provided the Department of Defense with new budgetary authority to subsidize mining and processing of critical materials that are crucial to the national security of the United States. In accord with these federal programs, the developer at Rhyolite Ridge (Ioneer) has secured a $700 million dollar conditional loan from the DOE to partially support the capital costs of this project.	The decision to be made is based on the analysis of impacts as required by NEPA, CEQ regulations, and the BLM NEPA Handbook.
	65.5	**Comment #3: Lithium has been identified as a critical mineral/material by both the US Geological Service and the US Department of Energy.** The Department of Interior, through the US Geological Survey, has identified lithium as a critical mineral that is crucial to the national security of the United States. Drawing from the USGS determination, the US Department of Energy has determined that lithium is a critical material for the energy security of the United States, including the clean energy transition. In June 2023 DOE published a "criticality matrix" that rates each critical material according to its "criticality" for the Unites States economy and security. Lithium has rated at highest level in terms of both "important to the energy system "of the United States and the degree of supply chain vulnerability from 2025 to 2035. (https://www.energy.gov/sites/default/files/2023-07/doe-critical-material-assessment_07312023.pdf).	The decision to be made is based on the analysis of impacts as required by NEPA, CEQ regulations, and the BLM NEPA Handbook.
	65.6	**Comment #4: Federal, state, and local agencies have been working collaboratively for several years to minimize any adverse environmental impact that might occur from a new lithium mine at Rhyolite Ridge, Nevada.** The review of the developer's plan at Rhyolite Ridge has been led by the Bureau of Land Management Battle Mountain District Office Tonopah Field Office 1553 South Main Street Tonopah, Nevada 89049. The Cooperating Agencies include the United States Department of Energy, the United States Environmental Protection Agency, the United States Fish and Wildlife Service Ecological and Migratory Bird Programs, the Nevada Department of Wildlife, the Nevada Division of Forestry, the Nevada Division of Environmental Protection, and Esmeralda County and Nye County of the State of Nevada. In the Draft Environmental Impact Statement, the BLM has concluded that the new lithium mine at Rhyolite Ridge can proceed without significant adverse environmental impact.	The BLM has involved cooperating agencies as required by CEQ regulations and analyzed environmental impacts in accordance with applicable laws, regulations, and agency policy.
	65.7	**Comment #5: The developer's plan for mining at Rhyolite Ridge is environmentally responsible.** The developer has conscientiously designed the planned mining and processing operation to have minimal negative impacts on the environment, in particular the North and South OSF Alternative. The systems applied to the entire process stream are both innovative and exceptional in the mining industry. Within the Draft Environmental Impact Statement, careful consideration of all facets of the operation's impacts ranging from the social/economic implications to those involving the physical environment have been designed in consultation with technical environmental experts, impacted stakeholders, and numerous local, state and federal regulatory agencies. Of particular note are the consideration and incorporation of Tribal nation's concerns, the water management system that will result in zero net discharge and careful management of the impacts on local water supplies, and the zero-carbon emission power supply system.	The EIS evaluates environmental impacts associated with the Proposed Action and alternatives.

Comment Letter No.	Comment Number	Comment	Response
	65.8	**Comment #6: The BLM and Cooperating Agencies have worked with the developer to minimize any adverse impact of the new lithium mine on Thiem's Buckwheat.** In collaboration with experts at federal agencies, the developer at Rhyolite Ridge has developed a multi-faceted plan of research and development, coupled with a suite of mitigation activities, designed to specifically address the preservation of an endangered species, Thiem's Buckwheat, and to help the current population of Tiehm's Buckwheat reproduce and thrive.	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER.
	65.9	**Comment #7: The future sustainability of Tiehm's Buckwheat is likely more promising with BLM approval of the new lithium mine than it would be without approval of the proposed development.** The forces of nature, grazing, and climate change – not mining – have led to the endangerment of Thiem's Buckwheat. A key to the survival of this endangered species may be additional ecological research to identify feasible ways to protect the flower. This research – and promising protective measures -- are more likely to be funded and implemented following BLM approval of the mine at Rhyolite Ridge than if BLM withholds approval of the mine. In other words, the ongoing harm to the habitat of Tiehm's Buckwheat is more than offset by the ecological gains that will flow from Ioneer's multi-year investment in R&D and mitigation activities to protect, nurture, and sustain the current limited population of Tiehm's Buckwheat that occurs near the proposed mining operation.	Consideration of effects to Tiehm's buckwheat has been conducted as required by the ESA. The BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat.
	65.10	**Comment #8: If BLM Disapproves the Rhyolite Ridge Lithium Mine, Greater Environmental Harms Could Occur at Other Locations Around the World Where Environmental Reviews Are Less Rigorous Than Are in the United States.** In risk analysis of regulatory actions, it is crucial to analyze the risks created by a regulatory action, as well as risks that may be reduced by such action. The regulatory framework in the U.S to protect the environment from adverse impacts associated with mining activities is universally recognized to he be the most comprehensive and effective in the world. If BLM disapproves the mine at Rhyolite Ridge, lithium mining will occur at other locations around the world that have less environmental protections than those in existence within the U.S. where multiple federal, state, and local agencies collaborate to minimize adverse impacts on the environment.	The effects analysis has been prepared according to NEPA, CEQ regulations, and the BLM NEPA Handbook. Assessment of lithium mining effects in other parts of the world is beyond the scope of purpose and need of this analysis.
Not Provided – May 24, 2024			
66	66.1	My family lives by CMR, we WILL be directly impacted by this mine and the rest of the fake renwable energy crap. I have worked for mining companies like this and they are all the same. They told everyone what they wanted to hear with a smile and unicorns are flying around. I does not take a rocket scientist tp read this and see that not only is this going to cause destruction of everything they touch, it IS going to make the water poisoned or dry. It is going to poison all of us and wildlife. Oh and farming will suck. Not only am I against this I am against all the green energy stuff coming. Not about the environment except for making it worse, this is about money and none of us can say anything because it is federal and you don't matter. The BLM can't handle horse management and don't think they understand that all those poisonous gases mentioned are above levels for health concerns. This area is very special to our family and now it is gone. Our son who has planned his whole life to be self-employed in the community he loves will have to move somewhere safer then next door. You destroyed or will destroy everything we love about this area and it is the reason we live here. Sadly too many people live here now who don't understand mining and your BS. That is actually being said you will destroy. The things that you disturb are worse than all the things in this reported. I hope the valley residents on board with this get what you deserve. When it is all said and done and we are all sick with no water or wild life you will take your money and run and the people here will still not get it!!! NO MORE	The air quality impacts were modeled for the Project and no pollutants are projected to exceed national or state standards. Section 4.1 of the EIS includes additional air quality information and impacts analysis. Section 4.19 describes impacts to wild horse and burros, Section 4.16 describe impacts to water resources, including quantity and quality, and Section 4.18 describes impacts to wildlife resources. Section 4.20.10 describes the estimated taxes that would be generated and distributed both locally to Esmeralda County as well as up through to federally, as well as direct, indirect, and inducted values.
Denis Phares – May 24, 2024			
67	67.1	Please find attached Dragonfly Energy's support letter for Ioneer's Rhyolite project.	Comment noted.
	67.2	Bureau of Land Management Scott Distel, BLM Project Manager SO Bastian Road Battle Mountain, Nevada 89820 RE: Rhyolite Ridge Lithium-Boron Project Dear Sir, I represent Dragonfly, we would like to submit a comment regarding the Rhyolite Ridge Lithium-Boron Project (Rhyolite Ridge) in Esmeralda County, proposed to be developed by loneer Rhyolite Ridge LLC. Rhyolite Ridge is one of the most advanced lithium projects in the U.S., with significant resources that can help us build a U.S. green energy storage supply chain. The vast majority of lithium processing occurs outside of the United States. Rhyolite Ridge will be an important domestic source of refined lithium materials so that we are able to build our domestic supply chains and be compliant with the Inflation Reduction Act and other U.S. Government objectives regarding reliable, clean energy. Dragonfly seeks the U.S. government to swiftly support the localization of lithium mine and processing development in the U.S. to support the significant investments we are making throughout the U.S. for green energy storage supply chain. Rhyolite Ridge Lithium Boron projects are important for the following reasons: ■ To reduce carbon footprint in the US ■ Green energy storage production for Dragonfly in the US ■ To secure critical minerals in the US Thank you for your consideration, Dr. Denis Phares Ph. D	The BLM is considering the proposal as required by NEPA, mining laws, CEQ regulations, and BLM surface management regulations.
Jeff Sutich, NNDA – May 22, 2024			
68 and 189	68.1 and 189.1	Dear BLM, Please see the attached comment letter in support of the Rhyolite Ridge Lithium project. Best regards, Jeff Sutich Executive Director Northern Nevada Development Authority	Comment noted

Comment Letter No.	Comment Number	Comment	Response
68	68.2 and 189.2	May 21, 2024 The Northern Nevada Development Authority (NNDA) is the state-designated Regional Development Authority (RDA) for the Sierra Region of Nevada that includes Mineral County which was included within the area of analysis for the Rhyolite Ridge Lithium-Boron Project. NNDA helps to grow and strengthen the region's economic ecosystem and facilitates business-to-business resources to support existing businesses – such as we would like to provide these comments on the Rhyolite Ridge Lithium-Boron Project Draft EIS. The lithium supply chain has become a major focal point in bolstering and diversifying Nevada's economy as it is the only state in the Nation that has all stages of the supply chain – from mining and processing to recycling - located within its borders – and the State stands to benefit for many decades from the lithium material that Ioneer will provide from Rhyolite Ridge. In 2023, The State was designated as one of the 31 unique Tech Hubs Across America in October of 2023. Led by the University of Nevada, Reno, the Hub aims to build a self-sustaining and globally competitive full lithium lifecycle cluster, spanning extraction, processing, manufacturing, and recycling. Through its many academic, industry and non-profit partners, including NNDA which is tasked with Enhancing the Existing Value Network and Supply chain (Gaps);, the team aims to pioneer a complete lithium supply chain, from resource management of critical materials to the rejuvenation, repurposing, and recycling of lithium batteries, and to the reinvention of the future generations of batteries. The Rhyolite Ridge Project's creation of lithium material is an important component in this endeavor. According to the Draft EIS Section 4.10.1, the Project is estimated to create 500 jobs during the construction period, and up to 350 direct jobs during mining operations. Hawthorne (located in Mineral County), by being one of the closest towns to the Project, stands to benefit for many years because of the operations at Rhyolite Ridge as many of the workers and their families are likely to reside in the community. Further, local businesses including hotels, restaurants, and mine support services are likely to see an uptick in activity that likely will result in the creation of even more local jobs and economic opportunity. The NNDA for many years has worked with Ioneer by connecting them with the local business community to find areas of synergy and opportunities for business development, in addition to community colleges within our territory to develop Project specific training programs for local citizens. The North and South Overburden Storage Facility Alternative being proposed in the Draft EIS will spur much needed economic development for this traditionally underserved part of rural Nevada, and we look forward to working with Ioneer as their Project is slated to create significant economic development and employment opportunities for decades to come. We thank you for considering these comments on behalf of NNDA,	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.
Eric Kaufman – May 24, 2024			
69	69.1	Hello; I live in Fish Lake Valley and am curious about the 10 foot draw down on aquifer impacts. I read something saying that it would represent the final, ultimate, amount of lowering of the aquifer, but maybe I'm wrong on that. So I guess my two questions: Does this mean that via monitoring wells the aquifer will not drop below 10 feet, and if it does, what happens? Does this mean that after the mine closes, the aquifer will not drop below 10 feet, and if it does, what happens? Thanks so much for any clarity you can provide, Eric	The 10-foot drawdown contour was used to assess impacts of the Proposed Action and alternatives. Impacts to groundwater are described in the EIS in Sections 4.16 and 4.20.16. Additional information is found in the Water Resources and Geochemistry SER. EIS Section 4.21 includes monitoring surface water and groundwater and mitigating impacts.
Peter Flanagan – May 24, 2024			
70	70.1	I fully support the Rhyolite Ridge Lithium-Boron Project We need critical minerals, like Lithium, made here in USA, with USA workers!	Comment noted.
Board of Mineral County Commissioners – May 24, 2024			
71	71.1	Please see the attached letter in support of the Ioneer project near Mineral County. All the best, T. Jaren Stanton, Esq. District Attorney, Mineral County District Attorney's Office	Comment noted.
204	204.1	Hello, Attached is the Mineral County Board of Commissioners comment letter for the Rhyolite Ridge Lithium-Boron Project. Thank You Bonnie DeMars Clerk-Treasurer Chief Deputy	Comment noted.
71	71.2 and 204.2	The Mineral County Board of Commissioners would like to submit the following comment regarding the Rhyolite Ridge Lithium-Boron Project in Esmeralda County, proposed to be developed by Ioneer Rhyolite Ridge LLC (Ioneer). Through many years of communication between Ioneer and Mineral County we know that the Project has been designed in a responsible manner and subject to the highest standard of environmental review. The North and South Overburden Storage Facility Alternative being proposed in the Draft EIS will provide much needed economic development for this underserved part of rural Nevada while also meeting national carbon emission objectives. The Draft EIS is well-reasoned and addresses all the local government impacts that are anticipated. We are confident that the Project will be of significant benefit for local businesses and residents in Mineral County. According to the Draft EIS for the Project, "Mineral County has the highest percentage of low-income populations within the area of analysis, which includes Hawthorne, Mina, and Luning." (Section 3.3 - Environmental Justice). In addition to providing meaningful	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER. Effects to environmental justice populations, including low-income populations, are evaluated in Sections 4.3 and 4.20.3.

Comment Letter No.	Comment Number	Comment	Response
		employment opportunities for our residents who will be able to commute to work at the facility, our local hotels, restaurants, gas stations, product vendors and other local businesses will all benefit from the activity at Rhyolite Ridge which is slated to be in operation for decades. The Hawthorne Army Depot is the largest ammunition storage facility in the world and played a pivotal role in supplying ordnance to the Pacific Theater during World War II. As such, the town of Hawthorne has a long military history and is appropriately nicknamed "America's Patriotic Home". Therefore we are well aware of the importance for the United States to develop a domestic supply of critical materials. Both the lithium and boron that will be produced at nearby Rhyolite Ridge are crucial for national defense applications. Ioneer has for many years indicated their commitment to hiring locally and instituting training programs for workers in the region, including partnering with local community colleges and vo-tech institutions to deliver training in advance of operations. Moreover, Ioneer is taking meaningful recruitment actions, including hosting job fairs for local communities and Tribes and affirmative recruiting in disadvantaged communities in the region. Thank you for your careful consideration. Chairman Larry Grant Vice Chairman Curtis Schlepp Commissioner Tina Manzini	
Amanda Hilton, NVMA President – May 24, 2024			
72	72.1	To Whom it May Concern: Attached please find a letter of support for the Rhyolite Ridge project. Regards, Amanda Hilton	Comment noted.
72	72.2	The Nevada Mining Association respectfully submits the following comments regarding loneer's proposed Rhyolite Ridge Lithium-Boron Mine Project in Esmeralda County, Nevada. The Rhyolite Ridge project is an exciting opportunity to develop local sources of lithium and boron - two materials essential for the increased deployment of clean technologies and sustainability. <u>The Nevada Mining Association and Mining in Nevada</u> First organized in Tonopah, Nevada, in 1913, the Nevada Mining Association (NVMA) currently consists of more than 400 companies that comprise Nevada mining and rely, in whole or in part, on this state's foundational industry. These member companies are engaged across the broad spectrum of the industry in Nevada, from exploration and discovery to development and construction, to operation and production, to closure and reclamation. The NVMA provides a voice for Nevada's mining industry in federal, state, and local policy matters, community engagement, public education, and workforce development. Mining in Nevada and in the U.S. is in global competition. Access to mineral resources and the costs of doing business weigh heavily on a decision to mine in the U.S. verses South America, Africa, and other mineralized areas of the world. Furthermore, the products mined in Nevada, especially lithium, have significant strategic importance to the U.S. in terms of climate change, technological innovation, energy independence, economic stability, and the national interest. In the absence of domestic metallic and industrial mineral production, the U.S. must import from foreign sources, making Nevada mining a national security interest. Mining offers great benefits to the communities in which it operates and to the state as a whole. Mining operations and mining-related businesses are found in every county in Nevada, and the mining industry makes significant contributions to the economic wellbeing of the state and counties, paying all taxes and fees that all general businesses are required to pay in addition to two industry-specific taxes. Further, the mining industry is known for being a great partner of education in the communities in which it operates by teaming with local efforts to sponsor everything from programs for at-risk students to construction of facilities. Nowhere is the presence of mining more important than in rural Nevada where it is a major economic driver in communities like Tonopah, Elko, Winnemucca, Battle Mountain, and Eureka. With direct and induced employment numbering near 37,000, average wages near $100,000, paid leave policies, and employer-provided health insurance, mining offers tremendous opportunities to rural residents and reduces the strain on the State's social safety net.	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.
72	72.3	<u>Benefits of the Rhyolite Ridge Lithium-Boron Mine Project</u> The NVMA is confident that the Rhyolite Ridge project will provide significant, much needed economic benefits and opportunities for Nevada in addition to critical minerals for the security of the U.S. supply chain. Rhyolite Ridge will provide important economic benefits for the local region, the state of Nevada, and the United States. The Rhyolite Ridge Project will create family-supporting jobs in rural Nevada, employing approximately 350 people while the mine operates, and 500 people during the construction phase. The expected $54 million of labor income during construction and $38 million of annual labor income during operations will be transformational. Once in operation, Rhyolite Ridge is expected to generate between $13 million and $31 million in annual fiscal tax revenue for state and local governments. The Draft Environmental Impact Statement estimates the total direct economic output to be $178 million during the construction phase and $125 million annually, once the mine is in operation. This level of long-term economic impact will be significant for nearby communities, Tribal and local businesses, and Nevada. The Rhyolite Ridge Lithium-Boron project is expected to employ 400 to 500 workers during the construction phase, and 320 to 350 during operation with median total compensation levels of $141,000 per year. In addition, the operation is estimated to contribute $15-25 million in taxes during construction and $13-35 million annually once in operation. When considering the life of the mine (30 to 50 years) and the direct, indirect, and induced jobs that will be created, the Rhyolite Ridge Lithium-Boron project will be transformational for the people, children, and businesses of Esmeralda County and its communities. loneer is focusing on engaging with local, regional, Tribal, and state businesses to execute its large-scale industrial	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.

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		project, and as demonstrated by its decadelong presence in the Fish Lake Valley region, is committed to doing business locally. The impacts to small business are obvious, creating opportunities for new ones and allowing existing businesses to thrive and expand. Throughout every step of the procurement process, loneer has involved regional and state contractors. Local and Tribal businesses will also naturally benefit from construction activity and other downstream economic development opportunities. Potential ancillary opportunities include, but are not limited to, diverse lodging options, restaurants, hardware and other retail stores, staging yards, waste disposals, and transportation options. In particular, loneer is committed to continuing its outreach with multiple Tribal Nations to discuss community benefit opportunities, cultural resource monitoring, economic development partnerships, and federal technical and workforce development opportunities.	
72	72.4	Strengthening the Domestic Supply Chain and Enhancing National Security This project will be only the second lithium operation in Nevada and all of North America. The need for lithium worldwide has skyrocketed with the development of renewable energy technologies. Due to its bountiful mineral resources, Nevada is uniquely positioned to fulfill that demand. In the 20th century, lithium production was almost non-existent, but accelerated quickly in response to technological demands. Production was 150,000 tons in 2000, 400,000 tons in 2010, and about 600,000 tons in 2020. As the demand continues to grow, so must the supply through new sources and new mining operations. The Rhyolite Ridge Lithium-Boron project is expected to produce 22,000 tons of lithium carbonate per year, significantly supplementing the country's supply. Unfortunately, the vast majority of lithium processing currently occurs outside of the United States. Rhyolite Ridge will invest in the domestic production of lithium and other critical minerals, which are essential to national security. The U.S. is dependent on foreign sources for the processed versions of many of these minerals. Without intervention, that reliance will only grow. The Rhyolite Ridge Project will inject Nevada lithium and boron into the U.S. electric vehicle supply chain, which will immediately make a positive economic impact. Once operational in 2026, Rhyolite Ridge will quadruple domestic lithium production and be sufficient to power approximately 400,000 electric vehicle cars per year for decades to come. Its 22,000 tons of produced lithium chemicals annually will provide a boost to American-made automobiles and help accelerate the clean energy transition. The refined lithium chemicals produced at Rhyolite Ridge will be immediately ready to be used by battery makers. The on-site production facility will also produce large quantities of borates, also a significant material for clean technologies and environmental sustainability. Boron is used in solar panels and the heat tubes inside them, microwave cookware, and the screens on mobile phones and other such devices. That material is thin and strong because of the borosilicate glass. Boron is also used in fiberglass insulation, making houses and buildings more energy efficient.	Comment noted.
72	72.5	Conservation Efforts by loneer The North and South Overburden Storage Facility Alternative proposed in the Draft EIS thoroughly examines potential local environmental impacts while also meeting national carbon emission reduction objectives. The Draft EIS is well-reasoned and addresses all anticipated environmental impacts Upon learning of the Tiehm's Buckwheat, the Rhyolite Ridge Lithium-Boron project took immediate actions to conserve and preserve the species, including the protection of current populations from non- mining threats. Further, the Rhyolite Ridge Lithium-Boron project has worked with federal land managers, state regulators, and researchers to learn more about the Tiehm's Buckwheat. This work has led to the development of a habitat suitability model and the funding of baseline studies and genetic research to identify undiscovered Tiehm's Buckwheat populations and to better understand the plant's lifecycle along with the soil and climatic factors on which the buckwheat depends. Additionally, in cooperation with the BLM, seeds have been sustainably collected for study; they have been banked and propagated with an eye toward natural germination and seedling planting. Significantly, the Rhyolite Ridge Lithium-Boron project's operational plans were modified specifically to avoid, minimize, and mitigate impacts on the Tiehm's Buckwheat and ensure that populations are preserved and protected while allowing mining activities to occur.	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat for the Proposed Action and North and South OSF Alternative in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER.
72	72.6	Conclusion The Rhyolite Ridge Project will provide important and sustained economic development opportunities for the community in addition to substantial tax revenue to this economically challenged region of Nevada. Rhyolite Ridge will positively benefit the regional and domestic supply chains during both its construction and operation phases. The project has carefully considered its environmental impacts and adjusted plans accordingly. The Nevada Mining Association appreciates the opportunity to provide comments on the Rhyolite Ridge Lithium-Boron Mine Project, which will be a globally significant, long-life, low-cost source of lithium and boron. The project will provide the materials necessary for a sustainable and thriving planet, while strengthening the U.S. critical minerals supply chain. The Draft EIS offers a thorough evaluation of the project, which should be allowed to move forward into construction and production as quickly as possible. Please contact me if you have any questions. Sincerely, Amanda Hilton President	Comment noted.
Brady Godbey – May 24, 2024			
73	73.1	Dear Bureau of Land Management, I am writing to express my strong support for the Rhyolite Ridge Lithium-Boron Mine Project. As we strive for a more sustainable future, projects like Rhyolite Ridge play a crucial role in meeting our clean energy needs and promoting environmental responsibility. At Fluor, we have collaborated with Ioneer since 2018 on the development and planning for this project. Our firsthand experience has highlighted several key points in favor of the Rhyolite Ridge project: 1. Resource Potential: Esmeralda County, Nevada, holds the largest known lithium and boron deposit in North America. The availability of these critical materials is essential for advancing technologies such as electric vehicles, renewable energy storage, and other clean energy applications. 2. Economic Impact: The project has the potential to create jobs locally, nationally, and globally. It will contribute to economic growth and stability, benefiting communities and supporting the transition to a low-carbon economy. 3. Sustainable Design: We applaud and embrace the efforts by Ioneer to produce a sustainable design. The project's innovative cost-saving measures make it an attractive investment for the future.	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER. ACEPMs to minimize impacts are described in the EIS in Section 2.1.13.

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		4. Responsible Mining Practices: Rhyolite Ridge stands out as one of the most meticulously planned projects. By extracting lithium and boron efficiently, it minimizes its environmental footprint while meeting growing demand for these critical minerals. Compared to all other critical mineral projects in development today, the Rhyolite Ridge project is one of the most positively impactful projects for the United States. I urge the Bureau of Land Management to support the necessary permits and approvals for this vital initiative. Let us work together to build a cleaner, more prosperous future. Thank you for your attention to this matter. Sincerely,	
Emily Ketchen and Simon Clarke – May 27, 2024			
74	74.1	Dear BLM Rhyolite Ridge Team, Please see attached public comment letter for the Rhyolite Ridge Lithium-Boron Project's Draft Environmental Impact Statement from Simon Clarke, CEO of American Lithium Corp./Tonopah Lithium Corp. Kind regards, Emily Ketchen [Attachment: FNL_ioneer_DEIS_Call_To_Action.pdf]	Comment noted.
207	207.1	Dear BLM Rhyolite Ridge Team, Please see attached public comment letter for the Rhyolite Ridge Lithium-Boron Project's Draft Environmental Impact Statement from Simon Clarke, CEO of American Lithium Corp./Tonopah Lithium Corp. Kind regards, Emily Ketchen Director of Administration	Comment noted.
74	74.2	RE: Rhyolite Ridge Lithium-Boron Mine Project To whom it may concern: American Lithium (dba Tonopah Lithium Corp. in Nevada) would like to provide the following comment on the Rhyolite Ridge Lithium-Boron Project in Esmeralda County, proposed to be developed by Rhyolite Ridge LLC (Ioneer). The Project is projected to create hundreds of long-term jobs in the area while also becoming a key domestic supplier of lithium necessary to create a cleaner, more sustainable future as well as helping domestic energy security. (See the Rhyolite Ridge Draft EIS Section 3-10, 3-11). By background, American Lithium is an advanced lithium developer with assets located in Nye and Esmeralda Counties near the town of Tonopah. We have developed a strong relationship with the Ioneer team over the last seven years and have seen first-hand the diligent work that they have done to collaborate with the local community, including local businesses, Tribes, and other Project developers including ourselves. They are great neighbors and understand, like we do, that it is critical for future energy security that all the large lithium projects in Nevada are developed and brought into construction as soon as possible. We look forward to continuing to work with them over the coming years to help provide the lithium required for domestic markets and to benefit the local communities, Nevada and North America at this critical time in the global transition of energy. Additionally, we are equally impressed with Ioneer's commitment to listen to experts including federal agencies to ensure the Rhyolite Ridge Project is developed in a way that is environmentally responsible. One of the strongest operational components of the Project is their ability to generate their own carbon-free power by leveraging the heat generated by their sulfuric acid plant to produce electricity while also extracting the lithium and boron products from the ore at Rhyolite Ridge (Section 2-6 of the Rhyolite Ridge Draft EIS). As the United States is currently dependent on foreign sources for the processed versions of the minerals needed for the energy transition, the Rhyolite Ridge Project is one of several world-class mining and processing projects that the country will need in the decades to come, including our own TLC project and several other projects in Nevada and nation-wide. Accordingly, we express our complete support for the Rhyolite Ridge Lithium-Boron Project, and we thank you for considering these comments.	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.
Steve Harris – May 26, 2024			
75	75.1	I am in support of this project as while following the progression, I find this effort to be responsible and well thought out. It will help us be less dependent on foreign suppliers whom will most certainly not be as safe or committed to our environment. The jobs created by this effort will also help American workers to provide for themselves and their families. This project will also help us achieve a lighter footprint on our planet evironmentaly. Please consider these points when moving this worthwhile effort forward. Thanks	Comment noted.
Han Cho – May 29, 2024			
76	76.1	Dear Whom it may concern, My name is Han Cho, who represents EcoPro Innovation Co., Ltd. We would like to submit our comment regarding the Ioneer Rhyolite Ridge LLC's Rhyolite Ridge Lithium-Boron Project (Rhyolite Ridge) in Esmeralda County. We believe Ioneer's Rhyolite Ridge project is important for the following reasons. • Playing critical role in the U.S. electric vehicle supply chain • Beneficial to the environmental impact by reducing carbon footprint in the U.S. • Support raw material procurement for lithium chemicals and cathode production in the U.S. Ioneer's Rhyolite Ridge project is one of the most advanced lithium projects in the North America.	Comment noted.

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		We believe the project will play critical role in establishing strong U.S. electric vehicle supply chain. Rhyolite Ridge will support securing critical raw material inside the U.S. and North America where we plan to expand on lithium chemical production and cathode active material production. Rhyolite Ridge's product will comply with the Inflation Reduction Act and other government objectives regarding electric vehicle production. As of now, most of the lithium is produced overseas outside the United States. We, EcoPro Innovation, would like to request unhesitating and full support of the U.S. government for ioneer's Rhyolite Ridge project. It would greatly support our investments in the U.S. and North America for the electric vehicle supply chain. I appreciate your consideration, Han Cho	
Personal Information Requested to be Withheld – May 29, 2024			
77	77.1	Lahontan Audubon Society comments on DOI-BLM-NV- B020-2021-0020-EIS, the draft EIS on the BLM Rhyolite Ridge Lithium-Boron Project	Comment noted.
77 and 180	77.2 and 180.1	Nevada Native Plant Society P.O. Box 8965 Reno, Nevada 89507 May 29, 2024 Rhyolite Ridge Lithium-Boron Mine EIS c/o BLM Battle Mountain District 50 Bastian Rd. via mail and ePlanning Battle Mountain, NV 89820 On behalf of the Nevada Native Plant Society, I am pleased to provide comments to the Bureau of Land Management (BLM) for the draft Environmental Impact Statement (dEIS) for the proposed Rhyolite Ridge Lithium-Boron Project in Esmeralda County, Nevada. The Nevada Native Plant Society (NNPS) is a non-profit organization whose mission is to stimulate an interest in and an appreciation of native plants and their conservation. Our primary concerns are the adverse environmental impacts of the proposed mining project on the endangered Eriogonum tiehmii (Tiehm's buckwheat), an endemic plant only found in the proposed mining project area on public land, and on its Critical Habitat designated by the U.S.F.W.S. Many of the issues which we raised in our February 1, 2023 scoping comments to the BLM on the impacts of the mining proposal on Tiehm's Buckwheat are mentioned in the dEIS. However, our major issue on protecting this endangered species and its critical habitat from adverse mining impacts was inadequately addressed. Neither the proposed action nor the North and South OSF alternative comply with federal legal and regulatory requirements. Instead, the proposed action, according to the dEIS, would result in the disturbance and degradation of 354 acres (39%) of designated Critical Habitat and the permanent destruction and loss of 97 acres (11%) of designated Critical Habitat. The North and South OSF alternative would result in disturbance and degradation of 197 acres (22%) and permanent destruction and loss of 45 acres (5%) of designated Critical Habitat. Only the no action alternative would result in no disturbance or loss of designated Critical Habitat for Tiehm's buckwheat; therefore, we could only support the no action alternative at this time. In addition to providing an alternative without these unacceptable impacts to the Critical Habitat of Tiehm's buckwheat, the BLM should also re-write the dEIS to adequately comply with the requirements of the Endangered Species Act, the National Environmental Policy Act and other laws and regulations. Our specific comments follow.	The EIS is consistent with NEPA, mining laws, CEQ regulations, BLM surface management regulations, and the BLM NEPA Handbook.
77 and 180	77.3 and 180.2	1. Unclear Purpose and Need for the Action: The BLM's stated purpose for the dEIS - to respond to the proposed Plan of Operations (PoO) - is compromised by the uncertainty in the description of the project as disclosed by the applicant (p.2) - "Should the exploration activities out-lined in this PoO provide sufficient geological and geotechnical information to modify the quarry plan, Ioneer will evaluate the potential to extend the life of the Project and obtain all necessary permits or amendments from the appropriate regulatory agencies at that time." The entire EIS would need to be rewritten in order for the BLM to publicly scope for comments on the actual changed mining proposal, evaluate the environmental impacts of a new PoO, provide for a new public comment period on a draft EIS, finalize the EIS, and make a decision based on a new and accurate PoO. Until the mining proposal is finalized, an EIS cannot be developed.	The Proposed Action and alternatives are described in Section 2.0 of the EIS.
77 and 180	77.4 and 180.3	2. Inadequate Range of Alternatives: The BLM has failed to comply with NEPA by not providing an alternative that provides for a permitted mine, but also one with no adverse impacts to the endangered Tiehm's buckwheat and its designated Critical Habitat. The No Action alternative is the only alternative which can be properly considered.	Alternatives considered are described in Appendix C of the EIS. The Project proposes development of a locatable mineral resource. Relocation of the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the resource deposit is located. The North and South OSF Alternative was developed that relocates some proposed facilities outside of Tiehm's buckwheat critical habitat and further away from Tiehm's buckwheat plants and subpopulations to minimize disturbance in Tiehm's buckwheat critical habitat.
77 and 180	77.5 and 180.4	3. Inadequate Mitigation: We recognize that mitigation of adverse mining impacts to endemic species, such as Tiehm's buckwheat, when its small habitat area would be surrounded by a mine, including a deep open pit, tons of excavation and dumping of waste rock, tons of dust generated by mining operations and other disturbances is a challenge to legally required mitigation. The mitigation proposed by the applicant seems insignificantly small and ineffective when considering in the dEIS the massive mining impacts to the entire population of this species. For example, dust is a significant threat to the continued existence of plants only a few feet from mining roads. The proposed mitigation of constantly watering the roads when operating in order to keep down the dust will facilitate the establishment of invasive species, which will also threaten the existence of the buckwheat.	The *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat* was prepared by Ioneer in close coordination with the BLM and USFWS to address potential impacts to the Tiehm's buckwheat and its critical habitat. ACEPMs to reduce dust and invasive plants are described in Section 2.1.13 of the EIS. Additionally, Ioneer has committed to dust monitoring and management, as described in the *Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical*

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			Habitat. Ioneer has also developed a Noxious and Invasive Weed Management Plan that would be required to be implanted for the Project, which includes prevention, detection, containment, and removal for weed control.
77 and 180	77.6 and 180.5	We are also concerned about statements in the dEIS about an ACEPM of growing and transplanting Tiehm's buckwheat and an ACEPM of protecting pollinator communities. We again are providing a link to research on the ecology of Eriogonum Tiehmii **(https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.4187)** that assessed the arthropod communities in E. tiehmii habitat, the most common visitors to the E. tiehmii flowers, and the importance of pollination for seed set. The results show that these plants are specifically adapted to their native soil types and that there were no unoccupied sites that could support both establishment and growth of E. tiehmii seedlings. The dEIS failed to discuss and disclose the ineffectiveness of transplanting E. tiehmii plants as "mitigation" for adverse mining impacts. Instead, the applicant's Buckwheat Protection Plan (Appendix I), discusses identifying sites for seeding and transplanting as "reclamation," without any independent scientific support. In addition, in our scoping comments, we specifically requested information on who would be responsible for mitigation for impacts on the endangered species. Instead in the dEIS, we read about EPMs and ACEPMs, without an explanation of how the proposed voluntary mitigation would be be enforced and by whom, penalties for noncompliance, or any actions required by BLM of the applicant if mitigation failed and/or if disturbances exceeded those estimated in the dEIS. Please clarify exactly what mitigation, if any, will be required by the BLM and how it will be implemented and enforced by the BLM, if the current proposed mining project goes forward.	The referenced paper was considered in the analysis. Mitigation for Tiehm's buckwheat is described in EIS Section 4.21.
77 and 180	77.7 and 180.6	Inadequate mitigation in addition to not avoiding disturbance, degradation, and permanent losses of nearly 59% of the 910 acres of designated Critical Habitat again leads us to support only the No Action alternative.	Under the Proposed Action, 39 percent of designated critical habitat is proposed to be disturbed (354 acres of 910 acres) with 11 percent permanent. The North and South OSF Alternative was developed that relocates some facilities outside of Tiehm's buckwheat critical habitat and further away from Tiehm's buckwheat subpopulations to minimize impacts to the extent possible. Under the North and South OSF Alternative, 22 percent of designated critical habitat is proposed to be disturbed (197 acres of 910 acres), with five percent permanent.
77 and 180	77.8 and 180.7	Our comments and those of others concerned with the protection of this endangered plant species and its Critical Habitat should lead the BLM to select the No Action Alternative for the current mining proposal and developing a new EIS with a range of alternatives which will not threaten the existence of the endangered Tiehm's buckwheat. Sincerely, , Chair Conservation Committee Nevada Native Plant Society	The Project proposes development of a locatable mineral resource. Relocation of the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the resource deposit is located. The North and South OSF Alternative was developed that relocates some proposed facilities outside of Tiehm's buckwheat critical habitat and further away from Tiehm's buckwheat plants and subpopulations to minimize disturbance in Tiehm's buckwheat critical habitat. Alternatives considered and dismissed from analysis are listed in Appendix C of the Draft EIS.
Not Provided – May 29, 2024			
78	78.1	American Battery Technology Company (ABTC) is dedicated to promoting responsible mining practices that prioritize environmental stewardship. Responsible mining is not just a necessity but a responsibility we owe to future generations. We also believe that the establishment of a domestic circular economy for battery metals is a necessity for the electric vehicle transition, and for national security as the economy continues to increase its usage of critical minerals in consumer products. ABTC is supportive of Ioneer's efforts in bolstering the critical minerals supply chain within the United States, which is essential for our nation's technological and economic advancement. By harnessing domestic resources, the United States can reduce its dependence on foreign imports and ensure a more secure and reliable supply of critical minerals vital for the production of batteries and other high-tech applications. ABTC also believes in ensuring projects provide benefit to their community members, contribute to long-term economic growth and stability in the region, and work to build a skilled labor force that can support the growing demands of the critical minerals sector. Ioneer has put forth an effort to engage local community members and stakeholders throughout its development phases, and is working to provide expanded employment and career development opportunities in rural Nevada.	Comment noted.
Edward Hartman – May 29, 2024			
79	79.1	My family moved to Fish Lake Valley in 1972. My father grew alfalfa for livestock in Southern California dairies. We have farmed here for nearly fifty years. Since that time some things have changed and mostly for the better. We remain a small population of just over 300 residents. We now have highspeed internet access and yet the community remains remote mostly made up of farmers, ranchers, retirees and miners. The one paved road is Highway 264 and its eighty miles to a town like Bishop, California or Tonopah with any sort of services. The Ioneer Rhyolite Ridge project promises to bring more opportunity, diversity and support for basic emergency services. I am impressed with the diligence, commitment and sensitivity we have witnessed throughout the permitting and development of this project. Ioneer has invested years of working with residents; listening, informing and improving the parameters of the project. Environmental concerns, traffic and dust management, water usage and endangered species that could be affected have all been addressed in a thoughtful and considerate manner. Ioneer has demonstrated that they are a responsive and responsible member of our small community.	Comment noted.
Willliam and Frances Hartman – May 29, 2024			
80	80.1	Ioneer will not only bring revenue to our county (which is one of the poorest in Nevada) but they have also been a supporter of opportunity for the youth of Fish Lake Valley, Silver Peak and Goldfield. They have provided scholarships and encouragement for families and students. They have supported community events and have taken an interest in the community knowing they will be a part of it for the life of the mine. We all understand that this will be a multigenerational project. They have sponsored multiple public meetings and have been a responsible and transparent company as the mining project has proceeded from concept to potential fruition. We find no negative in the proposed mining project or its impact on our environment. We are grateful that such a supportive and responsible company has chosen to develop the unique deposit of lithium and boron and has worked so diligently to inform and involve the citizens of Fish Lake Valley/Dyer.	Comment noted.
Dennis Bradley – May 30, 2024			
81	81.1	I fully support this project of producing lithium here in the US for the economic benefit and for national security.	Comment noted.

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Lyndsey Wright – May 30, 2024			
82	82.1	Bureau of Land Management 50 Bastian Road Battle Mountain, Nevada 89820 Attention: Scott Distel RE: Comments on Rhyolite Ridge Lithium-Boron Mine Project DOI-BLM-NV-B020-2021-0020-EIS Dear Mr. Distel: I. Introduction The U.S. is fortunate Ioneer is proposing to develop an operation for the Rhyolite Ridge lithiumboron deposit in Esmeralda County, Nevada which will produce two elements needed to meet the goals envisioned in the Infrastructure Investment and Jobs Act of 2023. The U.S. Department of Energy's January 2023 announcement of the conditional loan commitment, through the DOE Loan Programs Office, to the Rhyolite Ridge Project (Ioneer) will advance domestic production of a critical mineral, lithium. This will boost the U.S. battery supply chain[1]. In light of the national importance for domestic production of lithium, the Women's Mining Coalition (WMC) is submitting these comments on the Draft Environmental Impact Statement (DEIS) for the Rhyolite Ridge Project, published by the Tonopah Field Office of the Bureau of Land Management, Battle Mountain District. The DEIS was published on April 19, 2024. [1]https://www.energy.gov/lpo/articles/lpo-announces-conditional-commitment-ioneer-rhyolite-ridge-advancedomestic-production	Comment noted.
82	82.2	About WMC WMC is a grassroots organization with over 200 members nationwide. Our mission is to advocate for today's modern domestic mining industry, which is essential to our Nation. WMC members work in all sectors of the mining industry including hardrock and industrial minerals, coal, energy generation, manufacturing, transportation, and service industries. We convene Washington, D.C. Fly-Ins to give our members an opportunity to meet with members of Congress and their staff, and with federal land management and regulatory agencies to discuss issues of importance to both the hardrock and coal mining sectors. WMC members have extensive experience with the National Environmental Policy Act (NEPA), the U.S. Mining Law, and the BLM's surface management regulations at 43 CFR Subpart 3809 governing locatable minerals and mining activities pursuant to the U.S. Mining Law. We have provided comments on numerous NEPA documents for proposed locatable mineral projects on public lands administered by the U.S. Bureau of Land Management (BLM) and on National Forest System lands administered by the Forest Service. Some WMC members also have expertise in preparing third-party NEPA documents. Lastly, our Advisory Council is made up of industry experts from all facets of the mining industry. Based on this experience, WMC is well qualified to review the DEIS and to provide these comments. This letter expresses WMC's strong support for the Rhyolite Ridge Project because the development of the project will increase the domestic supply of lithium by 40%. The project will also generate many socioeconomic benefits for the communities near the mine and for the State of Nevada. WMC cannot imagine any circumstance in which delaying approval for this project to proceed with production of lithium and boron would make any sense for the environment, the State of Nevada, and the country at large.	Comment noted.
82	82.3	II. The U.S. Urgently Needs the Lithium and Boron to be Mined at the Rhyolite Ridge The Biden-Harris Administration is committed to increase the domestic supply of critical minerals[2] to strengthen the nation's battery supply chain to electrify the transportation sector thus reducing our reliance on fossil fuels and most importantly on a foreign supply of raw materials. Worldwide demand for lithium is expected to increase dramatically in the near future and that demand has exceeded global production as of 2023[3]. In addition to electrifying the transportation sector, lithium will be important to the development and implementation of safe and reliable energy storage systems allowing for commercial applications to store energy from renewable resources for the transition to green, carbon-free power grids. [2]https://crsreports.congress.gov/product/pdf/R/R47982/1 [3]https://www.statista.com/statistics/452025/projected-total-demand-for-lithium-globally	Comment noted.
82	82.4	III. Operation Planning and Applicant-Committed Environmental Protection Measures Ioneer worked closely with the BLM and USFWS to reduce impacts to the endangered Tiehm's Buckwheat that grows in the area, to limit the amount of water usage and to eliminate tying into the local electrical grid. Tiehm's Buckwheat • Tiehm's Buckwheat is found on 10 acres of ground within the project area of 7,166 acres. Ioneer has committed to a quarrying plan that will have no direct impact to the buckwheat's subpopulations. • Ioneer has committed to the following: ○ collecting and banking Tiehm's Buckwheat seeds; ○ construction of a green house and the propagation of the buckwheat (already in progress); ○ protecting designated buckwheat critical habitat; ○ establishing fencing with signage to protect critical habitat; ○ controlling public access to the critical habitat;	Impacts to Tiehm's buckwheat are discussed in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER. Impacts from proposed water use are described in Sections 4.16 and 4.20.16 of the EIS.

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		○ conducting pollinator habitat reclamation; ○ controlling invasive species; ○ management of light sources to minimize impacts on pollinators; ○ dust control mitigation; ○ using barriers when blasting to prevent dust carrying into buckwheat habitat; ○ including awareness training for employees and contractors on the buckwheat and its critical habitat; ○ monitoring of the subpopulation of buckwheat and its critical habitat. Water Usage • Ioneer has developed a production plan to reduce the amount of water needed during operations which uses much less water than other lithium operations around the globe. • Ioneer has acquired water rights in the area and designed an operation which will use 15% less water from within the State Engineer's designated groundwater basin than is currently allocated.	
82	82.5	IV. Power Generation The processing of the lithium-boron ore requires the use of acid which will be produced on site by an acid generating plant. This plant will produce enough heat and steam to generate all the electricity required to operate all of the planned facilities.	Comment noted.
82	82.6	V. Socioeconomic Benefits Many WMC members have first-hand experience with the types of socioeconomic impacts and benefits associated with a multi-year, large mining project like Rhyolite Ridge. Based on our review of Section 4.20 on Social and Economic Conditions in the DEIS, it is clear that this operation will create high-paying jobs and generate local and state tax revenues that will benefit Esmeralda County and the State of Nevada for at least 20 years. Section 4.20 presents the results from the IMPLAN economic modeling software, which is a widely accepted socioeconomic impact assessment methodology that is used to evaluate how proposed projects will affect nearby communities. For example, EIS documents prepared by the U.S. Bureau of Land Management (BLM) have used IMPLAN for the socioeconomic analyses for several Nevada gold mines. Based on this accepted methodology, WMC has confidence that the results of the IMPLAN modeling effort for the Rhyolite Ridge Project are a data-driven and reasonable prediction of the likely socioeconomic impacts and benefits associated with the project. For those who will be directly employed at the operation the median annual income will be $141,000. From construction to the end of mine life the number of employees or contractors will range from 350-500. For Esmeralda County financial benefits (revenue) including sales taxes, property taxes and Net Proceeds of Mines will range from approximately $600,000 in the first year of construction to between $5.2 to $11.6 million during production. This will be a significant benefit to Esmeralda County where the average revenue stream for 2020 through 2022 was approximately $5,191,000 million (accessesmeralda.com/county_office/auditor_recorder/financial_reports.php) per year. Another benefit to the county is the county road crossing the project area will be upgraded and maintained by Ioneer.	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.
82	82.7	IV. Conclusions Approving the Rhyolite Ridge project is the only logical decision because the project will accomplish significant objectives: • Meet the goals of the Infrastructure Investment and Jobs Act • Provide a reliable, domestic supply chain for the critical mineral lithium • Boost the development and construction of a green energy economy	Comment noted.
82	82.8	WMC urges the BLM to complete the NEPA process as quickly as possible so development can begin late in 2024. There are no valid reasons to delay or deny approval of this nationally significant project. The State of Nevada supports the development of lithium resources as shown by statements from the Nevada Senators: "As one of the few places in the United States with an abundance of lithium and other critical minerals, Nevada is central to strengthening our domestic clean energy supply chain and making electric vehicles more available and accessible," said Senator Rosen. "Nevada's lithium battery economy is key to our country's clean energy future, and that's why I've fought to ensure our companies have access to the resources they need to support their operations," said Senator Cortez Masto. Thank you for this opportunity to submit these comments on the DEIS for this important project. Please do not hesitate to contact us if you have any questions about our comments. Sincerely yours, Emily Hendrickson WMC President Ruth Carraher WMC Co-Founder and Board Member	Comment noted.
Personal Information Requested to be Withheld – May 31, 2024			
83	83.1	Please see the attached comment from the Zero Emission Transportation Association (ZETA).	Comment noted.
83	83.2	May 31, 2024	Comment noted.

Comment Letter No.	Comment Number	Comment	Response
		Bureau of Land Management United States Department of the Interior 1848 C St NW Washington, DC 20240 **RE: Public Comment on Rhyolite Ridge Draft Environmental Impact Statement** *Submitted electronically via BLM NEPA Register Submission Page* The Zero Emission Transportation Association (ZETA) is an industry-backed coalition of member companies advocating for 100% electric vehicle (EV) sales. ZETA is committed to enacting policies that drive EV adoption, create hundreds of thousands of jobs, dramatically improve public health, and significantly reduce emissions. Our coalition spans the entire EV supply chain including vehicle manufacturers, charging infrastructure manufacturers and network operators, battery manufacturers and recyclers, electricity providers, and critical minerals producers, among others. ZETA's membership includes Ioneer Rhyolite Ridge LLC ("Ioneer"). We thank the Bureau of Land Management (BLM) for the opportunity to comment on the Draft Environmental Impact Statement (EIS) on Ioneer's proposed Rhyolite Ridge Project. Mineral and refining projects such as Rhyolite Ridge will be crucial to reducing dependence on foreign supply chains, fueling the continued expansion of clean energy both at home and abroad, and creating good-paying jobs. Thoughtful analysis under the National Environmental Policy Act (NEPA) plays a crucial role in ensuring that new domestic mineral and refining projects are developed in a sustainable and environmentally conscious manner.	
83	83.3	**ZETA Believes the BLM's Draft EIS is Comprehensive** We believe that the North and South Overburden Storage Facility Alternative proposed in the Draft EIS thoroughly examines potential environmental impacts. The project will provide significant economic benefits in Nevada and strengthen U.S. economic competitiveness and supply chain security.	Comment noted.
83	83.4	**Economic Development Benefits** Rhyolite Ridge will provide significant economic benefits to the local region, the State of Nevada, and the United States economy. According to Ioneer's projections, the project will create 500 construction-phase jobs over a two-to-three construction period. Once operational, Rhyolite Ridge will be able to support approximately 350 direct jobs.[1] This type of economic development will sustain families across rural Nevada and positively impact rural and Tribal communities, injecting $38 million of income into the region annually. The project is expected to generate between $13 and $31 million in annual tax revenue for state and local governments, funding crucial public services across Nevada.[2] Ioneer has focused its efforts on engaging with local, regional, Tribal, and state businesses to execute the Rhyolite Ridge project, and is committed to doing business locally, as demonstrated by its decade-long presence in the Fish Lake Valley region.[3] Also, Ioneer has conducted outreach with multiple Tribal Nations to discuss community benefit opportunities, workforce development opportunities, and economic development partnerships.[4] This engagement will ensure that the benefits of the Rhyolite Ridge project are felt both locally and nationally. [1]https://eplanning.blm.gov/public_projects/2012309/200540745/20075692/250081874/20230327_Rhyolite_Ridge_Lithium_Boron_Project_EIS_Public_Scoping_Report_508.pdf [2]Ibid. [3]https://www.ioneer.com/rhyolite-ridge-project/community/ [4]https://rhyolite-ridge.ioneer.com/wp-content/uploads/2024/05/RR-Quarterly-Newsletter-May-2024.pdf	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.
83	83.5	**National Security Benefits** The vast majority of lithium extraction and processing occurs outside of the United States, with over half of global battery-grade lithium coming from China. Lithium is a crucial component of electric vehicle (EV) batteries, smartphones, battery storage systems, and many other advanced technologies. Demand for lithium will only grow as the clean energy expansion continues. Reliance on foreign sources of lithium, especially geopolitical adversaries such as China, presents significant national security risks. Without intervention, and the cultivation of projects such as Rhyolite Ridge, those risks will only grow. Once operational in 2026, Rhyolite Ridge will quadruple domestic lithium output. The project will produce and refine 22,000 tons of lithium chemicals annually, sufficient to power 400 thousand EVs per year for decades to come.[5] Rhyolite Ridge will onshore a key segment of the EV supply chain and increase manufacturers' ability to meet domestic content requirements for tax credits such as the New Clean Vehicle Credit (30D). This combination will further drive consumer adoption of EVs and grow the broader U.S. economy. [5]https://eplanning.blm.gov/public_projects/2012309/200540745/20075692/250081874/20230327_Rhyolite_Ridge_Lithium_Boron_Project_EIS_Public_Scoping_Report_508.pdf	Comment noted.
83	83.6	**Conclusion** ZETA appreciates the opportunity to comment on BLM's Draft EIS. Ensuring that domestic mineral and processing projects meet high environmental standards will help position the United States as a responsible leader in the clean energy expansion while ensuring that benefits accrue to local communities. The Rhyolite Ridge project will benefit U.S. supply chain security, expand the growth of the U.S. electric vehicle industry, and create good-paying jobs in rural Nevada. We encourage BLM to finalize the Rhyolite Ridge Draft EIS as proposed. Thank you for your consideration. **Albert Gore** Executive Director Zero Emission Transportation Association (ZETA)	Comment noted.
Personal Information Requested to be Withheld – June 1, 2024			
84	84.1	Re: The DEIS for Ioneer's Rhyolite Ridge Project Dear Mr. Distel, I am writing in support of permitting Ioneer's Rhyolite Ridge Lithium-Boron Project in Esmeralda County, NV. I am a geologist in the mining industry, having lived in Reno since the 1970s. In addition to a career in mining in the US, I have also worked in China, South America and Mexico and am well aware of foreign mining practices and the lax environmental regulations in those	Impacts to groundwater are discussed in EIS Sections 4.16, 4.20.16, and the Water Resources and Geochemistry SER. Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.

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		countries compared to the US. Mining mineral deposits in the US benefits not only the US economy but the planet as a whole. I am convinced Ioneer will develop the lithium-boron resource in an environmentally responsible way, according to US regulations, with minimal long-term impact on the local environment. In fact, according to their website, Ioneer will be leaving much of the lithium-boron ore untouched in order to protect the endangered Tiehm's buckwheat plant. On going research, voluntarily paid for by Ioneer, includes propagation of new plants to ensure the continued existence of Tiehm's buckwheat in the area. Because of the unique nature of the Rhyolite Ridge deposit, the only such deposit in the world, lithium and boron will be recovered in large vats without the need for leach pads, tailings dams or tailings ponds resulting in very little water use and no possibility of any ground water contamination. On-site production of the weak sulfuric acid, necessary to process the ore, generates heat that will be converted to electricity providing more than enough power to operate the entire facility for the life of the mine. Not only will the Rhyolite Ridge mine be energy independent, the surplus electricity can potentially be added to the local power grid. Development of Nevada's lithium and boron resources will benefit both the state and the country and help to make the US less dependent on unreliable and/or hostile foreign countries and provide a reliable supply chain for materials needed to boost domestic production of batteries for a cleaner, more energy efficient future. The economic impact on Nevada and Esmeralda County from sales taxes, property taxes and Net Proceeds of Mines revenue is expected to generate between $13 million to $31 million annually. The operation will create 500 jobs during the construction phase and 350 jobs over the more than 26-year life of the mine with a direct economic output of $178 million during construction and $125 million once the mine is in production. The economic impact is very significant for nearby communities, Tribal and local businesses and Nevada. Thank you for your time reviewing my comments. Kind Regards,	
84	84.2	RhyoliteRidge-1-500685589_Attachment same as 84.1.	Comment noted.
Joni Eastley – June 1, 2024			
85	85.1	Please accept this comment in support of Ioneer's project at Rhyolite Ridge. I have lived in Central Nevada for 40 years and during that time have not only worked in the mining industry, but have seen first-hand the benefits these projects bring to local communities. With the push from the federal and various state governments to encourage more electrical vehicle sales, this project will provide the materials necessary to meet those mandates. I have spoken to many residents of Tonopah about this project and have heard nothing but support.	Comment noted.
David Johnson – June 1, 2024			
86	86.1	We need to source these minerals in the U.S. Foreign dependence impinges our national security.	Comment noted.
James and Sandra Merlino – June 1, 2024			
87	87.1	We are in complete support of Ioneer's lithium project in Fish Lake Valley.	Comment noted.
Personal Information Requested to be Withheld – June 1, 2024			
88	88.1	I support of Ioneer's lithium project in Fish Lake Valley.	Comment noted.
Zachary Newell – June 1, 2024			
89	89.1	I am in full support for Ioneer coming to the tonopah area. I own the hardware store in town and think it would be a great thing for them to be here Zachary newell Central Nevada Hardware	Comment noted.
Not Provided – June 1, 2024			
90	90.1	Lithium is important for batteries to help respond to the climate crisis. But the extinction crisis is serious too. I support this mining so long as it does not contribute to the extinction of an ESA listed plant. There are other locations for lithium mining whereas extinction is forever.	Relocation of the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the mineral resource deposit is located. The North and South OSF Alternative was developed that relocates proposed facilities to minimize disturbance in Tiehm's buckwheat critical habitat.
Justin Shaffer – June 1, 2024			
91	91.1	I am strongly against the rhyolite project, and all the traffic, road damage, light pollution, and trash it will bring to the wonderful peaceful fish lake valley. Lithium is not the future of batteries. We have lithium mines, if we need another the Salton is much more suitable.	Comment noted.
Not Provided – June 2, 2024			
92	92.1	In considering all alternate options for the mine, those who are opposed to the mine will claim that there are many different options for a domestic supply of lithium. However, the importance of the boron (in form of boric acid) this mine will produce can not be understated. A stable domestic supply of boron is just as important if not more important than lithium for securing a sustainable transition to carbon dioxide free energy sources. Boron is used in many applications including, but not limited to, production of metal alloys (for automotive, civil, and defence use), fertilizers for maximizing farming yield, glass (including the glass used in solar panels), wood treatments, and medicine/medical applications. Given the relative geo-political instability of Turkey (where most of the world's boron is currently produced), securing a domestic supply chain of boron is just as important as securing a domestic supply of lithium. I hope, given the previous delays in the mine's approval, and the extensive work completed to date, including several years of planning and environmental ground work, the BLM can approve this mine in one of the two alternative options proposed this year. I look forward to closing out this matter, and construction/production commencing in an environmentally sustainable manner, which the BLM has ensured with the detailed oversight during the NEPA process. Thank you for your continued efforts.	Comment noted.
Stretch Baker – June 2, 2024			
93	93.1	Minning makes work. Thats good for all.	Comment noted.
Charles Galt – June 2, 2024			
94	94.1	I am 100% for, wholeheartedly agree with , in concurrence with, the proposals by mining interests in the ore body of LITHIUM near Silver Peak Nevada. I want to see this resource harvested, processed, refined and put onto the market for use in batteries and other products that are needed for the technological age we are in and continue to grow amid. I am satisfied that the environment of the endangered plant will be preserved and the succeeding generations will have much less mortality and hence lessenedthreat of extinction than is currently being offered by the BUR. OF LAND	Comment noted.

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		MANG., the US Fish & Wildlife, the National Forest Service, the U. S. National Park Service and all other government entities that continue to mismanage almost every aspect of the lands that they administer.	
Robert Perchetti – June 2, 2024			
95	95.1	I am in support of Ioneer's lithium project in Fish Lake Valley.	Comment noted.
Harry Chahal – June 2, 2024			
96	96.1	I Harry Chahal support Ioneer's lithium project in Fish Lake Valley and think it would really benefit the community.	Comment noted.
Not Provided – June 2, 2024			
97	97.1	A quién corresponda, Soy residente de Fish Lake Valle, Nevada, y quisiera enviar este comentario sobre el Proyecto de Litio y Boro propuesto por Rhyolite Ridge. Creo que la Alternativa de la Instalación de Almacenamiento de Material de Descarga Norte y Sur, propuesta en el Borrador de la Declaración de Impacto Ambiental presenta completamente los posibles impactos ambientales locales. Creo que el Proyecto proporcionará beneficios económicos significativos y muy necesarios, así como oportunidades para los residentes locales. La de Declaración de Impacto Ambiental es lógica y aborda todos los impactos ambientales que se anticipan. El Informe Sumplementario de Justicia Ambiental afirma que la población minoritarian (la cual incluye a los ciudadanos Hispanos/Latinos) constituye el 29% de la población del Condado de Esmeralda. Yo vivo aquí y creo que un proyecto minero como Rhyolite Ridge proporcionará muchas oportunidades, ya sea para trabajar en la mina o para operar negocios como restaurantes que apoyen el proyecto. El futuro del proyecto proporcionará oportunidades para que nuestras familias obtengan buenos empleos y permanezcan en la comunidad durante muchos años. Gracias por su consideración Translation: *To whom it may concern, I am a resident of Fish Lake Valley, Nevada, and would like to submit this comment on the Rhyolite Ridge proposed Lithium and Boron Project. I believe that the North and South Discharge Material Storage Facility Alternative, proposed in the Draft Environmental Impact Statement fully presents the potential local environmental impacts. I believe the Project will provide significant and much-needed economic benefits as well as opportunities for local residents. The Environmental Impact Statement is logical and addresses all the environmental impacts that are anticipated. The Environmental Justice Supplemental Report states that the minority population (which includes Hispanic/Latino citizens) makes up 29% of Esmeralda County's population. I live here and I think a project mining operations such as Rhyolite Ridge will provide many opportunities, either to work in the mine or to operate businesses such as restaurants that support the project. The future of the project will provide opportunities for our families to obtain good jobs and remain in the community for many years to come. Thank you for your consideration*	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.
Trish Rippie – June 2, 2024			
98	98.1	Having been a property owner and resident of Nye and Esmeralda Counties for over 40 years I would like to submit my comments as someone very familiar with the area. Esmeralda County is desperately in need of a boost to their economy. With less than 1000 residents the county budget is so small they are pressed to provide basic services such as road maintenance and utilities. Ioneer will provide a positive economic impact that is desperately needed here. They have already spent millions on a little plant that no one knew or cared about until they started mine exploration in the area. Let's move past this. It's a non-issue now. When I first learned about Ioneer I was mostly concerned about the impact on the water resources of Fish Lake Valley where the water table has already dropped substantially. There is a lot of lithium exploration going on all over central Nevada and I am more concerned about the mines that will be using the brine evaporation method. Ioneer is hard-rock mining and won't be using as much water. I welcome Ioneer into our county. They have shown every indication of a desire to be good citizens of our communities and with the influx of new workers and their families we may be able to achieve a higher level of community services in the very small towns that will be affected. Mining built this region and the people who have survived here through the last 7 or 8 decades of declining population and boom and bust cycles should have more say than out-of-state environmental activists who have no idea of what it's like to live in an area with no doctors, no supermarkets, no public transportation, etc. It's great to want to go all out to save an obscure plant but not at the expense of the people who live here, especially not when Ioneer has already gone above and beyond in what needs to be done to preserve the species.	Effects on social and economic values from the Project are described in the EIS in Sections 4.10 and 4.20.10 and in the Social and Economic Values SER.
Personal Information Requested to be Withheld – June 2, 2024			
99	99.1	Sunday, June 2, 2024 Bureau of Land Management Attention: Rhyolite Ridge Lithium-Boron Mine Project 50 Bastian Road Battle Mountain, Nevada 89820 To Secretary of the Interior Deb Haaland, BLM Director Tracy Stone-Manning, BLM Nevada State Director Jon Raby, Battle Mountain District Manager Douglas Furtado, and Tonopah Field Manager Perry B Wickham: Subject: Please protect Tiehm's buckwheat by selecting the no-action alternative for the Rhyolite Ridge Mine EIS -- Rhyolite Ridge Lithium-Boron Mine Project (NEPA Number: DOI-BLM-NV-B020-2021-0020-EIS) I strongly urge the Bureau of Land Management (BLM) to select the no-action alternative for the Rhyolite Ridge lithium-boron mine environmental impact statement. The mine would result in the extinction of the rare wildflower Tiehm's buckwheat (Eriogonum tiehmii) and shouldn't be allowed to proceed. Tiehm's buckwheat is protected by the Endangered Species Act. The BLM isn't permitted to take actions that would jeopardize the species' existence or cause adverse modification to its critical habitat—and the proposed Rhyolite Ridge mine will clearly do both those things.	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. The air quality impacts were modeled for the Project and no pollutants are projected to exceed national or state standards. Sections 4.1 and 4.20.1 of the EIS include additional air quality information.

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		The mine and the heavy industrialization of the site will outright destroy 22% of the plant's critical habitat and severely degrade the rest. It will pollute the environment with toxic mining dust and sulfuric acid mist, interrupt the movement of pollinators and wildlife, and drain precious Nevada groundwater, significantly harming Tiehm's buckwheat over the long term. The mine will put this rare wildflower on a trajectory toward extinction, and the proposed mitigation measures do nothing to change that. Tiehm's buckwheat is a fragile species. Transplanting it and growing new populations elsewhere almost certainly won't work. And even if it did, it wouldn't make up for destroying the species' native range. Tiehm's buckwheat is one of a kind. We need to protect native wildlife, not eliminate it. I urge the Battle Mountain District Office to comply with the Endangered Species Act and protect Tiehm's buckwheat by choosing the no-action alternative for the Rhyolite Ridge mine environmental impact statement. "The ultimate test of a moral society is the kind of world that it leaves to its children." -- Dietrich Bonhoeffer Thank you for your consideration of my comments. Please do NOT add my name to your mailing list. I will learn about future developments on this issue from other sources. Sincerely, San Rafael, CA	
Trisha Wallace – June 3, 2024			
100	100.1	I DO NOT support this mining project. The damage that has already occurred to the wildlife and habitat is irreversible, and obviously if the mine is allowed to operate, the area will be damaged permanently. There used to be (only ten years ago) a very healthy bighorn sheep herd that frequented the area where the mine is going to be, and once they started test drilling and starting their project, the sheep vacated the area. It has been very sad to watch. Also, the idea that the mine will pump water from below, in Fish Lake Valley to supply their water needs, is absolutely atrocious. The valley has had agriculture as its main economic income source for over 100 years, and this amount of water pumping/wasting threatens the farmers livelihood who currently live and work in the valley, not to mention the people who call Fish Lake home, as their well levels will inevitably drop. (2500 gallons a minute 24 hours a day will deplete the aquifer quite quickly I'm thinking). To me, it is wasting, as the carbon footprint of an electric vehicle is far greater than most people think it is. It is quite simply the fleecing of the country to think that electric vehicles are going to "save" the planet. The waste alone from these vehicles is causing irrevocable harm. I am greatly saddened at the prospect of this mine coming to the valley, as my own ancestors settled here and farmed over 100 years ago, and my own son was hoping to continue their legacy. If this mine is allowed to invade this beautiful, historic area, his own livelihood will be threatened as well as the traditions of this valley. I also question whether a full anthropological study has been conducted, as the mine's location is extremely close to a well established Native American cave/campsite. Regardless of any of my personal feelings, the fact remains that this mine would completely destroy a very beautiful part of Nevada's habitat. The wildlife has already been altered, as well as the topography. Damage has already been done, and mine operation has not even truly begun.	Wildlife impacts are discussed in Sections 4.18 and 4.20.18. Impacts to groundwater levels have been modeled for the Project and are described in Sections 4.16 and 4.20.16. Impacts to wildlife and water resources would be minimized by ACEPMs and mitigation described in Section 4.21. Cultural resource surveys completed for the Project are discussed in Section 3.2. Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts.
Peri Lee Pipkin – June 3, 2024			
101	101.1	EIS comment for "Rhyolite Ridge Lithium-Boron Mine Project" Peri Lee Pipkin June 2, 2024 As a botanist conducting a large scale floristic inventory in the Silver Peak Range, I am writing to strongly suggest that Action C: No Action is prioritized in the proposed Rhyolite Ridge lithium-boron mine project in consideration of the impact this would have on sensitive, rare species in the area and the impact groundwater extraction would have on this community. I also request that tribal members be directly consulted with this project, as the valley is the homeland of the Timbisha Shoshone and Paiute people, who need adequate and respectful representation in this planning process.The two projected alternatives are not sufficient in protecting the limited natural resources in the area and it is pertinent that no action be taken. Some examples are abbreviated here but elaborated on futher with references in the attached document. Tiehm's Buckwheat: the Plan identifies direct avoidance of individual plants as its primary protective measure (APCM1 in BLM 2024b p. 17), however "direct avoidance" fails to mitigate the magnitude, scale, and duration of a 2,271 acre industrial-scale mining project that would encompasses the entire global range of the species. The numerous proposed activities would occur within and adjacent to occupied and critical habitat and would have a cumulative effect across the 23 years of proposed mine life (BLM 2024a p. 2-1). The project boundary in Argentite canyon impacts habitat for the Nevada State Listed and critically imperiled Tonestus graniticus (Lone Mountain Serpentweed, Nevada rank S1, Global rank G1) (Pipkin collection #2680, data submitted to Nevada Division of Natural Heritage), recently discovered in the Silver Peak Range in 2023. Industrial scale disturbance would undoubtedly impact this population through dust and the cutting of new roads. The project intends to draw water from sensitive wetlands in which the rare plant Chloropyron tecopense is reliant on groundwater for survival. The plant is currently in petition for Endangered Species Listing and is ranked as a rare plant in both California and Nevada (Natureserve). In addition, the Fish Lake Valley is home to the endemic Fish Lake Tui Chub, an undescribed Toad on both the Nevada BLM sensitive species list and Nevada Division of Natural Heritage watch list, an endemic scorpion, and rare and undescribed spring snails (Corey Lange, personal communication). Most of Esmeralda County is currently in a period of ongoing and varying drought conditions (pg 24 Esmeralda County Water Resource Plan). New lithium and gold mines currently in the planning and permitting process are looking to reallocate water from agriculture to mining in several Esmeralda water basins (pg. 32 Esmeralda County Water Resource Plan) The Fish Lake Valley basin is experiencing irreparable damage from water production that exceeds annual recharge. This overdraft is resulting in collapse of aquifer storage. Preventing further decline of the water table in Fish Lake Valley and efforts to replace the water that has been removed from storage should be a priority for the County. (pg. 48, Esmeralda County Water Resource Plan). Drawing water from the Fish Lake Valley will run the risk of creating a dust bowl in Fish Lake Valley, irreparably harming rare and sensitive wildlife, and destroying the livelihood of local residents.	Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts. The Draft EIS analyses direct and indirect impacts to the Tiehm's buckwheat in Section 4.12 and cumulative effects in Section 4.20.12. Impacts to Tecopa birdbeak are described in EIS Section 4.1. Impacts to wildlife, including Tui chub, and other aquatic species are described in EIS Section 4.18 and 4.20.18. An NDNH request was submitted to identify additional species in the Plan of Operations boundary and its five kilometer radius. A response was received on June 14, 2024. No scorpions or *Tonestus graniticus* (Lone Mountain serpentweed) were identified (NDNH 2024). Newly identified species were added to the EIS and SERs, as applicable. Proposed water use is described in EIS Sections 2.1 and 2.2 and would be sourced from groundwater. Groundwater impacts were modeled for the Project and considered cumulative effects of water usage in Fish Lake Valley. Impacts are discussed in EIS Sections 4.16 and 4.20.16.

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		The Timbisha Shoshone Tribe have continuously used Fish Lake Valley for hunting, gathering food, and performing ceremonies since at least the early 1800s, and utilize the area today for hunting and pine nut harvesting (pg 7). The area has high cultural and spiritual value to the Timbisha tribal members, as spiritually and culturally this land is the birthplace and burial ground of many of their ancestors and relatives. (Documented from oral interviews with contemporary Timbisha tribal members.) (pg 10) There are specific sacred sites in the area related to the Timbisha Shoshone legends in the Silver Peak Range, significant because of the presence of ceremonial and burial grounds. Cremation ceremonies were performed at specific sites, with ashes and belongings buried in rock formations near the proposed Rhyolite Ridge Project. The sacred burial grounds have been left unprotected, and industrial scale development would desecrate the area. As per request of the tribe, the Silver Peak Range should be closed off to all environmentally damaging activities such as woodcutting and mining, as Tribal members feel that the land needs time to recover from past environmental damage (pg. 11). Thank you for your time, Peri Lee Pipkin	
101	101.2	**EIS comment for "Rhyolite Ridge Lithium-Boron Mine Project"** Peri Lee Pipkin June 2, 2024 As a botanist conducting a large scale floristic inventory in the Silver Peak Range, I am writing to strongly suggest that Action C: No Action is prioritized in the proposed Rhyolite Ridge lithium-boron mine project in consideration of the impact this would have on sensitive, rare species in the area and the impact groundwater extraction would have on this community. I also request that tribal members be directly consulted with this project, as the valley is the homeland of the Timbisha Shoshone and Paiute people, who need adequate and respectful representation in this planning process.The two projected alternatives are not sufficient in protecting the limited natural resources in the area and it is pertinent that no action be taken. Some examples are as follows:	The Project proposes development of a locatable mineral resource. Relocation of the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the resource deposit is located. Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process.
101	101.3	1. Tiehm's Buckwheat: the Plan identifies direct avoidance of individual plants as its primary protective measure (APCM1 in BLM 2024b p. 17), however "direct avoidance" fails to mitigate the magnitude, scale, and duration of a 2,271 acre industrial-scale mining project that would encompasses the entire global range of the species. The numerous proposed activities would occur within and adjacent to occupied and critical habitat and would have a cumulative effect across the 23 years of proposed mine life (BLM 2024a p. 2-1). This magnitude of impact would fundamentally alter habitat integrity, pollination, and dispersal. It would also exacerbate the effects of limited habitat availability and the species' inherently poor dispersal capabilities (USFWS 2022a p. 50), ultimately affecting its long-term survival. Construction of new haul and access roads would be approximately 50 m from subpopulation 3 and less than 300 m from subpopulation 1 which is the second largest subpopulation for the species (USFWS 2022a; BLM 2024b). The Project would permanently destroy 197 acres or 22% of the 910 acres of designated critical habitat deemed essential for Tiehm's buckwheat conservation (BLM 2024b p. 18; USFWS 2022a). **Reference:** Bureau of Land Management [BLM]. 2024a. Draft Environmental Impact Statement for the Rhyolite Ridge Lithium Boron Project. DOI-BLM-NV-B020-2021-0020-EIS. Bureau of Land Management [BLM]. 2024b. Supplemental Environmental Report 17: Threatened and Endangered Species. Appended to the Draft Environmental Impact. Statement for the Rhyolite Ridge Lithium Boron Project. DOI-BLM-NV-B020-2021-0020-EIS. US Fish and Wildlife Service [USFWS]. 2022a. Species status assessment report for Eriogonum tiehmii (Tiehm's buckwheat), Version 2.0. Department of the Interior California-Great Basin Region. Sacramento, California. May, 2022.	The Project proposes development of a locatable mineral resource. Relocation of the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the resource deposit is located. The North and South OSF Alternative was developed that relocates some proposed facilities outside of Tiehm's buckwheat critical habitat and further away from Tiehm's buckwheat plants and subpopulations to minimize disturbance in Tiehm's buckwheat critical habitat. The EIS evaluates effects (direct, indirect, and cumulative) to Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
101	101.4	2. The project boundary in Argentite canyon impacts habitat for the Nevada State Listed and critically imperiled *Tonestus graniticus* (Lone Mountain Serpentweed, Nevada rank S1, Global rank G1) (Pipkin collection #2680, data submitted to Nevada Division of Natural Heritage), recently discovered in the Silver Peak Range in 2023. Industrial scale disturbance would undoubtedly impact this population through dust and the cutting of new roads. Observation photograph available here: https://www.inaturalist.org/observations/175936946 **Reference:** https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.148875/Tonestus_graniticus	An NDNH request was submitted to identify additional species referenced in the area of analysis. A response was received on June 14, 2024. *Tonestus graniticus* (Lone Mountain serpentweed) was not identified (NDNH 2024).
101	101.5	3. The project intends to draw water from sensitive wetlands in which the rare plant *Chloropyron tecopense* is reliant on groundwater for survival. The plant is currently in petition for Endangered Species Listing and is ranked as a rare plant in both California and Nevada (Natureserve). In addition, the Fish Lake Valley is home to the endemic Fish Lake Tui Chub, an undescribed Toad on both the Nevada BLM sensitive species list and Nevada Division of Natural Heritage watch list, an endemic scorpion, and rare and undescribed spring snails (Corey Lange, personal communication). **Reference:** https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.158897/Chloropyron_tecopense https://www.biologicaldiversity.org/species/fish/pdfs/Fish-Lake-Valley-Tui-Chub-Petition.pdf https://heritage.nv.gov/assets/documents/2022-01-Watch_List.pdf	Proposed water use is described in EIS Sections 2.1 and 2.2 and would be sourced from groundwater. Impacts to Tecopa bird's beak are described in EIS Section 4.1. Impacts to wildlife, including Tui chub, and other aquatic species are described in EIS Sections 4.18 and 4.20.18.
101	101.6	4. Most of Esmeralda County is currently in a period of ongoing and varying drought conditions (pg 24 Esmeralda County Water Resource Plan). New lithium and gold mines currently in the planning and permitting process are looking to reallocate water from agriculture to mining in several Esmeralda water basins (pg. 32 Esmeralda County Water Resource Plan) The Fish Lake Valley basin is experiencing irreparable damage from water production that exceeds annual recharge. This overdraft is resulting in collapse of aquifer storage. Preventing further decline of the water table in Fish Lake Valley and efforts to replace the water that has been removed from storage should be a priority for the County. (pg. 48, Esmeralda County Water Resource Plan). Drawing water from the Fish Lake Valley will run the risk of creating a dust bowl in Fish Lake Valley, irreparably harming rare and sensitive wildlife, and destroying the livelihood of local residents. **Reference:** https://cms2.revize.com/revize/esmeraldanew/highlighted%2012-14-22%20-%208th_Draft_EC_Water_Resource_Plan_June_2022.pdf	Groundwater impacts were modeled for the Project and considered cumulative effects of water usage in the Fish Lake Valley. Impacts are discussed in EIS Sections 4.16 and 4.20.16.
101	101.7	5. The Timbisha Shoshone Tribe have continuously used Fish Lake Valley for hunting, gathering food, and performing ceremonies since at least the early 1800s, and utilize the area today for hunting and pine nut harvesting (pg 7). The area has high cultural and spiritual value to the Timbisha tribal members, as spiritually and culturally this land is the birthplace and burial ground of many of their ancestors and relatives. (Documented from oral interviews with contemporary Timbisha tribal members.) (pg 10) There are specific sacred sites in the area related to the Timbisha Shoshone legends in the Silver Peak Range, significant because of the presence of ceremonial and burial grounds. Cremation ceremonies were performed at specific sites, with ashes and belongings buried in	Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally

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		rock formations near the proposed Rhyolite Ridge Project. The sacred burial grounds have been left unprotected, and industrial scale development would desecrate the area. As per request of the tribe, the Silver Peak Range should be closed off to all environmentally damaging activities such as woodcutting and mining, as Tribal members feel that the land needs time to recover from past environmental damage (pg. 11). **Reference:** Fowler, Catherine S., Molly Dufort, &Mary C Rusco. 8 August 1995. Timbisha Shoshone Tribe's Land Acquisition Program: Anthropological Data on Twelve Study Areas. Thank you for your time, Peri Lee Pipkin M.S. Botany	significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts.
Peter Cardenaz – June 3, 2024			
102	102.1	With regards to the proposed Rhyolite Ridge project, I would like to put my support behind this much needed undertaking. As an American, this project greatly enhances our participation in the EV efforts to reduce carbon emissions. The jobs that this project will create, and sustain, is also a great incentive for you to green light this project. Finally, it is refreshing to see a company take such care and concern for Tiehm's Buckwheat. I have personally reached out to Ioneer to see if I can help out with this effort in any way. Thank you Peter Cardenaz	Comment noted.
Karl French – June 3, 2024			
103	103.1	I am writing in support of the Rhyolite Ridge Lithium Boron project. I believe it is essential that the U.S. develop sources of the crucial minerals needed for the transition from fossil fuels to clean renewable energy. Climate change due to burning of fossil fuels is real and threatens many ecosystems and humanity itself if left unchecked. I believe Ioneer's plan for the development of Rhyolite Ridge is well thought out and environmentally sustainable. As climate change is everyone's problem, I believe it is in eveyone's best interest to go forward with this project. Sincerely, Karl French	Comment noted.
Not Provided – June 3, 2024			
104	104.1	I am supportive of this project. It is very difficult to get a new project off the ground in the US. Or anywhere really. But that is very important to the health of a country, its economy, and its people. So in general i try to be supportive of these. I am an environmentalist. So I understand the concerns with sensitive ecosystems. But those should not be judged in a vacuum. And I think the mitigation measures are adequate. So I hope this project can proceed and be a success for the company, the community, our country and the environment. Good luck!	Comment noted.
Not Provided – June 3, 2024			
105	105.1	It is obvious ioneer is designing a responsible and sustainable facility. Support this facility/project moving forward.	Comment noted.
Paul Campos – June 3, 2024			
106	106.1	Hello, My name is Paul Campos I am in favor of having the Ioneer lithium-boron at Rhyolite Ridge move forward. I own the A-Bar-L Western Store in Tonopah and I can tell you, things are tough. We have been serving Central Nevada over 50 years, and it has always been a struggle to stay in business. This project will provide much needed jobs in Central Nevada and are essential to the health a vitality of our communities. I am all for doing what we can to preserve the natural habitat, through relocation, replanting and reclamation efforts when the project is completed. The Buckwheat plant can do nothing for you or anyone on its own. If it can moved replanted or reestablished elsewhere, that would be great. I for one do not want this plant to stop and opportunity to provides jobs for a few hundred families. It would definitely increase the tax base for Esmerelda County and help the economy throughout Central Nevada. Please vote to allow Ioneer to move forward with their project. Thank you, Paul Campos	Comment noted.
Personal Information Requested to be Withheld – June 3, 2024			
107	107.1	I support the approval for the proposal for mining of lithium and borax in the Rhyolite Ridge proposal by Ioneer LTD. This mine and the mining of Lithium and Borax is needed by the United States and should be approved not only for the valuable minerals needed by society today, but these minerals that also will help protect the environment in future years as electrification occurs. The United States should be approving not only this mine but also many other mining permits to bring this much needed mineral production to the USA where geopolitical forces cannot control the citizens of the USA. They have shown a commitment both verbally and being the only interested party to monetarily protect and plan for the survival of Tiehm's Buckwheat. By having greenhouses (paid for solely by Ioneer and not by the groups that won't put their money where their mouth is but just use the court system to sue and try to block all mining even if environmentally sound) that not only protect the seeds but also can propagate the endangered plant, they have shown this commitment to protect this endangered species.	Comment noted.
Personal Information Requested to be Withheld – June 3, 2024			
108	108.1	Please see submitted files and attachments for comment.	Comment noted.
183	183.1	Mr. Distel, Please find attached a copy of the comment letter from the Center for Biological Diversity, Great Basin Resource Watch, Western Shoshone Defense Project, Sierra Club, Earthworks, Basin and Range Watch, and Western Watersheds Project, submitted this morning along with all attachments and references, via eplanning.	

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		Thank you,	
108	108.2	240603 FINAL RR DEIS Comments FOR SUBMISSION.pdf	Comment noted.
108 and 183	108.3 and 183.2	June 3, 2024 Via BLM E-planning portal U.S. Bureau of Land Management (BLM) 50 Bastian Road Battle Mountain, NV 89820 BLM_NV_BMDO_P&EC_NEPA@blm.gov **Re: Rhyolite Ridge Lithium-Boron Mine EIS** Dear BLM: Pursuant to BLM's public notice, 89 Fed. Reg. 28803-04 (April 19, 2024), please accept these comments on the Rhyolite Ridge Lithium-Boron Mine (Mine or Project) and BLM's Draft EIS (DEIS), from the Center for Biological Diversity, Great Basin Resource Watch, Western Shoshone Defense Project, Sierra Club, Earthworks, Basin and Range Watch, and Western Watersheds Project. As shown below, BLM's review and potential approval of the Project violates a number of federal laws and implementing regulations, including the Endangered Species Act (ESA), the Federal Land Policy and Management Act (FLPMA), the National Environmental Policy Act (NEPA), and laws concerning the protection of Native American cultural and religious resources. The commenting groups adopt and include by reference herein into the administrative record all previous comments or materials submitted to BLM regarding the Project.	The EIS is consistent with NEPA, mining laws, CEQ regulations, BLM surface management regulations, and the BLM NEPA Handbook. The Project's consistency with FLPMA and land use plans is discussed in the EIS in Sections 4.6.
108 and 183	108.4 and 183.3	**I. ENDANGERED SPECIES ACT (ESA) VIOLATIONS** **A. The Proposed Action and North and South OSF Alternative Violate BLM's Affirmative Conservation Duty Under Section 7(a)(1) of the ESA.** The Endangered Species Act (ESA) is "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation." *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 180 (1978). Congress enacted the ESA in 1973 "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved." 16 U.S.C. § 1531(b). The ESA's "primary purpose . . . is to prevent animal and plant species endangerment and extinction caused by man's influence on ecosystems, and to return the species to the point where they are viable components of their ecosystems." H.R. Rep. No. 95-1625, at 5 (1978), reprinted in 1978 U.S.C.C.A.N. 9453, 9455. Section 7(a)(1) of the ESA imposes on all federal agencies, including BLM, a mandatory duty to conserve listed species. 16 U.S.C. § 1536(a)(1). The statute defines the terms "conserve," "conserving," and "conservation" to mean "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary." 16 U.S.C. § 1532(3). Accordingly, Section 7(a)(1) requires agencies to take actions that will tend to increase endangered and threatened species' populations. *See* 16 U.S.C. § 1532(3); *Sierra Club v. Clark*, 755 F.2d 608 (8th Cir. 1985). This is more than a generalized duty; it requires agencies to consult, develop programs, and "take whatever actions are required to ensure the survival of each [listed] species." *Sierra Club v. Glickman*, 156 F.3d 606, 616 (5th Cir. 1998). The Act's legislative history is replete with statements that Congress intended this affirmative duty to be taken literally and seriously by agencies. *See TVA v. Hill*, 437 U.S. 153, 183-84 (1978) (statement of Rep. Dingell); *see also House v. United States Forest Serv.*, 974 F. Supp. 1022, 1028 (E.D. Ky. 1997) (enjoining timber sale due to agency's failure to comply with affirmative duty to place an endangered species "at the top of its priority list"). Further, Section 7(a)(1)'s affirmative conservation duty supersedes a federal agency's primary mission as well as other statutory duties. *Carson-Truckee Water Conservancy Dist. v. Clark*, 741 F.2d 257, 259 (9th Cir. 1984); *Pyramid Lake Paiute Tribe of Indians v. United States Dep't of Navy*, 898 F.2d 1410, 1417-18 (9th Cir. 1990). As the U.S. Supreme Court has observed, the ESA requires the Secretary of the Interior to give the "highest priority" to the preservation of listed species, and directs federal agencies to "halt and reverse the trend toward species extinction, whatever the cost." *Hill*, 437 U.S. at 184. As described below, both the Proposed Action and North and South OSF Alternative will jeopardize the continued existence of Tiehm's buckwheat, and are therefore inconsistent with BLM's affirmative conservation duty under Section 7(a)(1). At the very least, both action alternatives will result in substantial damage to the ecosystem on which Tiehm's buckwheat depends. Further, both alternatives place BLM's objectives under its "multiple use" mandate and the 1872 Mining Law above its ESA obligations; in other words, BLM has failed to afford threatened and endangered species the "highest priority," as the ESA requires. Importantly, the losses incurred by either alternative cannot be offset by conservation actions elsewhere. Tiehm's buckwheat exists on only ten acres within the proposed project area, and efforts to transplant the species have proven an abject failure. For all of these reasons, approving either the Proposed Action or the North and South OSF alternative would violate ESA Section 7(a)(1), 16 U.S.C. § 1536(a)(1).	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
108 and 183	108.5 and 183.4	**B. The Proposed Action and North and South OSF Alternative Would Jeopardize the Continued Existence of Tiehm's Buckwheat and Adversely Modify its Critical Habitat, in Violation of ESA Section 7(a)(2).** ESA Section 7(a)(2) requires each federal agency, in consultation with a federal wildlife agency (Fish and Wildlife Service), to insure that any proposed action is not likely to jeopardize the continued existence of a listed species, or result in the destruction of adverse modification of its critical habitat. 16 U.S.C. § 1536(a)(2). To "jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 C.F.R. § 402.02. "Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species." *Id.* Whenever a proposed action may affect a listed species, the action agency must engage in "formal consultation" with a wildlife agency, in this case FWS. *Id.* § 402.14(a). During formal consultation the wildlife agency prepares a "biological opinion," *id.* § 402.14, which must detail "how the agency action affects the species or its critical habitat." 16 U.S.C. § 1536(b)(3)(A).	In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. The Biological Assessment evaluates the current status of Tiehm's buckwheat and the effects of the Project. The USFWS will evaluate the Biological Assessment and the applicant's Buckwheat Protection Plant to prepare a Biological Opinion. Section 7 consultation is ongoing.

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		A biological opinion must evaluate both the current status of any affected listed species as well as the effects of the proposed action on those listed species. 50 C.F.R. § 402.14(g)(2)-(3). Under Section 7's implementing regulations, "effects of the action" include: > [A]ll consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. *Id.* § 402.02. Agencies are required to "use the best scientific and commercial data available" in assessing impacts to protected species during the formal consultation process. *Id.* § 402.14(d); 16 U.S.C. § 1536(a)(2). Based on this information, the wildlife agency must determine whether the action, taken together with cumulative effects, is "likely to jeopardize the continued existence of listed species." 50 C.F.R. § 402.14(g)(4). Although the wildlife agency is responsible for the content of the biological opinion, the ultimate duty to ensure that an activity does not jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of critical habitat, lies with the action agency—in this case, BLM. Here, neither the Proposed Action nor the North and South OSF Alternative comply with the ESA's prohibitions on jeopardy and adverse modification. First and most obviously, both action alternatives would directly destroy a significant portion of Tiehm's buckwheat's critical habitat. The Proposed Action would directly eliminate 354 acres, or 38 percent of the species' total designated critical habitat, while the North and South OSF Alternative would eliminate 197 acres, or 22 percent of designated critical habitat. Further, both action alternatives can reasonably be expected to "reduce appreciably the likelihood of both the survival and recovery of [Tiehm's buckwheat] in the wild by reducing the reproduction, numbers, or distribution of that species," and both would "appreciably diminishes the value of critical habitat as a whole" for Tiehm's buckwheat conservation (*see generally* Fraga 2024, Appendix A). 50 C.F.R. § 402.02. Although BLM and Ioneer propose various avoidance, mitigation, and translocation measures that would, in the most optimistic (and arguably unrealistic) scenario, allow the species to cling to survival while its habitat is converted into an industrial site, the wholesale destruction of roughly a quarter of the species' total critical habitat is wholly inconsistent with the ESA, which requires the protection and conservation of the ecosystems on which threatened and endangered species depend. As the Ninth Circuit Court of Appeals has explained, "the purpose of the ESA is to promote populations that are self-sustaining without human interference." *Trout Unlimited v. Lohn*, 559 F.3d 946, 957 (9th Cir. 2009). This purpose "can be deduced from the statute's emphasis on the protection and preservation of the habitats of endangered and threatened species." *Id.* (citing 16 U.S.C. § 1531(b)). Eliminating the species' critical habitat—as well as the ecological processes that such critical habitat provides—is completely at odds with the statute's goals and emphasis. Further, neither the DEIS nor the Buckwheat Protection Plan demonstrate that any of the proposed mitigation measures will be effective, as required by the ESA, NEPA, and FLPMA. The Buckwheat Protection Plan, for example, focuses heavily on reclamation, but largely ignores the fact that reclamation of critical habitat will not begin until year 19 of operations. Neither the DEIS nor the Protection Plan consider how a 19-year absence of areas deemed "critical" to the survival and recovery of Tiehm's buckwheat will impact the species. In addition, the Protection Plan fails to describe the proposed reclamation activities in sufficient detail to evaluate their efficacy. Put bluntly, the so-called "Protection Plan" is better described as a plan to make a plan, which unreasonably and unlawfully delays development of specific plan components until after Project approval. The Protection Plan also fails to incorporate several of FWS's conservation recommendations, and fails to provide a satisfactory explanation as to why Ioneer has chosen to disregard best practices with respect to an endangered species. For a detailed description of how the Buckwheat Protection Plan fails to protect Tiehm's buckwheat from the existential threats posed by the proposed mine, *see* Appendix A (Fraga 2024), Appendix B (Emerman 2024), and Appendix C (McCarthy 2024). Finally, BLM and Ioneer cannot rely on translocation or offsite planting to satisfy their ESA obligations. Although translocation has been utilized in limited circumstances to assist species that are no longer viable in the wild, its application to a species that would be viable and self-sustaining in the wild, but for the proposed Project, violates the ESA. The statute mentions artificial propagation merely as a means "to bring any endangered species or threatened species to the point at which the measures provided pursuant to this [Act] are no longer necessary." 16 U.S.C. § 1532(3). The ESA's legislative history also confirms that the ESA is primarily focused on natural populations. *See* H.R. Rep. No. 95-1625, at 5, reprinted in 1978 U.S.C.C.A.N. at 9455. Relying on the offsite propagation of Tiehm's buckwheat would also be inconsistent with the ESA's fundamental purpose of protecting the ecosystems on which endangered species depend. And critically, there is currently no credible evidence that Tiehm's buckwheat can be successfully transplanted. For all of these reasons and per the discussion below, approving either the Proposed Action or the North and South OSF Alternative would violate the ESA.	
108 and 183	108.6 and 183.5	**II. FEDERAL LAND POLICY AND MANAGEMENT ACT (FLPMA) VIOLATIONS** **A. BLM Failed to Review and Regulate the Project Under the Correct Permitting Regimes.** The DEIS lists the required permits for the Project (Appendix B), but fails to note that the water pipeline and associated infrastructure requires a Right-of-Way (ROW) under FLPMA Title V. The existing limited ROW for the dirt access road (which itself needs to be amended/revised) is not sufficient for the expanded uses of the Project and required water pipeline and infrastructure. The DEIS erroneously assumes that the large water supply pipeline from Fish Valley fits within the existing minimal dirt road ROW held by the County. DEIS at 3-16. Under FLPMA and mining and public land law, BLM's review and approval of the water/infrastructure line(s) is not governed by the 1872 Mining Law and BLM's 43 C.F.R. Part 3809 regulations, as assumed by BLM in the DEIS, but rather under FLPMA Title V. The proposed activities are beyond the scope of those contemplated and approved in the original/existing ROW. This necessitates, at a minimum, an amended (more properly, a new) special use permit and ROW subject to full FLPMA, ESA, and NEPA compliance. Such ROW/permit review is entirely discretionary with BLM and the agency is not governed by any constraints under the Mining Law. This includes the requirement that all such activities (in addition to those on-site) be consistent and comply with all laws, regulations, and the applicable RMP and BLM policies, handbooks, and guidance. Under FLPMA Title V, Section 504, BLM may grant a Right-of-Way (ROW) only if it "(4) will do no unnecessary damage to the environment." 43 U.S.C. § 1764(a). Rights of way "shall be granted, issued or renewed … consistent with … any other applicable laws." *Id.* § 1764(c). A rightof- way that "may have significant impact on the environment" requires submission of a plan of construction, operation, and rehabilitation of the right-of-way. *Id.* § 1764(d). A Title V SUP/ROW "shall contain terms and conditions which will … (ii) minimize damage to scenic and esthetic values and fish and wildlife habitat and otherwise protect the environment." *Id.* § 1765(a). *See also* § 1765(b) (additional environmental protection requirements). The terms of this section do not limit "damage" specifically to the land within the ROW corridor, but to all lands and resources that may be affected by the ROW (here, the Mine Project and all its impacts). BLM not only has the authority to consider the adverse impacts on lands and waters outside the immediate ROW corridor, but it also has an obligation to protect these public resources under FLPMA. In *County of*	This concern is discussed in the SIR. Whether the Project is permitted under 2920 or 3809 regulations, the EIS will still analyze and disclose impacts from the Proposed Action and alternatives and include measures to reduce environmental impacts.

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		Okanogan v. National Marine Fisheries Service, 347 F.3d 1081 (9th Cir. 2003), the court affirmed the Forest Service's imposition of mandatory minimum stream flows as a condition of granting a ROW for a water pipeline across USFS land. This was true even when the condition/requirement restricted or denied vested property rights (in that case, water rights). *Id.* At 1085-86. BLM must also comply with the financial requirements of FLPMA regarding ROW applications and approvals. *See* 43 U.S.C. § 1701(a)(9); 43 U.S.C. § 1764(g); 43 C.F.R. § 2805.20; 43 C.F.R. Part 2800. The DEIS also erroneously limits BLM's review of the Project to its duty to "prevent unnecessary or undue degradation" (UUD) under FLPMA, presuming that Ioneer has valid statutory rights to use and occupy its claims under the 1872 Mining Law. There is no information and analysis verifying that all of the mining and millsite claims to be utilized by the Project are valid under the Mining Law. BLM must verify, and require the company to provide evidentiary proof, that all claims under the Mining Law proposed to be used by the Project are valid under the Mining Law. Without such verification, the company/claimant has no rights to use and occupy the claims (except for preliminary exploration which has already occurred) and BLM has full discretion over the project under FLPMA and BLM's multiple use authorities (i.e., BLM is not limited by the "unnecessary or undue degradation" standard in FLPMA). Relatedly, BLM must fully consider the various alternatives of not approving an activity on public land unless that activity is proposed on lands covered by claims that have been verified to be valid under the Mining Law (including denying the ROW discussed above).	
108 and 183	108.7 and 183.6	**B. The Project and BLM's Review Do Not Comply with FLPMA.** Even if Ioneer can show that all of its activities on its mining and millsite claims meet the strict test for valid rights under the Mining Law (which has not been shown), as an overarching mandate for BLM's management of public lands, FLPMA requires that BLM "take any action necessary to prevent unnecessary or undue degradation of the lands." 43 U.S.C. §1732(b) (the UUD standard). "FLPMA's requirement that the Secretary prevent UUD supplements requirements imposed by other federal laws and by state law." *Ctr. for Biological Diversity v. U.S. Dept. of the Interior*, 623 F.3d 633, 644 (9th Cir. 2010). This duty is "the heart of FLPMA [that] amends and supersedes the Mining Law." *Mineral Policy Center v. Norton*, 292 F. Supp. 2d 30, 42 (D.D.C. 2003). BLM cannot under any circumstances approve a mining project that would cause UUD. 43 C.F.R. § 3809.411(d)(3)(iii). As part of preventing UUD, BLM must ensure that all operations comply with the Performance Standards found at § 3809.420. *See* 43 C.F.R. § 3809.5 (definition of UUD, specifying that failing to comply with the Performance Standards constitutes UUD). These Standards require BLM to ensure that all operations comply with all environmental protection standards, including standards for air, water and threatened and endangered species. *See* 43 C.F.R. § 3809.5 (definition of UUD includes "fail[ure] to comply with one or more of the following: … Federal and state laws related to environmental protection."). The current rules: "retain[ed] the general performance standards (paragraphs (a)(1) through (a) (5) from the 2000 rule because they provide an overview of how an operator should conduct operations under an approved plan of operations and clarify certain basic responsibilities, including the operator's responsibility to comply with applicable land use plans and BLM's responsibility to specify necessary mitigation measures." 66 Fed. Reg. 54835, 54840 (Oct. 30, 2001). One of these standards is BLM's duty to impose "mitigation measures to protect public lands." 43 C.F.R. § 3809.420(a)(4). "Mitigation measures fall squarely within the actions the Secretary can direct to prevent unnecessary or undue degradation of the public lands. An impact that can be mitigated, but is not, is clearly unnecessary." 65 Fed. Reg. 69998, 70052 (Nov. 21, 2000) (preamble to rule section that remains in force). BLM's mitigation policy, as detailed by the Interior Solicitor, acknowledges the need to ensure compliance with an RMP as part of its mitigation duties under the FLPMA UUD standard. In discussing the previous rulemaking (quoted above) with approval, the Solicitor reiterated "'the operator's responsibility to comply with applicable land use plans and BLM's responsibility to specify necessary mitigation measures.'" M-37039, The Bureau of Land Management's Authority to Address Impacts of its Land Use Authorizations through Mitigation, 20, n.115 (Dec. 21, 2016) (Mitigation Opinion). In addition, BLM has the authority—and indeed, an obligation—to reject a proposal where mitigation cannot prevent UUD. "Although mitigation may contribute in some instances to the avoidance of UUD, in other cases, the impacts to resources may be of a nature or magnitude such that they cannot be mitigated sufficiently to prevent UUD." M-37039 at 20. According to the Solicitor: > the destruction of unique habitat in a particular place might not be adequately compensated by post-use restoration or protection of lesser habitat elsewhere. *In such a case, where mitigation cannot prevent UUD, the BLM has authority to reject the application for approval of the public land use based on the proponent's inability to prevent UUD*. The obligation to avoid UUD is a complementary but distinct source of authority for requiring mitigation under FLPMA. M-37039 at 20 (emphasis added). The Solicitor recognized that, without adequate mitigation, "the destruction of unique habitat in a particular place" would constitute UUD. M-37039 at 20. This duty includes, but is not limited to, species listed under the Endangered Species Act. *See Western Exploration v. U.S. Dept. of the Interior*, 250 F. Supp. 3d 718 (D. Nev. 2017). Finally, the DEIS bases BLM's review of the agency's duty to "prevent unnecessary or undue degradation of the lands," 43 U.S.C. §1732(b) (UUD) on its UUD definition at 43 C.F.R. § 3809.5. In order to properly comply with FLPMA and BLM's duties to protect public lands and resources, however, the new definition of UUD at 43 C.F.R. § 6101.4 should apply. BLM must revise its review and potential approval of the Project accordingly.	The Project's consistency with FLPMA and land use plans is discussed in the EIS in Section 4.6. The Project would implement ACEPMs to minimize impacts as described in EIS Section 2.0. Identified mitigation requirements are described in Section 4.21.
108 and 183	108.8 and 183.7	**C. The Proposed Action and North and South OSF Alternative Do Not Comply With the Tonopah RMP.** As noted herein, under FLPMA, BLM cannot approve any activity that is not in full compliance with the applicable land use plans, known as Resource Management Plans (RMPs). FLPMA requires that all activities approved by BLM comply with the requirements of binding RMPs. "The Secretary shall manage the public lands under principles of multiple use and sustained yield, in accordance with the land use plans developed by him under section 1712 of this title when they are available." *Id.* §1732(a). Here, the applicable land management plan is the Tonopah RMP, which requires BLM to "[p]rotect, restore enhance, or expand habitat for threatened, endangered, or Nevada BLM Sensitive Species." United States Dep't of Interior, BLM, Approved Tonopah Resource Mgmt. Plan and Record of Decision, 1, 9 (1997). The RMP further requires that "[h]abitat for all . . . Nevada BLM Sensitive Species (plant and animal) will be managed to maintain or increase current populations of these species." *Id.* at 9 (emphasis added). BLM Special Status Species Handbook § 6840 states that BLM Sensitive Species "will be managed… to minimize the likelihood and need for listing under the ESA." As discussed above, neither the Proposed Action nor the North and South OSF Alternative is consistent with protecting, restoring or expanding Tiehm's buckwheat habitat or increasing the population size. BLM's actions to date with Tiehm's buckwheat have already resulted in its being listed under the ESA, and the DEIS alternatives would only serve to exacerbate those same concerns.	The Project's consistency with FLPMA and land use plans is discussed in the EIS in Section 4.6. Special status species known to occur in the area are described in EIS Sections 3.14 and 3.18. Bi-state sage-grouse are discussed in Section 3.12.1. Impacts to special status plant species are described in Section 4.14 and 4.20.14. Impacts to special status wildlife are discussed in Section 4.18 and 4.20.18. Impacts to bi-state sage-grouse are discussed in Sections 4.12 and 4.20.12.

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		The Proposed Action and North and South OSF Alternative also fail to protect two other species in Fish Lake Valley that have been petitioned for ESA listing and are BLM Nevada Sensitive Species: the Fish Lake Valley tui chub (*Siphateles bicolor* ssp. 4) and the Tecopa bird's beak (*Chloropyron tecopense*). These have been added to the BLM Nevada Sensitive Species list as of September 2023 (BLM Instructional Memorandum NV-IM-2024-003). The Fish Lake Valley tui chub was petitioned for listing in 2021 and received a positive 90-day finding in 2022 (87 Fed. Reg. 51635). The Tecopa bird's beak was petitioned for listing in 2023 and has not yet received a 90-day finding. The Fish Lake Valley tui chub was previously known from several locations in Fish Lake Valley but now only survives in a single isolated spring at a privately owned ranch located in the northeast portion of the valley. Due to its small size and restricted range, this sole remaining population is particularly vulnerable to groundwater extraction and other threats such as non-native species. The Tecopa bird's beak is known from Fish Lake Valley and one other location in the Amargosa River Basin. The entirety of its habitat lies within lithium mining claims and it is surrounded by geothermal leases and exploration projects. Both of these species are entirely reliant on sustained discharge of groundwater from the aquifer in Fish Lake Valley, and as described below in Section III(E)(10), both are threatened with serious harm or extinction by the Rhyolite Ridge mine. An additional BLM Sensitive Species is the bi-state distinct population segment of the greater sage-grouse (*Centrocercus urophasianus*) ("BSSG"). BSSG is current proposed for listing, but its status has been in flux as a result of several court rulings. Nonetheless, at this time it is proposed for listing and there is a unit of proposed critical habitat in an area called Coyote Hole, just east of the Project Area. There is also an area of identified habitat north of the Project Area. Consultants for Ioneer found one male BSSG within the project area as an incidental observation in 2022 (DEIS at 3-14). As described below in Section III(E)(10), there could be significant impacts to BSSG and its critical habitat from the Project, including disturbance of habitat, increased vehicular traffic and disturbance, and dewatering of vital water sources. The Project risks irreparably degrading the proposed critical habitat of BSSG, as well as risking potential mortality of individuals. The Rhyolite Ridge Mine, and groundwater impacts therefrom, are likely to contribute to the listing of the Fish Lake Valley tui chub, the Tecopa bird's beak, and the bi-state sage-grouse under the Endangered Species Act, and thus violates BLM's sensitive species policy and the Tonopah RMP. Further, the DEIS does not indicate that BLM has complied with the 2016 RMP amendments for BSSG, which impose habitat buffers, seasonal restrictions, disturbance caps, compensatory mitigation, and other measures to minimize or offset impacts to BSSG populations and habitat.	
108 and 183	108.9 and 183.8	**D. The DEIS Does Not Demonstrate Compliance With Applicable State Permitting Requirements.** As noted, in order to prevent UUD, a project must comply with the performance standards at 43 C.F.R. § 3809.420, including State permitting laws. However, BLM cannot rely on eventual NDEP permitting (which does not require compliance with NEPA) to fulfill BLM's NEPA and FLPMA obligations. "'[A] non-NEPA document ... cannot satisfy a federal agency' obligations under NEPA.'" *Great Basin Res. Watch v. BLM*, 844 F.3d 1095, 1104 (9th Cir. 2016) (quoting *South Fork Band Council v. U.S. Dept. of the Interior*, 588 F.3d 718, 726 (9th Cir. 2009)). "[N]or have we allowed federal agencies to rely on state permits to satisfy review under NEPA." *Env'l Defense Ctr. v. Bureau of Ocean Energy Mgt.*, 36 F.4th 850, 874 (9th Cir. 2022). Here, BLM has failed to show that the Project complies with applicable State permitting requirements for water rights and water quality. ***1. The Project Does Not Have Adequate Water Rights*** Ioneer has not acquired all necessary water rights for the Project. Records from the office of the Nevada State Engineer indicate that Ioneer has acquired only a fraction of the water rights needed for the full development of its mine operations.1 For the remainder, Ioneer states that it will acquire agricultural water rights in Fish Lake Valley. *See* DEIS at 2-14. However, to utilize these water rights, Ioneer must file an application with the Nevada State Engineer to change the place and manner of use. *See* NRS 533.370. Under Nevada State Law, Ioneer must demonstrate that the change in use will not conflict with existing rights or threaten to prove detrimental to the public interest. *Id.* Further, the applications are subject to protest and judicial review. NRS 533.450. BLM has previously determined that failure to obtain all the necessary water rights for a project under Nevada State law constitutes a failure to prevent UUD under FLPMA. At the scoping meetings for this project, Scott Distel of BLM Battle Mountain District said, "By regulation the BLM cannot approve a project that requires water rights for which no water right exists…. BLM cannot authorize projects for which water rights are required where no water right exists." In a subsequent email, Mr. Distel cited 43 CFR 3809.402(a)(6) as the authority for this statement. On December 13, 2022, BLM Southern Nevada District sent a letter to Control Technology, Inc. notifying them that they were denying the company's application for a pumped hydro storage project in Clark County, Nevada. The letter stated, "Any BLM decision to authorize your hydropower project prior to the approval of the use of State water resources would result in unnecessary or undue degradation of public lands which would be inconsistent with the purposes for which BLM manages public lands." BLM 2022b (Letter to Control Technology, Inc. re: N-101255). ***2. The Project Does Not Have a Current Water Pollution Control Permit.*** The State of Nevada has not received an application from Ioneer for a required major modification of its water pollution control permit, which is not surprising given the DEIS's lack of detail regarding a number of mine facilities such as the tailings disposal facility (SOSF). This indicates that the federal permitting process is far ahead of the State process. The same problem recently occurred at the Thacker Pass mine and resulted in BLM permitting aspects of the mine plan that the State of Nevada did not. The Rhyolite Ridge project, with its highly accelerated and irregular permitting schedule, risks a similar outcome—BLM could permit aspects of the mine plan that could be deemed illegal by the State of Nevada. Failure to obtain all necessary state approvals would constitute UUD and require BLM to reject the plan of operations. [1]State of Nevada, Division of Water Resources, Online Data Portal, Hydrographic Abstract for Fish Lake Valley (Basin 117), *available at*: http://www.water.nv.gov/HydrographicAbstract.aspx.	Comment noted. The EIS acknowledges that other authorizations from federal, state, and local agencies are required and lists necessary major permits and approvals in Appendix B.
108 and 183	108.10 and 183.9	**III. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) VIOLATIONS** **A. BLM's Permitting Process for the Rhyolite Ridge Project Violates NEPA and FLPMA Public Disclosure and Participation Requirements.** The planning process for the Rhyolite Ridge project has not been carried out in a way that fosters informed decisionmaking and public participation, in violation of both FLPMA and NEPA. First, the process has been unreasonably rushed, with BLM's own staff complaining that "This is a very aggressive schedule that deviates from other project schedules on similar projects completed recently and concurrently at the District and State." Email from Scott Distel, BLM, to Doug Furtado, BLM, December 21, 2023. According to internal BLM correspondence obtained through the Freedom of Information Act (FOIA), the Rhyolite Ridge permitting process: • "[S]ignificantly changes timelines for [the BLM interdisciplinary team (IDT)] and cooperating agencies as provided in previous versions of the schedule, without prior coordination with these groups." • Assumes, without basis, that internal comments "are specific and provide direction on how to be resolved." • Assumes that mitigation measures, which have not yet been developed, "do[] not require additional NEPA analysis or baseline."	Public involvement opportunities for the Project have been conducted according to NEPA, CEQ regulations, and the BLM NEPA Handbook. In-depth analyses of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with NEPA. The EIS and SERs that support the analysis were made available to the public.

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		• Assumes that "[c]ooperating agency and IDT comments are not significant and do not require new analysis or additional information to be incorporated." • Assumes that "[n]o comments" will be received "that [require] input from BLM or Ioneer in responding to." • Assumes that BLM solicitors will "have no significant comments and do not require new analysis or additional information to be incorporated." • "Public comments are minimal, and no more than 100 individual comments are received (note this states individual comments, not comment letters; typically, comment letters have multiple individual comments in them)." *Id.* This internal correspondence thus shows that the current permitting and review process is a pro forma exercise that is not consistent with the public participation requirements of both NEPA and FLPMA. Both FLPMA and NEPA emphasize public participation, "with their statutory framework largely in unison on such a requirement." *W. Watersheds Project v. Zinke*, 441 F. Supp. 3d 1042, 1069 (D. Idaho 2020). FLPMA Section 309(e) directs that: > In exercising his authorities under this Act, the Secretary, by regulation, shall establish procedures, including public hearings where appropriate, to give . . . the public adequate notice and an opportunity to comment upon the formulation of standards and criteria for, and to participate in, the preparation and execution of plans and programs for, and the management of, public lands. 43 U.S.C. § 1739(e); *see also* 43 U.S.C. § 1701(a)(5) (FLPMA Section 102(a)(5)): "[I]t is the policy of the United States that . . . the Secretary be required to establish comprehensive rules and regulations after considering the views of the general public . . . ."); 43 U.S.C. § 1712(f) (FLPMA Section 202(f)): "The Secretary shall allow an opportunity for public involvement and by regulation shall establish procedures, including public hearings where appropriate, to give . . . the public, adequate notice and opportunity to comment upon and participate in the formulation of plans and programs relating to the management of the public lands."). NEPA, meanwhile, aims to "ensure[ ] that the agency will inform the public that it has indeed considered environmental concerns in its decision-making process." *Balt. Gas & Elec. Co. v. Nat. Res. Def. Council*, 462 U.S. 87, 97 (1983). To this end, federal agencies "must provide the public with sufficient environmental information, considered in the totality of circumstances, to permit members of the public to weigh in with their views and thus inform the agency decision-making process." *Bering Strait Citizens for Responsible Res. Dev. v. U.S. Army Corps of Eng'rs*, 524 F.3d 938, 953 (9th Cir. 2008); *see also Trout Unlimited v. Morton*, 509 F.2d 1276, 1282 (9th Cir. 1974) (explaining that an EIS prepared under NEPA "should provide the public with information on the environmental impact of a proposed project as well as encourage public participation in the development of that information"); *Idaho Sporting Cong., Inc. v. Alexander*, 222 F.3d 562, 568 (9th Cir. 2000) (holding that the Forest Service violated NEPA's public participation requirements because SIRs were not presented at the earliest time possible, as NEPA requires, and because public participation procedures attached to the preparation of the SIRs were not as thorough as NEPA mandates). BLM's determination to rush the permitting process here despite significant and unresolved issues ignores the fact that "a proposed decision carries with it an inevitable momentum favoring that result, an effect NEPA seeks to avoid by 'ensur[ing] that federal agencies are informed of environmental consequences before making decisions . . . .'" *W. Watersheds Project v. Kraayenbrink*, 538 F. Supp. 2d 1302 1314-16 (9th Cir. (2007) (*quoting Citizens for Better Forestry v. United States Dep't of Agric.*, 341 F.3d 961, 970 (9th Cir. 2003)). BLM's assumptions about the permitting process are unreasonable and unrealistic; many have already proven false. As this letter demonstrates, BLM's assumption that no new analysis or additional information will be required is obviously and demonstrably wrong. Moreover, BLM's various assumptions that internal and public comments will be minimal, and will not require "responding to" by either BLM or the project proponent, appear to preemptively foreclose meaningful public involvement and rigorous analysis in the planning process. In addition, many of the technical reports relied on and cited in the DEIS are from outdated mine plans. For instance, the mine subsidence evaluation (HydroGeoLogica 2020a) is based on an old configuration of the mine and the pit. In this document, the pit is conceived to be approximately 600 feet deep and the pit configuration includes destroying most of Tiehm's buckwheat's habitat. In the preferred alternative in the DEIS, the pit is over 300 feet deeper, will require more dewatering, and was moved in location. The mine subsidence evaluation is not a valid analysis to base the DEIS on because it analyzes a fundamentally different project. This same problem is true for many other technical documents including the pit lake model (HydroGeoLogica 2020b) and the geochemical characterization report (HydroGeoLogica 2020c). These documents need to be updated to reflect the current mine configuration. Finally, BLM's rollout of the DEIS was disorganized and confusing. BLM issued a press release on Friday, April 12, stating that BLM was "seeking public comment on a draft environmental impact statement for the proposed Rhyolite Ridge Lithium-Boron Mine Project." The Press Release also stated that "[p]ublication of the draft EIS for the proposed mine opens a 45-day public comment period, ending on May 27, 2024." However, BLM did not actually publish the DEIS on that date; nor did BLM issue the legally required notices in the Federal Register. BLM then informed the Center that it would not publish the Draft EIS for another week. However, four days later, on Tuesday, April 16, BLM surreptitiously posted the DEIS and accompanying SIRs on its eplanning website with no additional public notification. Again, BLM did not publish the federal register notice that is required to accompany a Draft EIS. Finally, on Friday, April 19th, BLM issued a federal register notice and changed its previously issued press release to state the correct comment deadline. This inexplicable conduct will undoubtedly lead to confusion among members of the public as to when the comments on this project are due, and what agency documents are being presented for public comment. As such it is inconsistent with the emphasis on meaningful public participation that is found in both NEPA and FLPMA, as discussed above. The public engagement process around the proposed Rhyolite Ridge mine must more adequately align with the National Environmental Policy Act (NEPA) than it has so far, and the 45-day comment period is slap in the face to the public. BLM should have allowed at least 120 days for comments to ensure the public is able to properly understand the proposed action and have their concerns fully taken into account. A more thorough and transparent public engagement process is needed. In addition, community members are currently still waiting for requested documents. The comment period must be extended due to the fact that these community members have still not been given access to the information they need in order to make meaningful comments at the DEIS stage. BLM has afforded the public longer comment periods for large complex mines such as Rhyolite Ridge; for example, for the proposed Mt. Hope Molybdenum mine BLM allowed 90 days. *See* Dear Reader Letter for the Mount Hope Project Draft Environmental Impact Statement, (November 29, 2011). The Pan Mine project, which is arguably less complex than Rhyolite Ridge, allowed for about 53 days for a comment period from March 15 to May 7 2013. *See* Abstract, Draft Environmental Impact Statement for the Pan Mine Project (March 8, 2013). BLM must address the problematic nature of streamlining. Adequate public engagement should be prioritized and the community adequately met, consistent with the spirit of NEPA. To sufficiently add these components	

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		and meet the spirit of NEPA, more time should be devoted to the permitting process, not less. Ioneer's plan for an expedited permitting for Rhyolite Ridge needs to be critically evaluated in light of this, and the comment deadline for the Draft Environmental Impact Statement (DEIS) needs to be extended at least through the end of June. In an effort to rectify BLM's errors and facilitate meaningful public input and informed decisionmaking, the signatories of this letter requested an extension to the bare-minimum 45-day comment period on May 17. Letter from the Timbisha Shoshone Tribe, Center for Biological Diversity, Great Basin Resource Watch, and Western Watersheds Project to Scott Distel, BLM (May 17, 2024). BLM rejected this request. Email from Doug Furtado, BLM to Scott Lake, Center for Biological Diversity re: Rhyolite Ridge Project (May 20, 2024).	
108 and 183	108.11 and 183.10	**B. The Ioneer Documents Rely on Euphemisms Instead of Standard Mining Industry Vocabulary, and The DEIS Duplicates this Misleading Terminology.** We have never seen the expression "spent ore The standard expressions in the mining industry are "tailings storage facility" or "tailings disposal facility." According to the SME Surface Mining Handbook, "Tailings are fine-grained mineral waste that remains after processing and recovery of the minerals of economic interest, along with process water and chemical reagents added during the milling or beneficiation stages" (Snow and Morrison, 2023). "Spent ore" is exactly the same concept, but, as far as we have ever seen, spent ore is material that is left on a heap leach pad, while material that is transferred to an engineered facility is called "tailings." In this letter, we refer to "tailings," except to quote from Ioneer documents or to use the acronym SOSF. In a similar way, the Ioneer website boasts that there will be "no tailings dam" (Ioneer, 2024a). The Definitive Feasibility Study elaborates, "The project will be an environmentally friendly operation … with no tailings dam … The SOSF has been designed to store a composite consisting of leached ore from the vats plus sulphate salts generated in the evaporation and crystallization circuits. This material is suitable for dry stacking, meaning there is no need for a conventional tailings dam" (Ioneer, 2020). By contrast, the stability analyses by NewFields (2020a) show a structural zone (see Fig. 1), which serves exactly the same function as a dam. According to Klohn Crippen Berger (2017), a filtered tailings storage facility "still requires 'structural zones' (which perform like dams), made of compacted tailings for confinement" and "if filtered tailings are placed in a stand-alone facility (pile/stack), the outer slopes must maintain structural stability (similar to a dam or a waste dump), particularly under seismic loading conditions." According to Safety First: Guidelines for Responsible Mine Tailings Management, "Because they [filtered tailings storage facilities] still require a structural zone (which is a type of dam) for containment, they must be treated as an engineered tailings facility (i.e. tailings dam) from a regulatory standpoint … The structural zone of a filtered tailings facility serves the same function as a dam" (Morrill et al., 2022). The suitability of the expression "dry stacking" by Ioneer (2020) will be addressed in our comment on the tailings disposal facility (SOSF). The use of the expression "spent ore" instead of "tailings" and of "structural zone" instead of "tailings dam" might only be a public relations matter, which would not be the most important concern. However, the real concern is that Ioneer might use these kinds of euphemisms to avoid compliance with regulations and mining industry guidance documents on tailings and tailings dams, such as Guidelines on Tailings Dams: Planning, Design, Construction, Operation and Closure (ANCOLD, 2012, 2019), Global Industry Standard on Tailings Management (ICMMUNEP- PRI, 2020), and Safety First: Guidelines for Responsible Mine Tailings Management (Morrill et al., 2022). Documents by Ioneer have not referred to any of the preceding industry guidance documents. Ioneer is not a Company Member of the International Council on Mining and Metals (ICMM, 2024),[2] the Minerals Council of Australia (MCA, 2024),[3] nor the International Lithium Association (ILA, 2024),[4] so that is entirely unclear as to what industry guidelines the company adheres. It is noteworthy that Safety First explicitly warns against the use of alternative vocabulary to avoid regulations and guidance documents. According to Safety First, "Operating companies may avoid using the word 'dam' in an attempt to skirt tailings dam safety requirements. However, it is important to note that these guidelines apply to any engineered structure that contains mine tailings, regardless of the terminology used by the operating company to describe the engineered structure" (Morrill et al., 2022). Along the same lines, the Ioneer documents refer to a "quarry" instead of an "open pit" or "mining pit" and discuss the storage facilities for "overburden" instead of "waste rock." Typically, quarries are very shallow excavations for the extraction of aggregate, while the "quarry" at the Rhyolite Ridge mine would be 960 feet deep (DEIS, Geology and Minerals SER). Moreover, the term "overburden" typically refers to unconsolidated materials or soil, not to rock types such as the sandstone, conglomerate, limestone and extrusive volcanic rocks that overlie the ore body at the Rhyolite Ridge mine, which are usually referred to as "waste rock." [2]ICMM (International Council on Mining & Metals), 2024. Our Members. Available online at: https://www.icmm.com/en-gb/our-story/our-members [3]MCA (Minerals Council of Australia), 2024. Our Members. Available online at: https://minerals.org.au/membership-and-benefits/our-members/ [4]ILA (International Lithium Association), 2024. Members. Available online at: https://lithium.org/members/	The proposed facilities are described in EIS Section 2.1. Regardless of the terminology used to describe the facilities, the EIS analyzes the environmental impacts of the proposed facilities.
108 and 183	108.12 and 183.11	**C. The DEIS Fails to Examine a Reasonable Range of Alternatives.** The DEIS suffers from two additional fundamental flaws which run afoul of NEPA. First, the purpose and need statement is unreasonably narrow, and misconstrues BLM's authority to reject or modify the proposed project. Second—and as a result of the unreasonably narrow purpose and need—the DEIS fails to examine a reasonable range of alternatives. As an initial matter, the DEIS wrongly assumes the BLM lacks discretion to deny or modify the proposed action. However, as noted above, mining operations on public lands are subject to BLM's obligation under FLPMA to "prevent unnecessary or undue degradation of the lands," 43 U.S.C. 1732(b), as well as the requirements of applicable land-use plans. 43 U.S.C. § 1712; 43 C.F.R. § 1610.5-3(a). *See also Norton v. S. Utah Wilderness Alliance*, 542 U.S. 55, 69 (2004); *Western Watersheds Project v. Bennett*, 392 F.Supp.2d 1217, 1227 (D. Idaho 2005). If mining claims cannot be utilized without violating FLPMA's strict environmental requirements, then they cannot be developed. In addition, where there is a likelihood that a mining operation could not comply with environmental regulations in a cost-effective manner, this can call into question the validity of the claim itself. *Clouser v. Espy*, 42 F.3d 1522 (9th Cir. 1994); *United States v. Kosanke Sand Corp.*, 12 IBLA 282, 546-547 (1973); United States v. Pittsburgh Pacific Co., 84 Interior Dec. 282, 290 (1977), *aff 'd sub nom. South Dakota v. Andrus*, 614 F.2d 1190 (8th Cir. 1980). "FLPMA, by its plain terms, vests the Secretary of the Interior with the authority—and indeed the obligation—to disapprove of an otherwise permissible mining operation because the operation, though necessary for mining, would unduly harm or degrade the public land." *Mineral Policy Ctr. v. Norton*, 292 F.Supp.2d 30, 42 (D.D.C. 2003). The DEIS's purpose and need statement is also unreasonably narrow. NEPA requires agencies to "specify the underlying purpose and need to which the agency is responding," 40 C.F.R. § 1502.13 (emphasis added). Agencies may not give a purpose and need statement "so unreasonably narrow that [alternatives would be eliminated and] the EIS would become a foreordained formality." *Nat'l Parks & Conservation Ass'n v. Bureau of Land Mgmt.*, 606 F.3d 1058, 1070 (9th Cir. 2009) (quoting *Friends of Southeast's Future v. Morrison*, 153 F.3d 1059, 1066 (9th Cir. 1998)). Here, the DEIS merely states: "The BLM's purpose is to respond to Ioneer's proposal as described in the Plan and to analyze the environmental effects associated with the proponent's Proposed Action and alternatives to the Proposed Action, consider reasonable alternatives, and develop and consider mitigation, when necessary, to lessen effects to environmental resources." DEIS at 1-1. The DEIS	A reasonable range of alternatives were considered as discussed in Section 2.4 of the EIS. Whether the Project is permitted under 2920 or 3809 regulations, the EIS analyzes and discloses impacts from the Proposed Action and alternatives. Mitigation is described in EIS Section 4.21.

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		describes the "need" for the action as follows: "to respond to a request for a Plan for the applicant to exercise their rights under the General Mining Law of 1872 and to prevent unnecessary or undue degradation of public lands…." *Id.* This fails to acknowledge the full spectrum of BLM's duties under various statutes, including FLPMA and the ESA. *See Nat'l Parks*, 606 F.3d at 1070 (quoting *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 199 (D.C. Cir. 1991)) (explaining that agencies "should always consider the views of Congress . . . in the agency's statutory authorization to act[.]"). The DEIS's narrow purpose and need results in an unreasonably narrow range of alternatives. NEPA requires the agency to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(E); 40 CFR § 1502.14. It must "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed action. *City of Tenakee Springs v. Clough*, 915 F.2d 1308, 1310 (9th Cir. 1990). The alternatives analysis should present the environmental impacts in comparative form, thus sharply defining important issues and providing the public and the decisionmaker with a clear basis for choice. *Id.* The lead agency must "rigorously explore and objectively evaluate all reasonable alternatives" including alternatives that are "not within the [lead agency's] jurisdiction." *Id.* "While a federal agency need not consider all possible alternatives for a given action in preparing an EA, it must consider a range of alternatives that covers the full spectrum of possibilities." *Ayers v. Espy*, 873 F.Supp. 2d 455, 473 (D. Colo. 1994). Much of the DEIS's discussion of alternatives is perfunctory and limited and ignores a number of reasonable alternatives. First, as noted above, BLM failed to consider of regulating the Project under its discretionary authorities, absent a verification that each of Ioneer's mining and millsite claims are valid under the Mining Law. Further, the BLM has chosen to examine in detail two alternatives that have the same or similar impacts on most resources affected, including air quality, environmental justice, geology, hazardous materials, lands and realty, livestock grazing, Native American traditional values, recreation, socioeconomics, transportation, vegetation, visual resources, water, wetlands and riparian areas, and wildlife. *See* DEIS at 2-23 to 2-31. The two alternatives vary only in how they would impact Tiehm's buckwheat; however, as discussed above, both would jeopardize the continued existence of the species and unlawfully destroy its critical habitat, so the comparison is functionally meaningless. It is insufficient for an EIS to only consider alternatives that "are essentially identical." *Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1039 (9th Cir. 2008). "The existence of reasonable but unexamined alternatives renders an EIS inadequate." *'Ilio'ulaokalani Coal. v. Rumsfeld*, 464 F.3d 1083, 1095 (9th Cir. 2006); *see also Western Watersheds Project v. Abbey*, 719 F.3d 1035, 1050 (9th Cir. 2013) (EA for grazing permit was arbitrary and capricious where all action alternatives considered same level of grazing, but with changes to the terms and conditions to mitigate impacts, such as installing or removing fencing). Remarkably, the DEIS eliminates 57 alternatives from detailed consideration, including several alternatives that would avoid direct impacts to Tiehm's buckwheat critical habitat. *See* Project Alternatives Supplemental Information Report (SIR). The DEIS also unreasonably eliminates all alternatives that would involve backfilling the pit. *Id*. Carefully implemented backfilling will eliminate the permanent groundwater draw from a mining pit lake. Judicious development of the mining pit and choice of backfill would allow groundwater to flow through the pit without degrading groundwater. This is approach is becoming more common and is being implemented in Nevada. For example, the Water Pollution Control Permit application submitted by Kinross Mining Corp. for the Bald Mountain Mine in March 2018 describes a plan for backfilling of the "Top Pit," which would have a pit lake if not backfilled. The objective for backfilling this pit is, "[t]o avoid groundwater depletion, any pit where the pit bottom is at or below the groundwater elevation, is to be backfilled using material that meets the criteria as presented in Section 3.2.2." The proposed Rhyolite Ridge mine pit lake would be large and have an even greater effect on groundwater. Backfilling the pit in this way would also serve an effective mitigation component to surface waters, wetlands, and springs that would be affected by the long-term drawdown from the pit lake. This type of mitigation is also preserves spring sources. Monitoring wells will need to be established to up and down gradient from the backfill pit to determine whether groundwater quality is being affected. If so, a mitigation scheme of pump and treat would likely be needed. Even if the pit is not backfilled it is likely that there will be flow through at times, so a monitoring network and a plan to pump and treat would still be needed. In the Great Basin where water is scarce it is irresponsible to allow a pit lake to form where the water will be wasted, since access is not allowed.	
108 and 183	108.13 and 183.12	**D. BLM failed to include an adequate mitigation plan under NEPA and Interior Department requirements.** Under NEPA, the agency must have an adequate mitigation plan to minimize or eliminate all potential project impacts. NEPA requires the agency to: (1) "include appropriate mitigation measures not already included in the proposed action or alternatives," 40 CFR § 1502.14(e); and (2) "include discussions of: . . . Means to mitigate adverse environmental impacts (if not already covered under 1502.14(e))." 40 C.F.R. § 1502.16(a)(9). NEPA regulations define "mitigation" as a way to avoid, minimize, rectify, or compensate for the impact of a potentially harmful action. 40 C.F.R. §§1508.1(s). "[O]mission of a reasonably complete discussion of possible mitigation measures would undermine the 'action-forcing' function of NEPA. Without such a discussion, neither the agency nor other interested groups and individuals can properly evaluate the severity of the adverse effects." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 353 (1989). NEPA requires that the agency discuss mitigation measures, with "sufficient detail to ensure that environmental consequences have been fairly evaluated." *Id.* at 352. An essential component of a reasonably complete mitigation discussion is an assessment of whether the proposed mitigation measures can be effective. *Compare Neighbors of Cuddy Mountain v. U.S. Forest Service*, 137 F.3d 1372, 1381 (9th Cir.1998) (disapproving an EIS that lacked such an assessment) *with Okanogan Highlands Alliance v. Williams*, 236 F.3d 468, 477 (9th Cir.2000) (upholding an EIS where "[e]ach mitigating process was evaluated separately and given an effectiveness rating"). The Supreme Court has required a mitigation discussion precisely for the purpose of evaluating whether anticipated environmental impacts can be avoided. *Methow Valley*, 490 U.S. at 351-52 (citing 42 U.S.C. § 4332(C)(ii)). A mitigation discussion without an adequate evaluation of effectiveness is useless in making that determination. *South Fork Band Council v. Dept. of Interior*, 588 F.3d 718, 727 (9th Cir. 2009) (rejecting EIS for failure to conduct adequate review of mitigation and mitigation effectiveness in mine EIS). "The comments submitted by [plaintiff] also call into question the efficacy of the mitigation measures and rely on several scientific studies. In the face of such concerns, it is difficult for this Court to see how the [agency's] reliance on mitigation is supported by substantial evidence in the record." *Wyoming Outdoor Council v. U.S. Army Corps of Eng'rs*, 351 F. Supp. 2d 1232, 1251 n. 8 (D. Wyo. 2005). *See also Dine Citizens v. Klein*, 747 F.Supp.2d 1234, 1258-59 (D. Colo. 2010) (finding "lack of detail as the nature of the mitigation measures" precluded "meaningful judicial review").	Necessary mitigation measures have been identified during preparation of the EIS and are described in Section 4.21.

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		"Mitigation measures fall squarely within the actions the Secretary can direct to prevent unnecessary or undue degradation of the public lands. An impact that can be mitigated, but is not, is clearly unnecessary." 65 Fed. Reg. 69998, 70052 (Nov. 21, 2000) (preamble to Part 3809 rule section that remains in force). BLM's mitigation policy, as detailed by the Interior Solicitor, acknowledges the need to ensure compliance with an RMP as part of its mitigation duties under the FLPMA UUD standard. In discussing the previous rulemaking (quoted above) with approval, the Solicitor reiterated "'the operator's responsibility to comply with applicable land use plans and BLM's responsibility to specify necessary mitigation measures.' *Id.* at 54,840 (emphasis supplied)." M 37039, The Bureau of Land Management's Authority to Address Impacts of its Land Use Authorizations through Mitigation, 20, n. 115 (Dec. 21, 2016) (Mitigation Opinion). The Solicitor noted that "in the hardrock mining context, the BLM has long recognized that the UUD requirement creates a 'responsibility [for the BLM] to specify necessary mitigation measures' when approving mining plans of operations." M-37039, at 19 (citations omitted). "The BLM regulations addressing surface management of hardrock mining operations on public lands have consistently included mitigation as a requirement for preventing UUD, including as part of the general performance standards in the current regulations." *Id.* Here, much of the purported mitigation relies on future pledges by Ioneer to remediate Project impacts. But such future submittals do not satisfy NEPA's requirement that mitigation measures be subject to public review in the DEIS. Also, as detailed herein, the purported mitigation measures do not satisfy the ESA's, NEPA's and FLPMA's procedural and substantive requirements, including for Tiehm's buckwheat, aquatic life, water quality and quantity, wildlife, and other affected resources. *See* Appendix A (Fraga 2024), Appendix B (Emerman 2024), Appendix C (McCarthy 2024), Appendix D (Myers 2024).	
108 and 183	108.14 and 183.13	**E. The DEIS Fails to Examine all Direct, Indirect and Cumulative Impacts of the Alternatives** Because the DEIS is legally deficient, as shown herein, BLM must revise the DEIS and subject it to additional public review as required by NEPA. BLM failed to fully review all direct, indirect, and cumulative environmental impacts of the Project. 40 C.F.R. §§1502.16, 1508.8, 1508.25(c). Direct effects are caused by the action and occur at the same time and place as the proposed project. §1508.8(a). Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. §1508.8(b). Types of impacts include "effects on natural resources and on the components, structures, and functioning of affected ecosystems," as well as "aesthetic, historic, cultural, economic, social or health [effects]." *Id.* Regarding cumulative impacts: > An [EIS's] analysis of cumulative impacts 'must give a sufficiently detailed catalogue of past, present, and future projects, and provide adequate analysis about how these projects, and differences between the projects, are thought to have impacted the environment.' … Without such information, neither the courts nor the public ... can be assured that the [agency] provided the hard look that it is required to provide. *Te-Moak Tribe of Western Shoshone v. U.S. Dept. of Interior*, 608 F.3d 592, 603 (9th Cir. 2010). The Ninth Circuit has repeatedly faulted the Nevada BLM's failures to fully review the cumulative impacts of mining projects. In one case, vacating BLM's approval of the Mt. Hope Mine, the court stated that "'in a cumulative impact analysis, an agency must take a 'hard look' at all actions that may combine with the action under consideration to affect the environment.'" *Great Basin Resource Watch v. BLM*, 844 F.3d 1095, 1104 (9th Cir. 2016) (quoting *Te-Moak Tribe*). BLM violated NEPA here because it "did not 'identify and discuss the impacts that will be caused by each successive project, including how the combination of those various impacts is expected to affect the environment.'" *Id.* at 1105, *quoting Great Basin Mine Watch*, 456 F.3d 973-74. In *Great Basin Mine Watch*, the Ninth Circuit required "mine-specific … cumulative data," a "quantified assessment of their [other projects] combined environmental impacts," and "objective quantification of the impacts" from other existing and proposed mining operations in the region. *Id.* at 972-74. The agency cannot "merely list other [projects] in the area without detailing impacts from each one." *Id.* at 972. *See also ONRC v. Goodman*, 505 F.3d 884, 893 (9th Cir. 2007). Overall, the DEIS is severely lacking in the required full analysis of the project's impacts, including the cumulative impacts from all of the other past, present, and reasonably foreseeable future activities within the Cumulative Effects Study Areas (CESAs) for all affected resources such as wildlife, plants, air and water, cultural, economic, recreation, etc. Instead, the DEIS provides only generalized statements on potential cumulative impacts, along with a table of acreages of these activities (DEIS Table 4-6 at 4-47/48), with none of the required detailed quantification of cumulative impacts. The DEIS admits that it hasn't done the required *quantitative* analysis of critical cumulative impacts: "Acres of disturbance are not applicable to air quality, environmental justice, hazardous materials and solid waste, social and economic values, and transportation and access; thus, impacts to those resources are *discussed qualitatively*." DEIS at 4-46 (emphasis in original). Further, the Ninth Circuit has squarely rejected the Nevada BLM's reliance on a list of acreages along with a brief mention of impacts from other activities – ruling that such a cursory review violates NEPA in striking down a Nevada BLM EIS for a large mining project: > The Bureau responds that the acreage of surface disturbance with the Pete Project, at least, is implicitly included in the cumulative effects analysis for other resources, such as soils and vegetation. We have held, however, that this is insufficient under NEPA. "*A calculation of the total number of acres to be [impacted by other projects] in the watershed is a necessary component of a cumulative effects analysis, but it is not a sufficient description of the actual environmental effects that can be expected from logging those acres*." *Klamath-Siskiyou*, 387 F.3d at 995. The Bureau also gives no explanation for why other mining projects were not explicitly discussed in the cumulative impacts analysis. *Great Basin Resource Watch v. Hankins*, 456 F.3d 955, 973 (9th Cir. 2006) (emphasis added). As just one example, the DEIS acknowledges a number of geothermal energy leases, but says that impacts from future operations on these leases need not be considered "unless a detailed plan has been submitted." DEIS at 4-45. That does not satisfy BLM's duty to quantify the impacts from all "reasonably foreseeable future activities" (see Section III(E)(15), below). This is especially concerning, as BLM admits elsewhere that future geothermal operations are "likely." DEIS at 4-51. Specific resources and issues that do not receive the required "hard look" in the DEIS are discussed in the following sections.	In-depth analyses of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with NEPA and CEQ regulations. Effects analyses are presented in EIS Section 4.0 and associated SERs.

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108 and 183	108.15 and 183.14	***1. The DEIS Does Not Provide Reliable Studies or Data to Support its Conclusions.*** As Fraga (2024, Appendix A) explains: > Industry funded research presents a potential conflict of interest, as it provides an opportunity for the sponsoring company to influence scientific results in favor of their proposed projects (Hall and Scott 2001, Nature 2001). If research outcomes do not align with desired results, corporate funders may seek to discredit, or suppress findings (Holzman 2021). Here, Ioneer and its contractors have gone to great lengths to dispute and discredit the only available published, peer-reviewed study on Tiehm's buckwheat, which Ioneer itself funded (McClinton et al. 2022a). McClinton et al. identified Tiehm's buckwheat as a soil specialist that supports a relatively diverse assemblage of arthropods. The Draft Buckwheat Protection Plan rely heavily on unpublished and non-peer-reviewed reports and technical memos in an effort to counter the McClinton et al. (2022a) study. As the U.S. Fish and Wildlife Service (FWS) has explained in comments on the draft plan, Ioneer's attempt to discredit the McClinton et al. study's findings, while simultaneously "hand-picking tidbits" from the same study "weakens the overall findings and conclusions of the plan." FWS also questions whether Ioneer is utilizing the "best available science" as the ESA requires, given its reliance on "research, reviews, reports, and memos that have been commissioned by Ioneer over the past few years" that "have not been provided to USFWS or BLM, do not provide detailed methods orlocations of the studies, and/or are not peer reviewed." Appendix A (Fraga 2024). The Buckwheat Protection Plan's efforts to counter the McClinton et al. (2022a) study fail to recognize that the conflict between Tiehm's buckwheat conservation and the proposed mine do not hinge on the species' status as a soil specialist or the specific pollinator community it is associated with; rather, the conflict centers on the sheer magnitude of the proposed disturbance surrounding the entire global range of a single site endemic species, which presents a significant extinction risk.	The EIS considers the McClinton 2020 and 2022 papers to describe the Tiehm's buckwheat pollinator community. The EIS relies on best available data for the analysis of effects.
108 and 183	108.16 and 183.15	***2. The DEIS Significantly Underestimates the Likelihood of Pit Wall Failure and Erosion of Occupied Tiehm's Buckwheat Habitat into the Pit.*** Information presented in this section summarizes Appendix B (Emerman 2024). Please refer to this report for a far more detailed analysis than is provided here. The DEIS includes geotechnical analyses that argue that Tiehm's buckwheat could not be affected by instability of the mine pit slopes. The DEIS chose a value of 1.2 as the minimum factor of safety for both the operational and post-closure periods. The factor of safety is the ratio of the resistance to the load, so that a factor of safety of 1.0 indicates a slope at the cusp of failure, equivalent to 50% probability of failure. Geo-Logic Associates (2023) updated previous stability analyses by considering six sections across the quarry, including TR02E-11, which is close to the population of Tiehm's buckwheat that has a separation distance of 15 feet from the quarry. The limit equilibrium method was used to show factors of safety for the operational period ranging from 1.20 to 1.26, thus satisfying the minimum value set by the DEIS. By adding buttresses to promote slope stability for the post-closure period, the factors of safety increased to the range 1.25 to 1.45. The stability analyses assumed that, after depressurization and dewatering, the slope materials would remain unsaturated indefinitely. The Adaptive Management plan called for the cessation of mining activity if monitoring indicated instability near Tiehm's buckwheat habitat. Some information in the DEIS is inconsistent with information in other sources and the BLM has indicated that other information is already out of date. For example, the Tiehm's buckwheat population geospatial information in the DEIS, which was created by Ioneer, is not the same as the geospatial information previously used by the US Fish and Wildlife Service. In particular, the FWS layer shows the closest separation distance between the Thiem's buckwheat and the quarry to be 17 feet. According to the FWS layer, subpopulations of Thiems's buckwheat are found 380 feet, 332 feet, 283 feet, and 177 feet from the quarry on the western side. The Ioneer map places those same subpopulations 208 feet, 329 feet, 281 feet, and 165 feet, respectively, from the edge of the quarry. From a geotechnical standpoint, a critical issue is that BLM has stated that the position of the haul road is going to change, Email from Scott Distel, BLM to Patrick Donnelly, Center for Biological Diversity, re: GIS information for Rhyolite Ridge (May 20, 2024), although the quarry as mapped has the exact dimensions to accommodate the haul road as currently mapped. Thus, if the position of the haul road changes, then the location of the quarry will also change, even though the location as shown in the DEIS was the basis for the stability analyses in the DEIS. a. Factor of Safety The factors of safety that are calculated in the DEIS cannot be regarded as reliable. The geotechnical parameters for each geologic unit that are the input data for the stability analysis are stated with ultra-precision, sometimes with five significant digits, and with no range of uncertainty. Some of the geotechnical parameters were obtained from another consulting report that is not available for public review, while other parameters were simply the judgment of Geo-Logic Associates. The DEIS does not specify which parameters were developed from data and which were based on "judgment." The DEIS presents some of the raw data that were used to develop the geotechnical parameters, which show a very small number of measurements for each geologic unit with a high degree of scatter. The calculated factors of safety are also stated as single values with no range of uncertainty. In particular, there is no sensitivity analysis that would show the range of possible factors of safety that could result from reasonably possible alternative values for the geotechnical parameters and there is no distribution of possible values for the factor of safety that would make it possible to estimate the probability of failure. The DEIS does not identify any source or type of material for the buttress, so that the geotechnical parameters of the buttress should be regarded as strictly hypothetical. Failures of mine pit slopes are incredibly common in comparison with other types of industrial accidents. The mean annual probability of failure of a mine pit slope is about 6% with a range of 2-20%. According to the Guidelines for Open Pit Slope Design (Read and Stacey 2009, cited in Emerman 2024), for mine pit slopes with High consequences of failure, the minimum factor of safety should be in the range 1.3-1.5 and the maximum probability of failure over the entire design life (as opposed to an annual probability) should be 5%. This was subsequently affirmed by the SME Surface Mining Handbook (Mohanty et al. 2023, cited in Emerman 2024). Since the adaptive management plan calls for the cessation of mining activity as a response to slope instability affecting sensitive habitat, the consequences of slope failure at the Rhyolite Ridge mine should be placed into the High category (on a three-level scale of Low, Medium, and High). The range of 1.3-1.5 for the minimum factor of safety depends upon the uncertainty in the input data with the upper end corresponding to high uncertainty. Based upon both the high data uncertainty and lack of attention to data uncertainty addressed above, the appropriate minimum factor of safety during the operational phase should be 1.5, which is significantly greater than the value of 1.2 that was chosen in the DEIS.	1) A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GeoLogic Associates report. 2) The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report. 3) For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report. 4) See response number 2, 3, and 7. 5) See response number 2 above 6) To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site. The following was added to Section 2.1.1: "The buttress material is included in Table 1 of Geo-logic and Associates 2023 Geotechnical Report (GLA 2023)."

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		The DEIS fails to ensure an adequate factor of safety in the post-closure period. The appropriate minimum factor of safety should increase in the transition from the operational to the post-closure period. Some industry publications have argued that the post-closure factor of safety should be greater than 2.0 or as high as credible with the probability of failure reduced to the ALARP (As Low as Reasonably Practicable) level. There are two principal reasons for the need to increase the minimum acceptable factor of safety. After pit closure, there will be a long-term degradation in the strength of the adjacent rock masses due to rewatering of the pit and the time-delayed responses to blasting and the radical changes in topography and stress levels that accompanied construction of the pit. For example, the removal of the weight of overlying rock could result in the slow opening of joints (cracks). Thus, the first reason is that there is considerable uncertainty as to the rate or degree to which the rock masses will degrade. There is even considerable theoretical uncertainty regarding the coupled interactions of erosion and slope instability and how those interactions are coupled with climate change. The second reason is that the post-closure period will see a reduction in or a complete lack of slope monitoring and trained on-site personnel, thus limiting the ability to detect and respond to changes in slope stability. It should be noted that, in addition to raising the minimum value of the factor of safety for the post-closure period, the factor of safety should be calculated based upon the anticipated future reduced rock strength, not the rock strength that exists during the operational period. In response to the above concerns, the Large Open Pit Project published the Guidelines for Mine Closure, which describe a procedure for determination of the appropriate minimum factor of safety for the post-closure period. The procedure involves the calculation of a Relative Stability Guideline (RSG), which is the product of the score for the Pit Wall Condition Class (on a scale of 1 to 7 with lower scores indicating more competent slopes), the Adjacent Impact Consequence (on a scale of 1 to 5 with higher scores indicating more severe consequences), and the Existing Design Confidence (on a scale of 1 to 5 with higher scores indicating less design confidence or greater data uncertainty). Since the pit slopes at the Rhyolite Ridge mine would have factors of safety slightly greater than 1.2 (although those calculations are highly unreliable, as explained above), the pit slopes would be placed into Pit Wall Condition Class C, corresponding to a score of 5. Pit Wall Condition Class C is described in the Guidelines for Mine Closure as “unvegetated slopes with uncontrolled rockfall risk and undesirable risk of failure” with a “high level of concern.” In terms of failure consequences, the Guidelines for Mine Closure do not address the irreplaceable loss of biological resources, but other five-level consequence classifications, such as the Global Industry Standard for Tailings Management place accidents with “catastrophic loss of critical habitat or rare and endangered species” into the most severe category of Extreme consequences. Thus, a score of 5 for Adjacent Impact Consequences, corresponding to Very High consequences would yield an RSG score of 25 multiplied by the score for Existing Design Confidence. The Guidelines for Mine Closure require a minimum factor of safety greater than 1.5 for RSG in the range 20 to 50 and a minimum factor of safety greater than 2.0 for RSG in the range 50 to 100. On that basis, the minimum post-closure factor of safety of 1.2, which was assumed by the DEIS, would not be appropriate even if the Existing Design Confidence could be raised to the level of Very High (corresponding to a score of 1). The Existing Design Confidence is certainly not at the level of Very High, based on the low-quality geotechnical data that are currently available. If the Existing Design Confidence could be raised to a level of Medium with a score of 3, then the RSG score would be 75, which would demand a post-closure factor of safety greater than 2.0. In summary, the appropriate minimum factor of safety for the post-closure period would be 2.0 with the factor of safety calculated based on the anticipated future degraded rock strengths. b. Zone of Instability The Department of Industry and Resources (Western Australia) has detailed guidelines for calculating the post-closure Zone of Instability. There is no application of these or similar guidelines or any corresponding discussion of the width of the unstable zone anywhere in the DEIS. The Western Australian guidelines specify that a safety bund wall with a width of 5 meters should be constructed at least 10 meters outside of the Zone of Instability, so that the safe region begins 15 meters (roughly 50 feet) beyond the Zone of Instability. The calculation involves connecting a line from the toe of the pit to the surface with an angle of 45° for unweathered (strong) rocks and an angle of 25° with respect to the horizontal for weathered (weak) rocks. Some studies have shown the calculation procedure to be insufficiently conservative (insufficiently protective) because some pit slope failures have resulted in breakback angles significantly less than 25°. In the application of the Western Australian guidelines to the Rhyolite Ridge mine, all rock units at the stratigraphic level of geologic unit B5 of the Cave Spring Formation or higher were regarded as weak based on the description of the units in the DEIS. In the absence of any information, the unknown buttress material was also regarded as weak or weathered. The widths of the Zones of Instability were calculated for the same six sections for which stability analyses were updated in the DEIS. All widths were reduced when a buttress was added to the section, except in the single section in which there was no Zone of Instability even without a buttress. Thus, the widths ranged from 0 to 450 feet without a buttress and from 0 to 225 feet with a buttress. Adding 50 feet to establish a safe region resulted in safe regions ranging from 50 to 500 feet upslope from the edge of the quarry without a buttress and 50 to 275 feet upslope from the edge of the quarry with a buttress. It is most important that Section TR02E-11, which is closest to the population of Thiem’s buckwheat that has separation distance of 15 feet from the quarry, has a Zone of Instability of 400 feet, with the safe region beginning 450 feet from the edge of the quarry. In other words, the Zone of Instability at Section TR02E-11 would extend far into the population of Tiehm’s buckwheat. It should be noted that, according to the Western Australian guidelines, the Thiem’s buckwheat population that has a separation distance of 15 feet from the quarry could not be in the safe region even if there were no Zone of Instability (setting the region at 50 feet beyond the edge of the quarry). c. Other Issues The mining plan involves the depressurization and the dewatering of the geologic units prior to construction of the quarry. The DEIS expresses the opinion that the slope materials will not be rewetted even by extreme precipitation or snowmelt events because the water will infiltrate to a very shallow depth and then evaporate. The preceding is only an opinion because it is not accompanied by any data, calculations or modeling. In particular, there is no consideration as to the hydrogeological and meteorological processes by which the geologic units became saturated and then pressurized in the first place. Thus, it should be assumed that the relevant geologic units will eventually become re-saturated and re-pressurized and there should be some consideration as to the time period over which this will occur. In addition, there should be some consideration as to the localized impact of the large volume of water that will be applied to the haul roads for dust suppression. At the present time, nearly all large-scale mining projects involve the application of an Adaptive Management plan (also called the Observational Method). For complex projects, not all actions can be planned in advance. Instead, a monitoring program is set up together with a set of preplanned actions ready for execution as a response to every possible adverse observation. The DEIS does describe a plan for monitoring slope instability, but only in terms of the particular instruments that will be used. The description of pre-planned responses to indications of instability consists of a single sentence that states that the mining activity could cease in response to any evidence of slope instability that could affect sensitive habitat. It is difficult to determine whether the assertion is meant to be taken literally, since it is found in a report by Geo-Logic Associates that is an attachment to the DEIS, and certainly does not represent a binding commitment by the mining company. The following flaws in the DEIS have been identified in the geotechnical analysis:	7) The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. 8) GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure. 9) GLA did not use Guidelines for Mine Closure published by the Large Open Pit Project (LOPP), which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of “Guidelines for Open Pit Slope Design” (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA’s proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase (Geo-Logic Associates, Inc. 2023. Supplemental Geotechnical Report. Rhyolite Ridge Lithium-Boron Project. Esmeralda County, Nevada. March 2023 Revised June 14, 2023). 10) See response to number 9 above. 11) The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey (2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines.

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		• The DEIS failed to identify a specific source for the buttress material with estimation of the geotechnical parameters for that particular source. • The DEIS failed to sufficiently justify how geotechnical parameters were chosen and what data back up those parameter choices. • The DIES failed to account for uncertainty in geotechnical parameters. • The DEIS failed to include uncertainty, such as the standard deviation, in the calculated factors of safety. • The DEIS failed to include an adequate sensitivity analysis based on a range of reasonable values for the geotechnical parameters. • The DEIS fails to anticipate that slope materials may not remain unsaturated. The factors of safety should be recalculated for a range of possible pore pressures and water tables, including the eventual possibility that pore pressures and the water table will return to pre-mining levels. If the factors of safety are strongly dependent upon the assumption that all slope materials will be unsaturated, then the results for unsaturated materials should be used with great caution. • The DEIS fails to account for localized rewatering of slope materials that could result from the surface application of water for dust suppression, and how such watering could affect slope stability. • The DIES failed to give possible values of the factor of safety for each pit wall section. • The DEIS failed to ensure that the minimum factor of safety be 1.5 and the maximum probability of failure should be 5% during the operational period (prior to buttress construction). • The DEIS failed to ensure that the minimum factor of safety be 2.0 during the post-closure period (after buttress construction). • The DEIS failed to adhere to Zone of Instability guidelines of the Western Australian Department of Industry and Resources. The connecting lines for the geologic units that are stratigraphically higher than Unit B5 of the Cave Spring Formation should have an angle of 25° with respect to the horizontal. • The DEIS fails to ensure that Tiehm's buckwheat plants do not fall into the pit. Populations located within the Zone of Instability are at high risk of imminent destruction due to pit wall collapse. The DEIS fails to provide a specific and detailed adaptive management plan, only hand waving that mining operations will cease if there is pit wall instability. It seems unlikely that after investing billions in the mine, mining would simply stop. Any claims that the mine will be closed in response to evidence of slope instability should be supported by a binding commitment from the mining company.	12) The current geotechnical report details the location of the Tiehm's buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12). The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability. 13) Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species SER. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability. 14) Geo-Logic Associates (2022) used "Guidelines for Open Pit Slope Design" (Read &Stacey, 2009) which is a source commonly used for mining in the US. The Factor of Safety used 1.2 and is consistent with a site that includes monitoring including for the buttress. Please see the response to #9 above. 15) The Factor of Safety and critical failure surfaces were calculated by Geo-Logic Associates (2022) using data on the material obtained from the site. Rock mass degradation over time was not a specific geotechnical consideration. Failure surfaces are discussed as being monitored using inclinometers and surface methods (GLA Supplemental Report, 2023). 16) For the design, GLA used "Guidelines for Open Pit Slope Design" (Read & Stacey, 2009) which is a source used for mining in the US. The Factor of Safety used was 1.2 and is consistent with a site that includes monitoring. Please see the response to #9 above. 17) The Supplemental Geotechnical Report (GLA, 2023) discusses individual sections of the pit and follows the Guidelines for Open Pit Slope Design (Read & Stacey 2009). Individual material properties were identified and provided in Table 1 of the supplemental document. 18) Setback requirements for plants on the ground surface are not included in the geotechnical analysis. The design criteria factor of safety of 1.2 is a minimum and provides stability for the pit walls (GLA, 2023). Please refer to the Buckwheat Protection Plan for specific information regarding plant protection. 19) Adaptive management and slope monitoring are discussed in the Supplemental Geotechnical Report (GLA, 2023). Options are explained that include monitoring of slopes and the geology and groundwater in the zone supporting the slopes.
108 and 183	108.17 and 183.16	***3. The DEIS Significantly Underestimates the Impacts of Dust Deposition on Tiehm's Buckwheat and its Habitat.*** Information presented in this section summarizes Appendix C (McCarthy 2024). Please refer to this report for a far more detailed analysis than is provided here. The DEIS fails to adequately consider and address the project's dust deposition impacts on Tiehm's buckwheat and its critical habitat for several reasons, including: **Fugitive dust emissions are underestimated.** Fugitive dust emissions from quarry blasting, quarry excavation operations, overburden loading/unloading, service roads, watering trucks, and overburden wind erosion are not included in the fugitive dust dispersion modeling impacts on critical habitat. **Model inputs are systematically biased low.** Multiple dispersion model or emission inputs systematically bias the results to lower fugitive dust emissions. Silt fraction, meteorology, and water truck emissions activity are inadequate. Minor and major sources of fugitive dust are not included in critical habitat deposition modeling.	An air quality impact analysis was prepared for the Project, which was reviewed by the BLM and cooperating agencies, and was approved for use in the NEPA. The air quality impacts analysis demonstrates compliance with both secondary and primary National Ambient Air Quality Standards (NAAQS), including for particulate matter. The Clean Air Act identifies two types of NAAQS, which are primary standards and secondary standards. Primary standards, which are what is assessed in the Air Quality Impact Analysis, provides public health protection, including sensitive human populations. Primary standards are more stringent than the secondary standards. The secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

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		Resuspended herbicide and/or chemical suppressants will affect critical habitat. Indirect effects of dust deposition and dust suppression on critical habitat are not considered at all. Resuspension of particles and dust deposition of mine dust with adsorbed/absorbed herbicides or chemical dust suppressants is not considered. **Water truck emissions and water requirements are inadequate.** Dust suppression activities from Water Trucks are inadequately modeled for emissions activity and water management. **Model documentation is insufficient.** DEIS documents, supplemental reports, appendices, and attachments are insufficient for evaluation of model domain and model results for critical habitat dust deposition. Dispersion modeling was not performed for the North and South OSF alternative. For detailed discussion of the flaws in the DEIS and its supporting documents related to the analysis of dust deposition, see Appendix C (McCarthy 2024).	A particulate matter impact analysis was prepared as part of the Buckwheat Protection Plan for the North and South OSF Alternative. This particulate matter impact analysis was used to assess particulate matter deposition from haul trucks in proximity to designated critical habitat and Tiehm's buckwheat subpopulations and was used in the Buckwheat Protection Plan for the North and South OSF Alternative in assessing Project particulate matter deposition impacts relative to the particulate matter threshold that was established using the best available science. The results showed the Project is below the established threshold, and the Buckwheat Protection Plan includes measures to monitor particulate matter deposition within designated critical habitat and provides protocols and procedures to assess the established threshold during the life of the Project. This will allow for appropriate management implementation if data from monitoring shows the need to modify the threshold or implement other management requirements to meet the intent of the conservation measure detailed in the Buckwheat Protection Plan for the North and South OSF Alternative. Impacts to Tiehm's buckwheat from dust are disclosed in EIS Section 4.12 and additional clarification was added to Section 3.3.3 of the Threatened and Endangered Species SER. This additional clarification was added to the SER and was available to the public during the comment period as Appendix B of the Threatened and Endangered Species SER.
108 and 183	108.18 and 183.17	***4. The DEIS Fails to Take a Hard Look at Water Quality Impacts*** a. <u>The pit lake water quality forecast systematically underestimates acidity and other solutes.</u> While the DEIS's method of simulating aqueous chemical reactions within the proposed pit lake seems sound, but the model does not account for the leaching of solutes, including acids, from the exposed pit wall. The rock around the proposed pit lake and the rock proposed for partial backfill contains appreciable sulfide (up to 1.94% sulfide S), and includes some net-acid generating rock, Appendix D (Myers 2024) (citing HydroGeoLogic 2021, Piteau 2022), as demonstrated in the kinetic tests ("humidity cells"). Consequently, the model of solute leaching from runoff and eventual flooding of the Rhyolite Ridge pit needs to account for the duration over which that rock has been exposed to the atmosphere. *Id.* As Piteau (2022) acknowledges, "[t] geochemical composition of run-off depends on the exposure of rock in contact with water and the frequency of precipitation that rinses the rock exposure." That is, less-frequent rinsing means there is a longer period for soluble oxidation products to accumulate between rinses, thus producing higher concentrations of solutes. The model used to evaluate pit lake water quality entirely ignores the duration over which sulfidebearing rock would be exposed to the atmosphere, and instead assumes that that the concentration of aqueous solutions leaving each type of wall rock would be consistent over the entire duration of the model simulation. Appendix D (Myers 2024) (citing Piteau 2022). The model's tendency to underestimate solute concentrations is particularly extreme with respect to the "slug" of accumulated weathered and oxidized compounds that would be released into the pit lake from the "reactive zone" near the water line. *Id.* The term "reactive zone" describes the fracture rock zone behind the pit face, which is only flushed to the pit lake when submerged by the lake surface. As the lake reaches its final elevation, the leachate will carry solutes into the pit lake that will have accumulative after oxidation for approximately 40 years. *Id.* However, the model assumes this will be equivalent to the concentrations observed after just one week of oxidation in the laboratory. Naturally, sulfide-bearing rock that has oxidized for more than 40 years will release far more soluble pollutants than the same rock after being oxidized for a week, but the model entirely ignores this factor. Relatedly, the model has no internal accounting to indicate how much sulfate in the pit lake would have originated from various sources, including groundwater, direct precipitation, wall rock, and backfill, and does not consider the portion of total sulfide S in each source (e.g., wall rock and submerged backfill) that would be lost by flushing to the pit. *Id.* Further, the assumption that solute concentrations measured in a controlled laboratory kinetic test would accurately represent field conditions is entirely arbitrary. For the type of highly soluble elements released by sulfide mineral oxidation, there is no basis for assuming that concentrations derived from a controlled laboratory test with a water/rock ratio of 1:1 would accurately represent the concentrations that would occur under field conditions, where the hydraulic flow and associated water/rock ratios would vary widely. *Id.* This introduces a systematic bias that underestimates pollutant loads to the pit lake and generates model uncertainty. The rationale given for using humidity cell data to directly estimate field concentrations is that "early flush concentrations . . . comprised the highest solute concentrations and thus . . . represent greatest mass loading that could occur upon inundation" (Piteau 2022, p.47). However, early-time date from humidity cell tests only contain the "highest solute concentrations" relative to other samples from this operationally defined lab test protocol. Solute concentrations in leachate from sulfide-bearing waste rock under field conditions can be tens or even hundreds of times higher than concentrations in humidity cell effluent from the same rock. The humidity cell test results therefore do not provide "conservative estimates" as Piteau (2022, p.47) claims. Further, these high concentrations in early tests are artifacts of how the rock were handled before testing began (particularly moisture and temperature). Had the Rhyolite Ridge samples of sulfide-bearing wall rock been held longer before lab testing began, these early concentrations would have been higher, and the model estimates for the pit lake would be higher. This type of model sensitivity to arbitrary testing methods is an indication of erroneous model assumptions. BLM's modeling analysis also incorrectly ignores long-term leaching, causing it to further underestimate pollution inputs. Piteau (2022) states that the model assumes submerged backfill to be "non-reactive." However, leaching from the backfill could continue for as long as hundreds of years, as BLM recently acknowledged for the Thacker Pass project.	In-depth analysis of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with NEPA. EIS Section 4.16 contains the water resources and geochemistry analysis. Additional information including the modeling approach is in the Water and Geochemistry SER. Piteau 2024 describes the method that analyte leaching from wall rock and backfill was incorporated into the quarry lake chemistry model. The method applied utilized kinetic testing results that simulate sulfide oxidation in the pit wall rock and backfill materials. The model does account for inflow volumes from various sources (i.e., groundwater, precipitation). Use of laboratory humidity cell data for prediction wall rock leachate is an accepted practice for pit lake chemistry analysis (see NDEP Guidance for geochemical modeling). Backfill leaching is also incorporated into the quarry lake water chemistry model utilizing humidity cell data. The model does not assume that the backfill is non-reactive. The numerical groundwater flow modeling was used to assess whether the quarry lake would be terminal or outflow to local groundwater. In the model simulation and all the sensitivity runs, the quarry lake was a terminal pit lake that did not outflow to groundwater. The recovered pit lake level is more than 100 feet below local groundwater levels indicating that groundwater flow gradients will be from the local groundwater into the quarry lake. Effects on varying recharge on groundwater levels and quarry lake recovery were evaluated through the sensitivity analysis applied to the groundwater flow model. Pan evaporation rates and quarry lake evaporation rates are consistent with meteorological monitory data at the methodology for estimating evaporation from a pit lake surface. Sensitivity analyses on evaporation rates indicated that the quarry lake will remain terminal under the range of likely evaporation rates.

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		b. The DEIS ignores evidence that the pit lake could be a flow-through lake. A flow-through pit lake would allow pit-lake water to flow from the pit into the groundwater table on the downstream side of the lake. Although the DEIS claims the pit lake would be terminal, DEIS at 2-29, 4-5, 4-33, BLM's analysis improperly relies on assumptions that make prediction of a terminal lake more likely. Further, the DEIS provides information about the pit lake that does not reflect the analysis of Piteau (2024a). For instance, the DEIS claims the state-state level for the pit lake will be 100 feet below the surrounding groundwater, DEIS at 4-33, but Piteau (2024a:58) indicates that there will be only a four-foot difference. Based on the Piteau (2024a) analysis, seasonal variations or even a high amount of pit wall runoff could cause the pit lake to flow into the surrounding groundwater. The DEIS fails to consider that while the pre-mining water table slopes across the proposed pit, a pit lake would be a flat surface. Thus, the DEIS does not consider whether the flat pit lake surface would exceed the recovered groundwater level at any point along the pit perimeter, or provide sufficient pressure into a confined aquifer unit to cause outward flow. The modeling also fails to account for seasonal variability and long-term dry conditions. Groundwater levels that recharge seasonally or rapidly recover from a long-term drought would cause significant fluctuations in the pit lake elevation, and may result in groundwater levels recovering at different rates around the pit. Varying pit lake elevations could wet and dry reactive rock or allow the pit lake to flow through. Given that Piteau (2024a) places the groundwater divide just four feet above the quarry lake, it is highly probable that such fluctuating levels would occasionally cause the lake to flow through. The model also applies an inappropriately high evapotranspiration (ET) rate for the pit lake, thus underestimating pit lake elevations and the potential for flow-through conditions. Piteau (2024a) uses a 90.7 in./yr. pan evaporation rate which yields a 63.5 in./yr. pit-lake evaporation rate. Because the pit lake will be below the pit walls and sheltered from the wind, 90.7 is likely an inappropriate pan coefficient, which causes the model to overestimate evaporation. Overestimating evaporation, in turn causes the model to underestimate the pit lake elevation. A higher-elevation pit lake resulting from lower evaporation rates could be flow-through. In sum, despite the model's biases, the evidence suggests that the quarry lake will likely have periods during which it is flow-through and discharges into surrounding groundwater. BLM needs to address the flow-through scenario as likely, even if intermittent, and provide a defensible mitigation plan to avoid groundwater contamination.	Based on the groundwater flow model results and model sensitivity analyses, a flow-through condition at the quarry pit lake is not anticipated.
108 and 183	108.19 and 183.18	***5. The DEIS Fails to Adequately Consider Impacts to Groundwater Hydrology and Groundwater-Dependent Ecosystems.*** Information presented in this section summarizes Appendix D (Myers 2024) and Appendix E (Myers 2021). Please refer to these reports for a far more detailed analysis than is provided here. a. The DEIS's Groundwater Model Does Not Consider Seasonality or Drought. Both the HGL and Piteau modeling use an annual time step, which is too course to reflect impacts to groundwater levels or their impacts on surface water expression. The models use constant annual precipitation for both recharge, pit lake input and pit wall runoff. Piteau simulated agricultural pumping on an annual basis, using annual time steps. The use of annual time steps prevents the model from adequately accounting for seasonality in the system, including pumping, recharge and evapotranspiration (ET). For instance, simulating on an annual basis does not consider the increased ET and pumping during summer or the recharge occurring primarily during spring. Thus, the baseline for groundwater drawdown from existing agricultural pumping is not appropriately modeled. b. There is Insufficient Evidence to Support the DEIS Model's Assumptions Regarding Groundwater Compartmentalization. The groundwater model cited in the DEIS assumes that various faults and lineaments will be flow barriers and simulated them as such in the numerical model. Some of the hydrogeologic units in the model are compartmentalized as a result. However, neither Piteau (2023) nor HGL (2020a) presents adequate hydrologic evidence to support the assumption. The discussion of the TW-02 pumping test in HGL (2020a) misinterprets the data and ignores evidence suggesting constant inflow rather than compartmentalization. TheTW-02 pumping test was too short to provide useful information retarding connections in the groundwater aquifer, and a lack of simulated recovery at well TW-03 suggests that the model is too segmented. In short, there is likely more connection to surrounding aquifers than simulated in the model. The assumption that the area has segmented hydrogeology is based on little supporting data and may suggest a poor conceptual model of the area. The analysis of groundwater for this project should not depend on compartmentalization of portions of the groundwater aquifer. As a result of the model's poor fit, the predicted drawdown from the Project is likely to be very different from the modeling outputs. This calls much of BLM's impacts analysis into question, as predictions regarding impacts and the development of mitigation measures hinge on the hydrologic modeling, and specifically the modeled drawdown which, as explained above, is not scientifically defensible. This alone invalidates much of the DEIS analysis. c. Mapped Calibration Residuals Demonstrate Model Inaccuracy Calibration "residuals" also indicate inaccuracy or poor fit in the DEIS groundwater model. Model calibration involves minimizing "residuals," or data points that do not align with observed conditions. The DEIS utilizes a methodology that produces both "negative" and "positive" groundwater residuals, meaning there is as much of a chance for the modeled potentiometric groundwater surface to be above ground level as below. The mapped calibration residuals for the Rhyolite Ridge model show a significant "aerial bias," with spring elevations under- or overpredicted by up to hundreds of feet. Aerial bias in the model residuals render the simulated connectivity over much of the model domain very inaccurate. d. BLM's Assumption that Drawdown Must be at least 10 Feet to Affect Springs has no Scientific Basis. Any reduction in the groundwater level beneath a spring will cause the flow to lessen or cease. Spring discharge depends on the groundwater gradient at the spring; simply decreasing that gradient by lowering the groundwater table upgradient will decrease the discharge even though there has been no reduction in the groundwater table at the spring. There are 12 springs, including Cave Spring (SP-01) within the projected maximum 10-foot drawdown area and 20 springs within the one-mile buffer around the 10-foot drawdown (BLM 2024a, p 4-32). These springs within the buffer will be just as affected by drawdown as those within the 10-foot drawdown because springs occur wherever groundwater intersects the surface and any	A numerical groundwater flow model was used for assessing potential impacts which was reviewed by the BLM and cooperating agencies and approved for use in NEPA analysis. In-depth analysis of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with NEPA. EIS Section 4.16 contains the water resources and geochemistry analysis. Impacts to groundwater-dependent ecosystems are discussed in Section 4.17. Additional information is in the Water and Geochemistry SER and Wetland and Riparian Resources SER. a) Annual estimates for recharge, evapotranspiration, and pumping are utilized in the model over its 200-year simulation based on information for these parameters that is primarily reported as annual data (e.g., annual NDWR pumping records. The sensitivity of model predictions to these parameters was evaluated for the groundwater flow model. Assessment of potential impacts to seeps and springs is not limited to the groundwater flow model but would rely more on required monitoring of surface water flow and groundwater water levels with mitigation requirements should dewatering pumping affect surface waters. b) The presence of several geologic structures is supported by the drillhole, and surface geology data collected during exploration for the Project. However, only three fault structures were incorporated in the groundwater flow model based on water level observations. While limited in duration, the available pump test data does not contradict the fault interpretations. In addition, the sensitivity analysis evaluated the simulation of the three fault zones included in the model. Predicted drawdown changed little when the conductivity of the fault zones and other lithologic units were increased. c) The model calibration results in acceptable calibration statistics. There is no spatial bias in the simulation of spring elevations. Instead, calibration to spring locations is biased by the assumption that the regional groundwater elevation is at the ground surface at the spring locations. This assumption overestimates groundwater levels at the locations of seeps and springs that are sourced from perched water zones rather than regional groundwater.

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		decrease in the groundwater table will affect the flow. Wetland plants depending on those springs will also be affected by decreased water in the vadose zone, as discussed below regarding the Fish Lake Valley Wetlands. BLM has often justified using a 10-foot drawdown to separate the predicted drawdown from natural variability. This is fallacious reasoning. Modeled drawdown occurs in addition to natural groundwater level changes. BLM has considered less than 10 feet for other projects. The groundwater modeling completed for the Copper Flat project in New Mexico (BLM 2019) is one example. JSAI (2013, cited in Myers 2024, Appendix C) Figure 3.9 presented the one-foot drawdown around the downstream end of the stream that would be affected by water supply pumping. JSAI (2013, cited in Myers 2024, Appendix C) summarized: "The figures indicates that peak groundwater-level drawdown along Animas Creek and most of Percha Creek will be less than 1 ft. Drawdown in a small area along lower Percha Creek is projected to be greater than 1 ft and less than 2 ft. The projected effects on evapotranspiration and surface discharge from the shallow aquifers are correspondingly small." JSAI (2013, cited in Myers 2024, Appendix C). Table 3.5 also tabulated drawdown as low as 0.01 feet expected at springs affected by the project. Other federal EISs for mining projects have used a much lower drawdown contour for the consideration of impacts. The following is a small sample of those documents drawn from different states: • Donlin Gold Project, Final Environmental Impact Statement, Alaska, 2018. This FEIS considers drawdown to 0.1 feet due to the nearby wetlands that could be dried (Myers 2024, Appendix C). • Haile Gold Mine Project, Final Environmental Impact Statement, 2014, SAC 1992-24122- 41A The FEIS considers drawdown to 1 foot (Myers 2024, Appendix C). e. <u>BLM's Hypotheses Regarding Perched Springs are Unsupported.</u> The DEIS states that the springs in the project area likely will not be affected by drawdown because it assumes the springs are perched. Neither the DEIS nor supporting documentation provide conclusive evidence the springs are perched. The DEIS notes that "Cave Spring and SP-02 through SP-05 are likely related to a fault zone at the base of the exposed Rhyolite Ridge Tuff formation" (BLM 2024b, p ES-4). Neither the DEIS nor supporting documents presents evidence this fault compartmentalizes the groundwater. A similar argument applies to SP-06 and SP-07 which "are likely related to a fault zone along the southern edge of the OPA" (*Id.*) Chemistry data presented in HGL (2020a, Table B-3) suggests that the monitoring wells are screened deeper in the aquifer, but does not indicate compartmentalization. Pit dewatering that lowers the pressure at depth would significantly change groundwater flow gradients so that groundwater would be pulled deeper into the aquifer. In general, the hydrogeologic data is insufficient to adequately protect Cave Springs or to design a decent monitoring/mitigation plan. f. <u>The DEIS Does Not Adequately Analyze Potential Impacts to Wetlands and Groundwater-Dependent Ecosystems</u> Even small drawdowns or changes in groundwater flow can adversely affect wetland vegetation because wetland plans often survive on water in the "vadose zone" above a shallow groundwater table. Vadose zone water has two sources: water percolating downward from recent precipitation, and shallow groundwater drawn upward by capillary action. Lowering the shallow water table increases the distance that water must move upward through the capillaries and decreases the water available to wetland vegetation. Here, the pit area dewatering and quarry lake refilling will divert substantial amounts of water from northeast Fish Lake Valley. The piezometric surface maps of the quarry area shows groundwater flows down Cave Springs drainage to enter Fish Lake Valley not far from McNett Ranch. Modeling predicts dewatering will average 280 gpm (450 afa) and peak at 650 gpm (BLM 2024b). Modeling also predicts a pit lake will develop over about 60 years after which it will evaporate 347 afa when full. Thus, dewatering and pit lake evaporation will intercept approximately 10% of the predicted recharge in the Silver Peak Range in perpetuity. Modeling does not predict the 10-foot drawdown will reach the McNett Ranch, but as explained above, any change in the groundwater level controlling flow to the springs at McNett Ranch could be detrimental. Because the flow path from the quarry area is directly towards the McNett Ranch, it is likely there will be some significant impact. The DEIS notes that quarry evaporation will have a "minor, permanent" effect on Fish Lake Valley. It is minor only when considering the valley as a whole, but not correct when considering as a localized impact. Current pumping in Fish Lake Valley is already causing groundwater declines. Recent agricultural pumping as estimated by Piteau (2023) is 29,700 afa, based on the last five years of pumping records obtained from the Nevada Division of Water Resources. Total discharge, pumping and ET, exceeds natural recharge (approximately 30,000 afa) which causes the groundwater table to lower. Piteau Figures 2.14, .15, and .16 show that northern, central, and southern Fish Lake Valley wells have declined 0.47, 1.1, and 2.2 ft/y, respectively, since 1970. Because agricultural pumpage and ET continues to exceed natural recharge, the decline will continue, even without the Rhyolite Ridge project. GeoLogic (2024) prepared a geologic and geochemical analysis and to concluded the McNett Ranch waters are not from the project area. That may be true for existing groundwater conditions, but drawdown from the Project would affect flow at the ranch in two ways: by changing the gradient, and removing shallow groundwater from the mix of flow. Piteau's currently postulated groundwater compartments cannot be assumed to protect McNett Springs, or any spring in the northeastern Fish Lake Valley, from future impacts. In addition, impacts are not limited to those resulting from pumping the project water supply. The proposed pit could intercept flows that would reach the northeastern Fish Lake Vally, including the McNett Ranch area, and cause drawdown in the shallow groundwater that affects the surface recharge and discharge. Finally, the relationship between Tiehm's buckwheat and vadose zone moisture is unknown and has never been investigated. Tiehm's buckwheat lives in a porous substrate. It co-occurs with the facultative wetland plant *Sporobolus airoides*, implying some source of underground moisture may affect the Tiehm's buckwheat habitat. The DEIS should have considered impacts from pumping and dewatering at the mine site to possible interactions between Tiehm's buckwheat and the vadose zone. g. <u>The Proposed Monitoring and Mitigation is Inadequate to Protect Spring Resources.</u> In general, the hydrogeologic data is insufficient to adequately protect Cave Springs or to design a decent monitoring/mitigation plan, as described herein. BLM's monitoring plan is also insufficient. BLM suggests two water resources mitigation measures. The first, WR-01 (BLM 2024a, p 4-77) proposes monitoring the flow rates at any surface water resources (springs) within the predicted ten-	d) Impacts detailed as a result of groundwater drawdown are considered predicted impacts based on the groundwater model developed for the Project, which details a predicted maximum extent of 10-foot drawdown. The EIS assesses the predicted 10-foot drawdown contour and a one-mile buffer. A change in groundwater elevations of 10 feet or more was selected by the BLM for identifying areas of potential drawdown impacts. This threshold was established by the BLM based on the fact that natural fluctuations in water levels, particularly in fractured rock aquifers, commonly exceed 10 feet. Drawdowns of less than 10 feet are not considered since these changes probably would not be measurable or distinguishable from natural seasonal and annual variations in groundwater levels. In addition, it is important to note that the 10-foot drawdown contour has been used as the threshold for defining the potential drawdown impact area for numerous other BLM EISs for mining projects in northcentral Nevada over the past 30 years. The BLM acknowledges that numerical models could be used to provide predictions of drawdown of less than 10 feet, and drawdown of less than 10 feet could significantly impact flow in some perennial springs and streams. However, considering the broad regional extent of the numerical modeling domain, and lack of hydrogeologic data outside of the mine exploration and mining area, it is not reasonable to use numerical modeling to predict areas with drawdown of less than 10 feet. The potential for drawdown effects is therefore addressed via monitoring requirements that can be expanded based on monitoring results. The one-mile buffer was added to account for additional areas where impacts from less than a 10-foot drawdown contour may take place. Due to uncertainty in the modeling, BLM Battle Mountain District required a one-mile buffer to be placed on the predicted maximum extent of 10-foot drawdown to address this potential modeling uncertainty and establish the locations for monitoring drawdown effects on surface water resources. The hydraulic connectivity of surface water resources with the deep groundwater aquifer in the area of analysis is currently unknown, therefore the potential for impacts at present seeps, springs, and streams throughout the area of analysis is acknowledged but subject to monitoring for verification. Drawdown monitoring would inform the actual extent of impacts from dewatering on surface water sites that are dependent on upon the extent of hydraulic connectivity between surface waters and the groundwater targeted by the dewatering. e) The Draft EIS does not draw conclusions regarding whether seeps and springs are connected to regional groundwater or perched water. Instead, it notes that predicted effects associated with groundwater drawdown would not occur "if these springs are perched features." The Draft EIS summarizes the findings of Cave Spring documentation provided in Confluence 2019 and Piteau 2023. These surveys and reports quantify surface flow that emanates at Cave Spring from a fault zone at the base of an exposure of the Rhyolite Ridge Tuff Formation. Monitoring of flows at Cave Spring and groundwater levels between the Project and Cave Spring are included in the proposed monitoring plan to assess and mitigate Project effects. f) The Water Resources SER examines the wetlands in the analysis area in Section 2.3.2.1. These wetland areas are outside the predicted area of affect for groundwater resources. Ground surface areas with Tiehm buckwheat observations are more than 100 feet higher than local groundwater levels, indicating that the vadose zone water in those areas is not sourced from local groundwater. g) Mitigation measures for seeps and springs focus on maintaining the current use of those surface water features. Effects of groundwater pumping on seeps and spring would indicate that they were sourced from local groundwater. As such, flow supplementation would also be sourced from local groundwater for consistent water chemistry with the existing conditions.

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		foot drawdown and one-mile buffer. "If monitoring indicates that flow reductions in surface waters are occurring, and that these reductions are likely the result of Proposed Action drawdown, Ioneer would be responsible for implementing mitigation at the affected surface water resource to enhance or replace the impacted surface water resource." (*Id*). However, there is no plan to monitor groundwater levels between the pit and the spring, therefore the DEIS does not provide a means for showing that any observed reductions are the result of mine operations. Mitigation measure WR-92 does require Ioneer to monitor groundwater levels between "the pit and existing groundwater or surface water rights." Thus, a monitoring well would be required only if the source has a water right. This does not sufficiently protect groundwater-dependent ecosystems and wetlands. Mitigation for surface water rights or springs for either WR-01 or WR-02 would require make-up water as proposed by BLM and Ioneer mitigation strategy. However, this form of mitigation does not preserve spring sources, so it is inadequate to protect any cultural values of the springs and preserve the natural riparian areas. Make-up water also may not be appropriate for the resource because it could have different chemistry. Springs and wetland seeps have water with chemistry based on the source. The local ecosystem would have evolved with and could depend on that chemistry. Even so, if the water is sourced nearby from other sources could harm the local balance. For example, if a nearby well replaces a spring that goes dry, then pumping that well will draw from the very resource that dewatering has already depleted, adding to the problem. Generally monitoring wells only provide information after the water system has been affected, thus is a poor mitigation for avoiding impacts. Once drawdown has reached intermediate monitoring, there is a certain momentum will continue the expansion of the drawdown even if the cause of the drawdown is removed.	
108 and 183	108.20 and 183.19	***6. The DEIS Fails to Adequately Describe or Analyze the Impacts from The Project's Tailings Disposal Facility.*** a. <u>BLM and Ioneer Use Inaccurate and Misleading Terminology.</u> BLM and Ioneer refer to the tailings dump as the "Spent Ore Storage Facility" (SOSF) which does not clearly communicate to the public that this is actually a permanent waste disposal facility. However, as a tailings disposal facility it is subject to all the regulations involving tailings and tailings impoundments. b. <u>Ioneer Analyzed Only Two Tailings Samples With Widely Divergent Properties.</u> NewFields (2020a) measured the geotechnical properties of only two samples of tailings, referred to as "Vat 3" and "IBC Cycle 1" (see Fig. 2a). The two samples had very different geotechnical properties. The specific gravities of the fine-grained tailings were either 2.42 or 2.68 (see Fig. 2b), while the percentages of fine-grained tailings were either 15.3% or 27.3% (see Fig. 2c). For sample "Vat 3," the dry density after maximum compaction was 71.3 pounds per cubic feet, which was achieved at the optimum geotechnical water content for maximum compaction of 20.6% (see Fig. 2d). For sample "IBC Cycle 1," the dry density after maximum compaction was 79.2 pounds per cubic feet, which was achieved at the optimum geotechnical water content of 30.7% (see Fig. 2d). For an unexplained reason, the shear strength parameters (cohesion and friction angle) were measured using the direct shear test on "Vat 3" and the triaxial test on "IBC Cycle 1," so that it is difficult to compare the two samples (see Fig. 2e). Finally, the hydraulic conductivity of "Vat 3" was two orders of magnitude greater than that of "IBC Cycle 1" (see Fig. 2f). In summary, the geotechnical parameters of the tailings that will be used to construct the SOSF are very poorly known. For a filtered tailings storage facility, one of the most important parameters is the optimum geotechnical water content, which is known only to be somewhere in the range of 20-30% (see Fig. 2d). c. <u>The Appropriate Method For Measuring Water Content Has Not Yet Been Determined.</u> NewFields (2020a) obtained very different water contents for the two samples, depending upon the drying temperature and the drying time. For "IBC Cycle 1," geotechnical water contents ranged from 34.8% to 39.9% for drying at 60°C and ranged from 45.5% to 48.4% for drying at 110°C (see Fig. 3a), thus also showing the very different water contents of subsamples of "IBC Cycle 1." An additional sample "Vat 4" showed geotechnical water contents of 33.0% and 37.0% for drying at 60°C and 110°C, respectively (see Fig. 3a). For an unspecified sample, the measured geotechnical water contents ranged from 38.3% to 41.5% for drying from 24 to 48 hours (see Fig. 3b). NewFields (2020a) never resolved the issue as to the correct procedure for measuring the geotechnical water content of tailings, but acknowledged that it was a crucial issue. According to NewFields (2020a), "Based on the data, it has been determined that the drying temperature has an effect on the measured moisture content … The influence of temperature and time on the measured moisture contents indicates that absorbed, structural water is present in the spent ore. This phenomena has implications on additional laboratory testing so that data reported by different entities is comparable. More importantly, it has implications for construction, operations and field control of compacted spent ore and composite waste materials." d. <u>The DEIS's Stability Analyses are Not Reliable.</u> It is difficult to connect the properties that were assumed in the stability analyses (see Fig. 4) with the properties that were measured in the two tailings samples (see Figs. 2a-e). For example, NewFields (2020a) states that the tailings in the structural zone will be compacted to 95% of their maximum dry density. On that basis, and based on the measured maximum dry densities, optimum geotechnical water contents, and 95% compaction, the compacted wet weights of samples "Vat 3" and "IBC Cycle 1" would be 81.7 and 90.7 pounds per cubic feet, respectively. Thus, it is difficult to understand and it is not explained how NewFields (2020a) arrived at a unit weight of 100 pounds per cubic foot for the structural zone (see Fig. 4). The geotechnical parameters for the common fill and the alluvium were not related to measurements, but were only estimates that were defended by recourse to "experience." According to NewFields (2020a): "Local alluvium will be sourced for common fill and a conservative frictional strength was considered for the stability evaluation for the SOSF and the Underdrain Pond embankments … The site is underlain by dense to very dense alluvium. Any loose materials at the ground surface will be stripped, as necessary, and the surface compacted prior to facility development. The unit weight and shear strength of this material were estimated based on our regional experience." In addition, the stability analyses assumed a low water table without justification. Specifically, they assumed that the water table within the filtered tailings facility would be only 5 feet above the geomembrane. According to NewFields (2020a), "The phreatic surface [water table] within the SOSF was conservatively modeled five feet above the geomembrane, representing minor	a) The Draft EIS describes the Spent Ore Storage Facility (SOSF) and its closure in place. The Mine Plan of Operations/Nevada Reclamation Permit (Ioneer 2022) was used for descriptions of the SOSF and closure b) The SOSF design incorporates the range of material properties for the material contained and adheres to Factor of Safety requirements for this type of facility in Nevada. More details can be found in the Rhyolite Ridge Spent Ore Storage Facility Engineering Design Report (NewFields 2020) and the Spent Ore Storage Facility Geotechnical Stability Analysis (NewFields 2019). c) The moisture content for material placed in the facility would be monitored for compliance with its design requirements and Factor of Safety. Moisture measurements would use the standard methodology at a Nevada-certified analytical laboratory. More details can be found in the Rhyolite Ridge Spent Ore Storage Facility Engineering Design Report (NewFields 2020) and the Spent Ore Storage Facility Geotechnical Stability Analysis (NewFields 2019). d) See the response to comment b) above. At the hydraulic permeabilities anticipated, the materials in the facility are expected to drain. More details can be found in the Rhyolite Ridge Spent Ore Storage Facility Engineering Design Report (NewFields 2020) and the Spent Ore Storage Facility Geotechnical Stability Analysis (NewFields 2019). The Clay Tailings Filter Stack associated with the Thacker Pass Project discussed in the comment referencing The Thacker Pass Project-Engineering Design Report-Clay Tailing Filter Stack, Waste Rock Storage Facilities, Coarse Gangue Stockpile, Mine Facilities and Process Plan-Storm Water Management prepared by NewFields in April 2020, has different hydraulic conductivity properties and therefore, different predicted drainage and water levels. e) A failure of the SOSF designed and constructed to Nevada specifications is not reasonably foreseeable. f) See the response to comment c) above. g) The Project includes a construction design of the facility developed and stamped by a Nevada-Certified Professional Engineer. More details can be found in the Rhyolite Ridge Spent Ore Storage Facility Engineering Design Report (NewFields 2020) and the Spent Ore Storage Facility Geotechnical Stability Analysis (NewFields 2019). h) The Plan of Operations includes collection of seepage from the SOSF for use as process water. The effectiveness of the evapotranspiration (ET) cover was based on an ET model developed by Geo-Logic Associates (2020) appearing in the Water Resources SER. Predicted draindown rates were developed as part of the facility design and used to size the collection ponds that are included in the design and

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		accumulation of draindown fluid along the liner." The assumption was not conservative in any way because, due to precipitation, surface runoff, water contained within the tailings, and the ongoing consolidation of the tailings (which reduces the pore space), the water table can often rise to onethird to one-half of the height of the filtered tailings stack. In fact, the very same month (April 2020), NewFields (2020b) carried out stability analyses for the clay tailings filter stack (CTFS) at the Thacker Pass mine that assumed that the water table will rise to one-half of the height of the tailings stack. Moreover, both sets of stability analyses made the same assumption that draindown of water within the tailings stack would be negligible. e. The DEIS Does Not Consider the Consequences of Failure of the Tailings Storage Facility. Despite the finding that the SOSF will be unstable in response to an earthquake with a return period of 475 years, there is no discussion of the consequences of failure of the SOSF and there does not seem to be any available document that discusses this question. The first and obvious question is the destination of the tailings after failure of the filtered tailings stack. The EIS needs to analyze the effect of failure especially given that the Tailings disposal facility (SOSF) is in the drainage. f. The DEIS Has No Plan For Ensuring the Appropriate Water Content. The outcome of the analyses of tailings properties and the stability analyses in NewFields (2020a) is the design criteria for the SOSF. The optimum geotechnical water content is stated as the range 25-35% (see Fig. 6), which is quite a large range. The design criteria do not state how the water content will be measured or why the range of 20-30% that was found for the two tailings samples (see Fig. 2d) is irrelevant. The line below states the geotechnical water content of the tailings as 35-75% (see Fig. 6), which presumably means the expected water content as the tailings leave the filter presses. Thus, the filtered tailings are expected to be far wetter than optimum and there is no discussion of any plan for obtaining the appropriate water content for proper compaction. For reference, based on a bulk dry density of 75 pounds per cubic foot, and a particle specific gravity range of 2.4-2.6 (see Fig. 6), the saturated geotechnical water content would be in the range 41.6- 44.8%, so that the expectation is that much of the filtered tailings will be over-saturated (with considerable free water) after leaving the filter presses. It will be impossible to safely construct the filtered tailings storage facility with such over-saturated tailings. g. The Tailings Management Plan is Extremely Preliminary for a Mining Project at Such an Advanced Stage. Because of the high risk that tailings storage poses to a mining project, the plan for the tailings storage facility needs to proceed at a faster pace than the other aspects of the project. According to the SME Tailings Management Handbook, "The level of engineering complete for a TSF [Tailings Storage Facility] is greater than the level of engineering required for the rest of a mining project to support permitting requirements" (Henderson and Morrison, 2022). The SME Tailings Management Handbook quantifies that level of engineering by stating that, prior to producing the Definitive Feasibility Study, 70-90% of the engineering for the tailings storage facility should have been completed (see *id.* Fig. 7). Figs. 8a-b taken from the SME Tailings Management Handbook give more specific examples as to what it means for 70-90% of the engineering to be completed prior to producing the Definitive Feasibility Study. In terms of tailings sampling, not only should samples be available from a pilot plant (which should be completed prior to producing the Feasibility Study), but samples should be "available from additional confirmatory test work" (Henderson and Morrison, 2022; see Fig. 8a). In terms of tailings characterization, the engineering should be at the stage of "no additional work required" (Henderson and Morrison, 2022; Fig. 8a). In terms of the design basis, not only should the design be complete (which should be the case prior to producing the Feasibility Study), but the design should be "final" with "design criteria fully agreed to by owner and designer" (Henderson and Morrison, 2022; Fig. 8a). In terms of the failure consequence classification, not only should a preliminary dam breach analysis have been carried out (which should have been completed prior to producing the Pre-Feasibility Study), but the dam breach analysis should be at the stage of being "refined as needed including using rheological parameters" (Henderson and Morrison, 2022; see Fig. 8b). What is clear from the analysis cited in the DEIS is that Ioneer is not even close to knowing how the tailings disposal facility (SOSF) will perform, if it may fail catastrophically, and how much drainage is to be expected over time. Failure of the facility would pollute the drainage into Fish Lake Valley, so this analysis and a plan to prevent catastrophic failure is needed. The bottom line is that this aspect of the mine cannot be evaluated and BLM needs to require Ioneer to complete its technical analysis before any permit can be issued. h. The DEIS Does Not Contain Sufficient Information Regarding The Drainage Of Fluid From The Tailings Disposal Facility (SOSF), Potential For Leakage, Or Needs For Long-Term Management. According to the DEIS (p. 4-32) "The SOSF would be designed as a zero discharge facility." Under Nevada regulations "zero-discharge" does not mean that there will be no drainage. What it does mean is that no drainage is allowed to be released into the environment. The DEIS does not indicate what the drainage will be, which is not surprising since the tailings disposal facility remains largely undeveloped as discussed above. However, the amount of fluid that is draining and over what time horizon is essential in evaluating that active management will be needed and for the public to be able to evaluate the plan as required by NEPA. BLM should require a statistical analysis or research on liner failures to predict potential leakage from the liner. Given the level of toxicity anticipated for any drainage from the tailings disposal facility, detailed scrutiny is needed to ensure that the drainage where the facility is to be located will not be polluted. The DEIS also provides no justification to support the next statement: "Drainage is expected to cease shortly after the ET cover is established." The ET cover is a mitigation to prevent water from infiltrating into the tailings disposal facility (SOSF) and requires evaluation under NEPA. The DEIS also states that "The facility operations and nearby waters would be monitored in accordance with NDEP WPCP requirements to verify that the facility is not contributing to water quality degradation." However, Ioneer has not even submitted an application to the State of Nevada on the current mine plan, so there is no way for the public to review whether or not the yet to be proposed monitoring will be adequate. The DEIS fails to identify monitoring points.	Plan of Operations. Facility monitoring would be required by both the BLM and NDEP Bureau of Mining Regulation and Reclamation (BMRR). Specific monitoring locations would be identified in the Water Pollution Control Permit (WPCP) and the monitoring plan contained in the final Plan of Operations.

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		Tailings drainage is likely to be highly toxic based on the Rhyolite Ridge Baseline Geochemical Characterization Report (HGL 2020b). The Meteoric Water Mobility Profile table shows some results for the three ore processing waste streams destined for the tailing dump (SOSF). It is not clear from the DEIS if these test results represent the expected chemical profile of the drainage, nor how the chemical profile would change over time. The mobility test shows extremely high levels of TDS, sulfate, boron, aluminum, magnesium, sodium, fluorine, and low pH for the Sulfate Salt Residue and Spent Ore (tailings). There are also high levels of a number of other metals such as arsenic, thallium, uranium, and chromium to name a few, especially in the Sulfate Salt Residue. Indeed if this is representative of drainage there will need to be a plan for drainage management. DEIS also fails to provide an estimated volumetric draindown profile. The engineering design report only states, "It is anticipated that the operational draindown from the SOSF [Spent Ore Storage Facility] will be minimal" (Newfields 2020). This is an inadequate description. The application needs to include a summary from the original source, and there needs to be a description of how the draindown is to be managed. Given the information in the application the toxicity of the tailings drainage could persist for a long time. Is Ioneer planning to treat this fluid after mining and processing is discontinued?	
108 and 183	108.21 and 183.20	***7. The DEIS Lacks Critical Details Concerning the Waste Rock Management Plan.*** The DEIS states that about 20% of the waste rock is potentially acid generating (PAG). It is therefore critical for Ioneer to design and implement an effective waste rock management plan. Unfortunately, the information presented in DEIS is incomplete, inaccurate, and fails to demonstrate the effectiveness of proposed waste rock management measures, as described below. a. <u>The Waste Rock Analysis Incorrectly Relies On Precipitation Averages Without Accounting For Water Pules From Significant Weather Events.</u> Precipitation in the Great Basin is not regular with many years of low precipitation punctuated with short-duration but significant rainfall. Representative significant precipitation events for the Project area are 3.01 inches at Silver Peak (August, 21, 2023) and 3.07 inches at Dyer (August, 2, 2015) (NOAA 2024). There is no evidence in the DEIS or supporting documents that precipitation pulses have been taken into account in any of the analysis including seepage eliminating from the waste rock and into the subsurface of the waste rock. b. <u>The DEIS does not provide a clear picture of the expected fraction of net-acid generating rock that will be produced over the project mine life.</u> The environmental analyses conducted to determine the potential for Rhyolite Ridge waste rock ("overburden") to produce acidic leachate seem internally consistent but similar to results from other Nevada mines. The problem is that the Overburden Management Plan (OMP) (Piteau 2024) is entirely focused on the averages, and gives almost no information on the specific mass of waste rock that will be net-acid generating, and that will thus need to be handled selectively to reduce the potential for acidic runoff or other detrimental environmental impacts. According to the OMP the interim overburden management plan: > quantifies the volumes and masses of different lithologic groups to be excavated, identifies the bulk ARD properties of each, estimates the potential for impacts from a bulk standpoint, and combines those attributes to produce guidelines for overburden rock placement and management. One shortcoming of the overburden management plan is that it estimates impacts "from a bulk standpoint." But the waste rock won't be homogeneously blended, so the impacts won't be from bulk characteristics, but rather from specific areas that have excess acid-generating material. For example, Table 4.2, "Average Acid-Base Accounting Properties for Lithologic Units" shows the average acid-base accounting for each lithologic unit, and also provides a helpful comparison of these results that are based on actual acid/base analyses relative to the estimated "surrogate" values from whole-rock. But, there is no indication of the fraction of rock from each lithologic unity that is expected to generate acidic leachate. Table 5.2, "Yearly Schedule of Overburden Placement to West OSF" (from IMC, 2022) presents estimates for the mass of rock scheduled for disposal in the West OSF, but gives no indication about how much of the rock each year will probably be net-acid generating and thus possibly subject to selective handing. In order to understand the potential for acidic drainage BLM needs to require the Overburden Management Plan needs provide estimates for how much net acid-generating rock will be produced from each lithologic unit during each year of projected mine operation. Placement of the acid generating rock in the open pit, as far below the premining water table as practical, will ensure that the sulfide minerals become isolated from oxidative weathering and thus that the acid and metals bound in the sulfide minerals become permanently stable. This subaqueous disposal closure method avoids any concerns over long-term oxidation and leaching of solutes from acid-generating rock in subaerial waste facilities. The case against placing sulfidic rock in the pit is that any oxidation products released from the rock before it is flooded could flow into the pit lake or out to groundwater. The remedy for this is to include a plan to pump water out of the flooded backfill before it enters lake or flows out to the surrounding aquifer and treat the water as needed. Monitoring plus pumping or other treatment of water in pit backfill is not ideal. But under the current plan, the pit backfill is already the largest destination for waste rock (Figure 5.2 "OSF Mass through time," Piteau 2024), and the two largest sources of waste rock proposed for pit backfill are S3 and TBX lithologies, both of which contain appreciable sulfide-bearing and acid-generating rock (Table 5.4. Yearly Schedule of Overburden Placement to Quarry Infill OSF (from IMC, 2022), Piteau 2024). This recommendation is consistent with the pit backfill alternative that we discuss in our comments on the pit lake in general.	The EIS refers to the low risk of acid rock drainage (ARD) based on 20 percent of the overburden being potentially acid generating. Samples from the site were subjected to laboratory analysis based on established and monitored NDEP methods and found to be acid neutralizing with a positive net neutralizing potential. The Overburden Management Plan (Ioneer 2022) addresses the leaching of metals, sulfide oxidation, and prescribes eliminating seepage through all overburden materials through managed closure of the OSFs. A detailed explanation of the low ARD potential and the net acid-neutralizing anticipated conditions of all OSF facilities is discussed in detail on Rhyolite Ridge Overburden Management Plan Update (Piteau 2024). Applicant protection measures have been agreed to by the proponent to verify and confirm this is observed during operation and closure. The WPCP monitoring plan, includes specific information regarding leak detection systems, surface and groundwater monitoring (including methods), and will be reported to the various state and federal agencies (Appendix H, NewFields, 2022)."
108 and 183	108.22 and 183.21	***8. The DEIS Contains Insufficient Detail Regarding the Sulfuric Acid Plant*** The acid plant is a significant aspect of the mine plan and necessary aspect of the operation, so its construction is a connected action. All aspects of the construction and operation of the acid plant need to be discussed and evaluated in the EIS. Yet, there is very little about the acid plant including how much acid is to be produced, the shipping of sulfur to the mine operation, and the general construction requirements. The DEIS fails to identify: where the sulfur will be sourced; what transit consequences will result from shipping it; will the shipping be via train or truck and what is the quantity being shipped; the environmental consequences of the transfer station; and other facets of the sulfur sourcing. Without this information, the public cannot evaluate the impacts of the sulfuric acid plant.	Impacts of the sulfuric acid plant are analyzed in detail in EIS Sections 4.1 and 4.5. Additional detail is provided in the Hazardous Materials and Solid Waste SER.
108 and 183	108.23 and 183.22	***9. The DEIS Fails to Consider the Use of Per- and Polyfluoroalkyl Substances (PFAS)***	Based on the Plan of Operations for the mine, ore processing consists of leaching in vats, and surfactants are not listed in Table 5 (Fuel, Chemical, and Reagent Summary). Therefore, PFAS in these materials are not a concern at the

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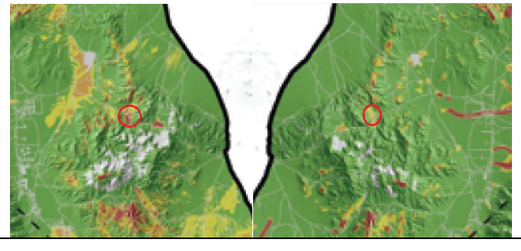
		DEIS does not discuss the potential use of per- and polyfluoroalkyl substances—known as PFAS—at these operations, which are hazardous materials that exist forever. NEPA and FLPMA require BLM to fully analyze the PFAS issue with this and cumulative activities in the region. A leading mining industry technical group, Golder & Assoc., highlighted the concerns with PFAS use in the mining industry. As a 2019 report states: > To date, mines have not been a major focus for assessment of potential PFAS impacts. However, PFAS have long been used in mining, as part of both processing and firefighting activities. PFAS may be present due to the use of aqueous filmforming foams (AFFFs) for firefighting, but also through inclusion in surfactants, ore-floating processes and other performance chemicals such as hydraulic fluids and fuel additives. This means that PFAS contamination is a risk for the mining sector and should be assessed and managed appropriately. > > Who and what is at risk? > > Each situation is unique, but the risks of PFAS contamination typically depend on key factors related to the site conditions and the use and value of water resources, such as the extraction and use of groundwater, and the ecological value of surface water bodies. > > On and around mine sites, the risks from PFAS include the exposure of mine workers who have used or maintained fire-fighting equipment or used contaminated surface or groundwater, for instance as process make-up water or for dust control. Drinking water is a major concern too: Do mine workers, site visitors or off-site residents use the surface or groundwater as drinking water or for washing? Has livestock been exposed via surface water, groundwater or irrigation? If so, people consuming that livestock may have been exposed. Similarly, with PFAS being so easily transported through water, they may have been taken up by aquatic organisms, as well as by the birds and other animals that consume them. Local communities such as traditional owners may, in turn, be exposed via their consumption. Mundle, Why Do PFAS Matter In The Mining Sector, and What Can Be Done? (2019).	Proposed Project. However, the use of AFFFs in firefighting equipment is a potential. A brief discussion of PFAS has been added to the Hazardous Materials and Solid Waste SER, Section 3.2.1.
108 and 183	108.24 and 183.23	***10. The DEIS Fails to Take a Hard Look at Impacts to Sensitive and Imperiled Wildlife and Plant Species*** a. Bi-State Sage-Grouse The Silver Peak Range is known to be habitat for the bi-state distinct population segment of the greater sage-grouse (Centrocercus urophasianus) ("BSSG"). BSSG live in the bi-state area of the eastern Sierra Nevada and environs including in Esmeralda County. The species is currently proposed for listing as threatened (88 Fed. Reg. 25613). There is a unit of proposed critical habitat of approximately 2,600 acres within just over one mile of the Project Area, in an area called Coyote Hole. This area has numerous elements which make it priority habitat for BSSG, including highgrowing big sagebrush, a mix of forbs and grasses, and small water sources and wet meadows nearby. A single BSSG was observed by Ioneer's consultants in 2022 in the Project Area (DEIS at 3-14). It appears to have been observed just north of Cave Spring at the base of Rhyolite Ridge (EM Strategies 2022, Figure 10). This observation was incidental during a wide-ranging wildlife survey. This wildlife survey was conducted over just 5 days in August of 2022. Conducting a wildlife survey in one of the hottest months of the year during a record drought will not yield comprehensive results about wildlife use and occupancy of an area, since many of them will be dormant during periods of extreme drought. It is impossible to extrapolate any further information from the sighting of a single male sage-grouse during a single 5-day survey. There is one record on iNaturalist of a sighting of BSSG sign in the area – BSSG scat was observed in July of 2022 to the south of the Project Area along Argentite Canyon Road at 37.7876137534, -117.8577073101 (iNaturalist 2024). The Project Area and the nearby Coyote Hole proposed critical habitat are known to be important for the bi-state sage-grouse. Radio-collared sage-grouse preferentially chose both of these areas for occupancy during multiple seasons (Coates et al 2020; Figure 1). Averaged out across the year, these areas both ranked as having high habitat selection. This means that both the Project Area and the nearby proposed critical habitat are important for the conservation of the species, and any impact to the species warrants special scrutiny and attention in an Environmental Impact Statement. 	The location of bi-state sage-grouse habitat in relation to the Project is described in Section 3.12.1. A detailed analysis of potential impacts to bi-state sage-grouse and its habitat is presented in EIS Section 4.12. Impacts to tui chub and spring snails are discussed in EIS Section 4.18. Impacts to Tecopa birdbeak and other special status plant species are discussed in Section 4.14.

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		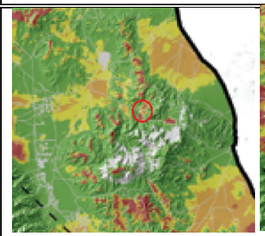 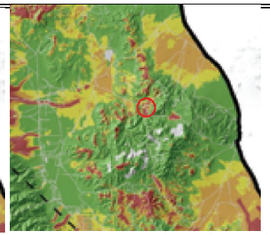 *Figure 1: Seasonal habitat selection category maps for radio-marked BSSG; Top Left is Spring; Top right is Summer; bottom left is Winter; bottom right is Annual. Red is high, orange is moderate, yellow is low, and green is non-habitat. A rough approximation of the project area is outlined in bright red. High habitat selection (red) lands can be seen in Coyote Hole and within the Project Area itself during spring, winter, and annually. Even in summer the area has moderate and low habitat selection. Map adapted from Coates et al. 2020, Figure 27.* Unfortunately, the DEIS provides no such special scrutiny or attention. Despite the known importance and regular occupancy of the habitat at Rhyolite Ridge, and despite the actual observation of an individual BSSG, Ioneer failed to provide any baseline information whatsoever about the status of the BSSG within and near the Project Area. No targeted surveys were executed; no modeling or other desktop exercises were provided; no original baseline research was conducted at all, and the DEIS provides almost no information about the status of the species nor the potential impacts it may experience from the Project. There are many other flaws with the DEIS's treatment of BSSG. The DEIS constrains its analysis of impacts to BSSG to an arbitrarily designated boundary, called the area of analysis. The DEIS uses the 10 foot groundwater drawdown contour plus one-mile buffer as the area of analysis for BSSG (DEIS SER 13 at 2-1). The DEIS provides no justification for using this boundary for the area of analysis. One could envision a variety of criteria that would go into selecting a boundary for the area of analysis of potential impacts to BSSG, including habitat quality, frequency of habitat use (based on Coates et al. 2020), proximity to access roads, connectivity, and other factors. The potential impacts to BSSG are far greater than just groundwater drawdown, so using the groundwater drawdown boundary for the area of analysis is arbitrary and unsupported by science. The DEIS also violates the BSSG RMP amendment for Tonopah Field Office (BLM 2016). Per Table ROD-2, BLM must "Require site-specific project mitigation to insure no permanent net loss of habitat due to project disturbance." Per Minerals Action #2, BLM must "Control fugitive dust on roads and pads." Per Locatable Minerals Action #1, BLM must "Mitigate long-term negative impacts to habitat from locatable mining operations to the extent practicable." The RMP amendment makes it a policy that, "When authorized land uses cause habitat loss or degradation, the BLM will require mitigation that provides a no permanent unmitigated net loss to the BSSG habitat." The DEIS takes pains to try to minimize the disclose of impacts to BSSG. For instance, an important habitat component for BSSG is the availability of springs and small wet meadows, of which there 32 within the area of analysis (DEIS at 3-14). Yet, when describing the consequences of the proposed action, the DEIS states, "There is one spring located within the proposed critical habitat east of the OPA. This spring is inside the area of analysis and the maximum extent of the predicted 10-foot drawdown area for the Proposed Action. Impacts from groundwater drawdown associated with the Proposed Action are anticipated to be minor, permanent, and localized." The DEIS fails to disclose and analyze the consequences of any of the other 31 springs within the area of analysis going dry. The drawdown of these springs would functionally eliminate the Rhyolite Ridge/Coyote Hole area as viable habitat, since springs are a necessity to the bird, and yet such a scenario is not analyzed in the DEIS. The DEIS only accounts for three potential impacts to BSSG: surface disturbance, possibly vehicle collisions, and the aforementioned groundwater drawdown. However there are many other potential impacts to BSSG which are not analyzed in the DEIS. This includes dust, air pollution, noise, visual disturbance, increased raven subsidy leading to increased raven populations, increased density of cows as they try to access areas now closed to them. Industrial development, including hardrock mining, has long been recognized as one of the leading threats to sage-grouse. BLM's 2011 National Technical Team (NTT) Report reviewed the available science and unequivocally recommended that sage-grouse priority habitats be closed to future fluid minerals leasing, future coal leasing, locatable minerals claims, and other forms of mining (NTT 2011). Since that time, new science has only underscored the threat from mining and other forms of industrial resource extraction. For instance, a recent study of greater sage-grouse in Wyoming from 2008 to 2014, Kirol et al. (2020), measured the impacts to grouse from both fossil fuel energy and renewable energy and found that ongoing surface disturbance from energy development within 8 km (4.97 miles) of a greater sage-grouse nest decreased the likelihood of nest success. Sage-grouse broods within 1 km (0.62 miles) of ongoing surface disturbance from energy development were less likely to survive than those further away. As ongoing disturbance increased, sage-grouse nests had an increasing rate of failure. Furthermore, female sage-grouse avoided habitat with higher levels of disturbance in favor of habitat with lower levels of disturbance. The study indicates that current BLM nest buffers are too small to conserve grouse and implementing disturbance caps of 3-5% does not eliminate the negative impacts of ongoing disturbance on nest survival. Pratt and Beck (2019) studied sage-grouse response to bentonite mining and found that female mortality increase 19 times when females were exposed to mining activities within 1.6 km. This increase in mortality risk has direct population consequences due to adult females being the linchpin to carrying the population forward from year to year. In addition Pratt and Beck (2019) found that nest site selection decreased by 50% when surface disturbance increased from 0% to 12%, and identified "knock-on effects" to other vital rates including: reduction in nest success, lower brood success, and riskier choices for female sage-grouse because of lower habitat continuity. Coates et al. (2023) found that sage grouse abundance declined approximately 24 % within 5 km of geothermal sites in central Nevada, while lek absence rates (e.g., local extirpation) increased by about 730 % within 2 km of geothermal development.	

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		Finally, Harju et al. (2010) observed 704 leks over 12 years and found that leks within 2km of energy infrastructure had 35-76% fewer sage-grouse compared to leks with no associated infrastructure. Leks that had energy infrastructure within a 0.4 km radius showed a 35-95% drop in male attendance. Harju et al. (2010) further found that sage-grouse occupancy was negatively affected by surface disturbance up to 4.8 km away. Harju et al. (2010) identified a 2-10 year time lag between the initial activity associated with energy infrastructure development and a measurable effect on lek attendance, indicating that the impacts from development may not be initially apparent, and long-term analysis of project impacts is required. BLM must consider these and all other potential impacts to BSSG, and per the governing land-use plan, either avoid or mitigate these impacts to achieve no net losses. b. Fish Lake Valley Tui Chub The Fish Lake Valley tui chub (*Siphateles bicolor* ssp. 4) is a critically imperiled subspecies of tui chub found in only in Fish Lake Valley. Its current distribution is limited to a single spring and outflow system at McNett Ranch, whereas it was previously known from several locations in the Valley. The loss of habitat within its former range is due to the alteration of habitats and groundwater development drawing down the aquifer. The last remaining population is immediately and severely threatened by over-appropriation of groundwater due to agriculture, potentially compounded by in-situ impacts from grazing and aquatic plant encroachment. The tui chub is also threatened by groundwater development from the geothermal energy sector, rapidly-developing and water-intensive lithium mining interests. The Fish Lake Valley tui chub was petitioned for listing under the Endangered Species Act on March 10, 2021; and received a positive 90-day finding from the US Fish and Wildlife Service on August 23, 2022 (87 FR 51635). The Service has a settlement with the Center for Biological Diversity indicating that they will issue a final 12-month finding decision on the listing petition by May 17, 2025 (U.S. District Court 2024, p. 5). The DEIS briefly discusses potential impacts to the Fish Lake Valley tui chub, however it never provides a specific analysis of impacts to the fish itself, merely including it in a generalized analysis of impacts to aquatic species (DEIS at 4-36). The only statement about potential impacts to the Fish Lake Valley tui chub is: "Potential impacts to habitat from sedimentation and fugitive dust," (DEIS at 2-31). This same cursory analysis is repeated in the Supplemental Environmental Report 19: Wildlife Resources. The 2022 biological baseline survey report gives it brief mention, simply stating, "Aquatic habitat is not present" (EM Strategies 2022, Appendix F, p. 6), while the 2020 biological baseline report makes no mention of it at all (EM Strategies 2020). Thus despite the presence of a very rare and highly threatened species which is being considered for listing under the Endangered Species Act, the DEIS fails to provide any biological baseline information whatsoever about the Fish Lake Valley tui chub. There are no population surveys, no mark-recapture studies, no habitat quality assessments, no habitat quantity delineation. The DEIS provides no information whatsoever to set a baseline so that any changes in conditions due to the Project can be assessed. The DEIS also provides no specific disclosure or analysis of potential impacts to the Fish Lake Valley tui chub. It states that fugitive dust is a potential impact, but does not quantify the amount of dust, the rate of deposition, the grain size of the dust, nor, crucially, how dust deposition might affect the species or its habitat. It also cites sedimentation as a possible threat but does not describe how much sedimentation may occur, and how sedimentation may alter the tui chub's tiny habitat. In reality, there are several recognized threats to the Fish Lake Valley tui chub, many of which involve groundwater drawdown (Center for Biological Diversity 2021). And as described above regarding groundwater, there are several ways in which the Project could cause groundwater drawdown impacts that would impact the Fish Lake Valley tui chub and its habitat. c. Springsnails Wong's springsnail (*Pyrgulopsis wongi*) and the Fish Lake Valley pyrg (*Pyrgulopsis ruinosa*) have been detected within or directly adjacent to the Project Area (DEIS at 3-22). These are both extremely sensitive species whose life cycle is reliant on access to consistent water supply and static water temperature and geochemistry (FWS 2017, p. 42-45). Perturbations to the hydrologic regime which supports them may result in their extirpation or extinction. The DEIS fails to provide any baseline information whatsoever on Wong's springsnail or the Fish Lake Valley pyrg. No population estimates, habitat delineation, or habitat conditions are provided. It appears no baseline surveys occurred for these species, in violation of NEPA. The DEIS states, "If dewatering impacts are realized at Cave Spring, then depending on the amount of water reduction and habitat lost, fatalities to individual Wong's springsnails or the population may occur. Impacts to Wong's springsnails would be moderate to major, long-term, and localized." Wong's springsnail is restricted to the eastern Sierra Nevada and disjunct water holes eastward into the Great Basin (NatureServe 2024). Cave Spring is well within the 10-foot groundwater drawdown contour due to dewatering for the mine (DEIS at Figure 4-7). If Cave Spring has not already gone dry, it will certainly likely be severely impacted by dewatering for the mine (Myers 2024, p. 8-9). No mitigation is provided for this potential outcome. Mitigation Measure WR-01 (DEIS at 4-77) is insufficient to mitigate impacts to Cave Spring because by the time impacts are detected it would be too late to reverse them (Myers 2024, p. 11). It's unlikely that Wong's springsnail can survive complete desiccation. Replacement water would be of a different temperature and geochemistry than Wong's springsnail is adapted to, and would not succeed in maintaining the viability of the species. Wong's springsnail is highly likely to be extirpated from Cave Spring. The DEIS states, "Potential impacts to habitat from sedimentation and fugitive dust," would occur, possibly negatively impacting the Fish Lake Valley pyrg. DEIS at 2-31. However, this is the extent of the DEIS's consideration of this highly sensitive species. Such cursory examination of a species that potentially faces an extirpation risk from the proposed project fails to satisfy NEPA's "hard look" requirement. d. Tecopa Bird's Beak The DEIS fails to provide any analysis of the impacts of the project on the rare plant the Tecopa bird's beak (*Chloropyron tecopense*). The Tecopa bird's beak was petitioned for protection under the Endangered Species Act in 2023, due to many of the factors discussed in the cumulative impacts analysis of this document as well as due to impacts from the Rhyolite Ridge Mine (Center for Biological Diversity 2023). The Tecopa bird's beak lives in alkali wetlands and moist playa margins, relying on springs and seeps to sustain its mesic habitat. It lives in the entire Fish Lake Valley wetland area from the McNett Ranch outflow zone, through the Hot Well area and The Crossing, and nearly completely encircling the Fish Lake Valley Playa. There is also a population at Gap Spring. In addition to the	

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		Fish Lake Valley and Gap Spring populations, there are several populations along the Amargosa River in Nye County, Nevada and Inyo County, California. The habitats for this species are sustained by shallow groundwater. The DEIS and accompanying documentation fail to adequately document potential impacts to the Tecopa bird's beak. The DEIS states, "Dewatering is not anticipated to impact Tecopa birdbeak because the known locations are outside of the one-mile buffer of the predicted groundwater drawdown contour," describing any impacts from dewatering as "negligible, long-term, and localized," (DEIS at 4-28). However, Piteau (2023) documents several potential impacts form pumping and dewatering to the Tecopa bird's beak. Dewatering will cause reductions in evapotranspiration of 100 acre feet per year or more over the long term from base case within the evapotranspiration zone 6, described as "bare playa with some saltgrass. Damp," (*Id.*, Figure 4.22). This is precisely the Tecopa bird's beak's habitat. Since existing discharge in this evaporation zone is 1,900 acre-feet per year (*Id.*, p. 47), this is a permanent decline of some 5% of evapotranspiration within this zone. Other zones including greasewood zones, near where the bird's beak lives, would also experience long-term or permanent decreases in evapotranspiration (*Id.*, Figure 4.22).	
108 and 183	108.25 and 183.24	***11. The DEIS Fails to Consider Adverse Impacts from Subsidence.*** There is the distinct potential for dewatering for the project to cause subsidence in the area of the mine, but this was ignored in the DEIS. HydroGeoLogica (2020a) demonstrates the significant potential for subsidence due to dewatering for the mine pit. While the report is based on a previous configuration of the mine plan, it nonetheless is illustrative for our purposes. If anything, it underestimates the amount of subsidence because it is modeled using a shallower pit and lower dewatering levels. Yet it still shows up to one foot of land subsidence in Cave Springs Wash (HydroGeoLogica 2020a, p. 8). However, the DEIS is mixed in its treatment of the subject. In one location the DEIS states, without substantiation or references, that no subsidence is expected to occur (DEIS at 2-24). Later, the DEIS states, "minor subsidence may occur," (DEIS at 4-32). In neither case is a reference provided nor substantiation provided for the claims made. And both seem to directly refute the 2020 report, which finds up to 1 foot of subsidence, which is hardly minor. The DEIS must include an updated subsidence analysis and provide an accurate analysis of the impacts of such subsidence.	Subsidence impacts are discussed in the Water Resources and Geochemistry SER, Section 3.2.1.2 and Final EIS Section 4.16. This discussion was added to the Geology and Minerals SER, Section 3.2 and Final EIS Section 4.4.
108 and 183	108.26 and 183.25	***12. The DEIS Fails to Consider Environmental Justice Impacts.*** According to section 4.10 of the DEIS, the Rhyolite Ridge mine would require 500 workers for construction and 350 for operations. The project site is in Fish Lake Valley, which is a small agricultural community. It is expected that a majority of workers will have to come from outside of the community. Quarrying and processing would generate demand for 230 housing units from non-local labor (direct, indirect, and induced) from up to 402 new, non-local adults (includes single and married). It is expected that many of these workers will live in temporary housing such as trailer parks. This results in worker housing dynamics that are often referred to as "man camps"— where predominantly non-local temporary workers live. The construction of man camps and coordinating other forms of worker housing is a connected action that must be considered relevant to this NEPA analysis. The EIS must analyze the potential direct, indirect and cumulative effects of proposed man camps, including the potential increase of violence. At the very least, an analysis of the impact of "man camps" must be added to the DEIS consideration of indirect or cumulative impacts. In February of 2019, the Department of Justice published a report titled, Violent Victimization Known to Law Enforcement in the Bakken Oil-Producing Region of Montana and North Dakota, 2006-2012 (DOJ 2019). This report analyzed increases in violent crime as a result of man camps, or worker housing, associated with extractive industry. The report found that, "From 2006 to 2012, the rate of violent victimization known to law enforcement in the Bakken oil-producing region of Montana and North Dakota increased, particularly the rate of aggravated assault, which increased 70%. There was no similar increase in rates of violent crime in the counties surrounding the Bakken oil region." There is clear documentation from federal sources that a drastic increase in violence is to be expected based on objective evidence. Moreover, it is well understood through the issue of Missing and Murdered Indigenous People (MMIP) that this type of violence provides greater impacts Indigenous people as well has increase gender-based violence, such as rape, human trafficking, murder, and domestic assault. Furthermore, it is the obligation of federal agencies to address environmental justice based on Executive Order 12898. It is the responsibility of federal agencies to mitigate undue and disproportionate environmental impacts affecting historically marginalized communities such as low-income, Black, Indigenous, or communities of color. It is part of the federal government's Trust Responsibility with Tribes to ensure the physical health and wellness of Indigenous Peoples. Therefore, given the available information, it is the role of the federal government to include an analysis of the effects of man camps (or worker housing) on the local community with a specific focus on impacts to Indigenous Peoples. According to section 4.10 of the DEIS, Esmeralda county has 44% low-income residents, and Native American residents meeting environmental justice requirements, and that "Overall impacts to communities with environmental justice concerns within the area of analysis are anticipated to be moderate to major, long-term, and regional." Therefore it is known that the Rhyolite Ridge project would require significant non-local labor in a community with limited existing housing. Research conducted by the federal government clearly shows a connection between worker housing and increases in violence. It is the obligation of the federal government to take a "hard look" under NEPA, and therefore the EIS must analyze this predictable increase in community violence with specificity in terms of impacts to Indigenous communities and along gendered lines. This region is known to currently lack adequate funding for basic community safety and this has already resulted in gender based harm, "Some of the concerns include lacking sufficient medical care, access to legal materials, inmate safety, understaffing, and separation of inmates of different genders (Esmeralda County 2012)." Social and Economic Values Supplemental Environmental Report for the Rhyolite Ridge Lithium-Boron Project April 2024 ES-3. In regards to worker housing, Missing and Murdered Indigenous Peoples, and other forms of gender based violence, the Federal Government has the following obligations: • The BLM must take a hard look at the pattern of non-local worker housing resulting in increased localized violence and specifically along racial lines with Native Americans and gendered lines. ○ Using the best available research, the BLM must predict how their permitting actions for this project will increase violence inflicted upon specific communities which qualify for environmental justice screening.	A detailed analysis of potential impacts to environmental justice communities is presented in EIS Sections 4.3 and 4.20.3. Additional information is provided in the Environmental Justice SER.

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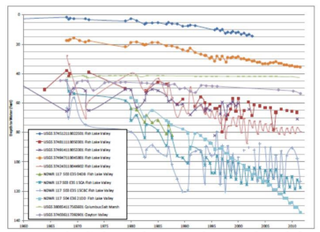
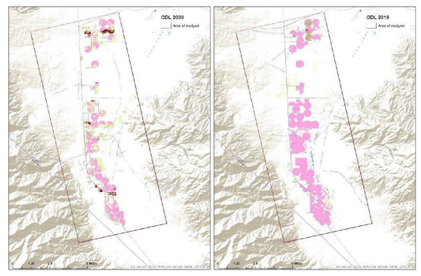
		• The BLM must work to mitigate impacts to environmental justice communities. The EIS should analyze not only increases to law enforcement and incarceration which address violence after it happens, but also preventative mitigations.	
108 and 183	108.27 and 183.26	***13. The DEIS Fails to Adequately Consider Cumulative Impacts.*** a. Agriculture. Fish Lake Valley is experiencing irreparable damage from water production that exceeds annual recharge (Esmeralda County 2022, p. 48). Water levels in Fish Lake Valley have declined up to 2.5 feet per year, causing more than 75 feet of cumulative drawdown (*Ibid*, p. 1). Historic groundwater levels are shown in Figure 2. This overdraft is causing aquifer storage to collapse, with the exact amount depending on the type of materials that comprise the local aquifers. This decrease in pore space reduces the aquifer's ability to store groundwater and cannot be reversed in the future (*Ibid*, p. 38). The vast majority of groundwater is extracted for irrigation (NDWR 2019, p. 8). The two main irrigation water uses are alfalfa and pasture. Fish Lake Valley "has long been a place for alfalfa farms along with cattle and horse ranches and some fruit trees," (Esmeralda County 2011, p. 14). Esmeralda County (2012, p. 38) notes that stabilizing the Fish Lake Valley groundwater resource will require a combination of increasing agricultural efficiency and decreasing the irrigable area within the basin. Other measures mentioned are preventing artesian flows from wells and limiting groundwater withdrawals from California.  *Figure 2: Selected groundwater level from 1960 to 2011 (Esmeralda County 2022, p. 50).* In addition to increased groundwater withdrawal, groundwater recharge from runoff may be declining and contributing to the groundwater decline. Surface water flows are an important source of irrigation water in the agricultural areas of Fish Lake Valley, with surface water diversions for agriculture from Chiatovich, Leidy, Busher, Perry-Aiken, and McAfee Creek drainages (Esmeralda County 2022, p. 26). Figure 3 shows land under alfalfa cultivation and pasture/grass in Fish Lake Valley, in 2009 and 2019. Within the red boundary shown in Figure 3, we estimate that the amount of land used to grow alfalfa has increased by about 3290 acres. This increase is also evident from the figure itself. Grass/pasture has conversely decreased by ~1938 acres but practically all of the conversion was due to alfalfa cultivation. The amount of shrubland converted to grass/pasture over this time period is ~540 acres.  *Figure 3: Agricultural land in Fish Lake Valley in (a) 2009 and (b) 2019. Alfalfa is shown in pink and grass/pasture in light green. (National Croplands Database 2020)* b. Geothermal Energy As of 2023, there are active geothermal leases encompassing part or all of 47 sections of public land in the vicinity of the Fish Lake Valley wetlands, including leases held by Open Mountain Energy, Ormat, and a subsidiary of Fervo Energy (Fig. 4; NDOM 2022a).	The potential for the Proposed Action to effect groundwater, including at McNett Ranch was evaluated in the groundwater model prepared for the project. The model and analysis (Sections 4.14 and 4.16) found that there would be no impact to springs at McNett Ranch or to Tecopa birdbeak because they are located outside of the one-mile buffer of the 10-foot drawdown contour. Cumulative effects for past, present, and reasonably foreseeable future actions were analyzed within respective Cumulative Effects Study Areas (CESAs). CESAs for each resource are listed in Table 4-5. Table 4-6 lists each CESA boundary, and lists each of the past, present, and reasonably foreseeable future actions (RFFAs) within each CESA. Cumulative impacts from these identified past, present, and RFFAs are described for each resource in Section 4.20. Past, present, and RFFAs outside of the defined CESA boundaries were not included in the analysis. The cumulative effects analysis considers the impacts of past, present, and reasonably foreseeable mining and geothermal projects. The groundwater model included analysis of cumulative drawdown in Fish Lake Valley and found that the maximum differential drawdown between the Proposed Action and No Action Alternative 200 years after the end of quarrying would be less than 20 feet. While mining claims exist throughout the CESAs, they may or may not be developed in the future. Mining claims and fluid mineral lease information for projects without submitted applications has been added to the cumulative effects analysis. Impacts from future mining or geothermal projects would include analysis of impacts on surface and groundwater resources specific to each project.

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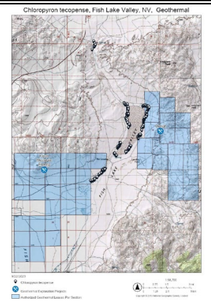

Figure 4: Map of Fish Lake Valley population area of the Tecopa bird's beak, with geothermal leases, by section, and geothermal exploration projects. Each highlighted section has at least one geothermal lease parcel in it. (Lease data per NDOM 2022a)

There are two active geothermal exploration projects in the area.

Open Mountain Energy conducted exploration beginning in summer of 2022, with ongoing activities observed in summer of 2023. These exploration activities occurred on previously existing well pads. This project was located in the vicinity of McNett Ranch, to the north of Hot Ditch Road. There is a second active geothermal exploration project in the vicinity of the Fish Lake Valley wetlands, and that is Ormat's Lone Mountain Geothermal Exploration Project. BLM approved this exploration project in March of 2023, and drilling commenced shortly thereafter. This project is located east of the Fish Lake Valley salt marsh, closer to Rhyolite Ridge. Drilling activities at this location continued into fall of 2023.

While geothermal exploration projects, through pump testing, may temporarily alter localized hydrologic conditions, it is geothermal production projects that will cause a cumulative impact to stress on the groundwater system. Geothermal energy production has a long track record of drying up thermal water features or otherwise altering hydrologic systems so as to change surface water availability. There is abundant peer-reviewed literature documenting this, and the U.S. Fish and Wildlife Service has previously recognized this phenomenon in its emergency listing of the Dixie Valley toad (87 FR 20336; April 7, 2022) and supporting documentation.

In general, geothermal energy production involves pumping hot water to the surface, and utilizing its heat or steam to spin a turbine and generate energy. In older geothermal energy systems, water would generally evaporate off as steam, resulting in a net loss to the groundwater aquifer. In more modern systems, called closed-loop binary cycle systems, the hot water is used to heat a thermal transfer medium, frequently pentane, which is then used to create energy. The hot water can then be reinjected into the aquifer, theoretically avoiding the problems with water loss from the older technologies. However, just because groundwater is not being directly consumed, does not mean there will not be changes to surface water features.

Myers (2017, p. 7-8), writing about the Dixie Meadows Geothermal Project but speaking about general concepts, describes some of the mechanisms through which geothermal energy production may affect groundwater flow and surface water discharge:

> Production wells [c]ould pull water from the natural discharges to the springs because pumping causes a drawdown in the potentiometric surface (a pressure gradient). Injection would create zones of pressure that would be higher than the background, as necessary to assure fluids flow into the fractures. Much of the injected flow would follow similar pathways as occurred before development because those pathways are most transmissive, but the limitation of the existing fractures would require higher pressure to force the fluid through the fractures. This would result in a substantial amount leaking off into other fractures or the bulk media, which would cause a net loss of flow. It is also possible that reinjection would not occur into the same fracture zones as the water removed for geothermal development. As described above, the most permeable fractures are few, and due to heterogeneity, there is no certainty that permeable fractures in the injection wells would intersect the permeable fractures in the collection wells. This would cause reinjected water to be lost to the circulation, especially if reinjection reaches fractures that are transverse to the general fracture trend found in the fault system. Therefore, there are two ways that recirculation could lose water – by leaking off into bulk media or by reinjection to fractures not connected to the collection wells.

Pumping from the geothermal reservoir would alter the aquifer's natural pressure gradients. Water would be pulled from natural discharge zones due to depressurization at the pumping sites while high pressure would be experienced in areas near injection wells. The reinjection wells would almost certainly not replace water in the same exact locales that it was pumped from. Permeable fractures in the injection wells would not necessarily intersect the permeable features.

Reinjected water might be lost to the circulation, particularly if reinjection reaches fractures transversal to the general fracture trend found in the fault system (Myers 2017, p. 8). Reinjection can also cause deformation and shattering of substrate, potentially offering new pathways for gas and water circulation and therein altering the hydrology of the adjacent surface features (Rissman et al. 2012, p. 232).

Numerous analyses of the environmental impacts of geothermal energy have cited changes to surface manifestations of geothermal waters as inherent in geothermal energy production technology (Kristmannsdottir & Armannsson 2003, p. 454-455; Bayer et al. 2015, p.374; Maochang 2001, p. 99). "Historical evidence shows that natural thermal features have been affected, often severely, during the development and initial production stages of most hightemperature geothermal systems," (Hunt 2001, p. 99). "Changes in surficial features and land elevations accompanying geothermal development should be viewed as the rule, rather than the exception," (Sorey 2000, p. 708).

There are many examples of geothermal energy projects in the Great Basin drying up or significantly altering nearby thermal springs. These include at Brady's Hot Springs, where thermal hot springs sufficient to host a resort and spa (at a minimum flow of 21 gallons per minute) completely dried up upon the drilling and pumping of geothermal wells (Lund 1982, p. 14). Upwards of 27 geysers at Beowawe, Nevada used to shoot thermal water 8 meters into the air (White 1998, p. 1), however upon commencement of geothermal drilling and pumping, the geysers ceased to flow, and

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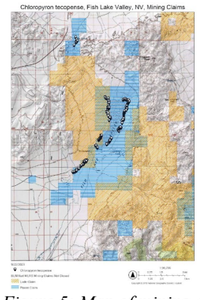
		groundwater levels fell 65 to 130 meters (*Id.*, p. 12). The geysers have never resumed their flow. Steamboat Hot Springs, near Reno, experienced a significant decline of surface discharge from geysers and springs including a reduction of thermal water discharge to Steamboat Creek by 40% (Sorey 2000, p. 707). Geothermal pumping in Long Valley Caldera near Mammoth, California has resulted in springs drying up and declines in pressure in the geothermal aquifer (Sorey 2000, p. 707). This has also resulted in a 30-40% reduction in thermal water content in the springs at Hot Creek Fish Hatchery (*Id.*). Notably, the literature shows impacts from the geothermal energy production in this area extending many kilometers away from the points of diversion (*Id.*). The ways geothermal energy may impact adjacent groundwater dependent ecosystems can be paradoxical. For instance, the North Dixie Valley geothermal project, a 56-megawatt project that has been in production since 1985, has experienced land subsidence as a result of their pumping (Sorey 2000, p. 708; Huntington et al. 2014, p. 5). In order to counteract land subsidence issues, the operator began pumping cold basin fill aquifer water and reinjecting it above the hot geothermal reservoir (Huntington et al. 2014, p. 5). This misguided mitigation effort may have contributed to the groundwater table decreasing some 2.5-3 meters from 2009-2011 (Albano et al. 2021, p. 79). Significant changes to vegetative composition in the area of the geothermal power plant were evident when pumping of the basin-fill aquifer began (*Id.*, p. 80). It is likely that some amount of the shallow groundwater in the Fish Lake Valley wetlands is sourced from geothermal aquifers. Eakin (1950, p. 29) reports temperatures of 77°F/25°C at the McNett Ranch flowing well, which is approximately 12°C above the average annual air temperature (Rush and Katzer 1973, p. 39). The Fish Lake Valley Hot Well is famous for its hot spring soaking activities, with water in the tub usually around 103°/40°C (*Personal observation, P. Donnelly*). Discharge from both of these springs helps feed the wetlands that sustain imperiled species like the Tecopa bird's beak. Another indicator of geothermal input is the chemistry of the water. The chemical character from the McNett Ranch flowing well is indicative of water supplied, at least partially, from sources related to volcanic activity (Eakin 1950, p. 31). Water from such sources is typically characterized by relatively high chloride, fluoride and boron content compared to normal groundwater. Partial analysis of the sampled spring in turn indicates lower but still relatively high chloride content, suggesting that it may represent water similar to that of the McNett flowing well mixed in with shallow groundwater of considerably lower dissolved solids (*Ibid*). It's clear that geothermal waters contribute at least some amount of flow to the shallow groundwater system. Further contribution could be made through interconnectivity between the deeper geothermal aquifer and the shallow alluvial aquifer. Widespread geothermal energy development in the Fish Lake Valley wetland area could result in a decrease in geothermal discharge from surface water sources like McNett Ranch and the Fish Lake Valley Hot Well, as well as a decrease in contribution from the geothermal aquifer to the shallow groundwater flow system. Combined with drawdown from the Rhyolite Ridge Mine, this could substantially alter the aquifer dynamics in the area, potentially causing drawdown within the Fish Lake Valley wetlands. c. <u>Mineral Exploration and Development</u> The DEIS inadequately considered the cumulative impacts of Mineral exploration and development within the CESA. Numerous mining interests are operating and developing prospects in Fish Lake Valley. Figure 5 depicts the hundreds or likely thousands of mining claims across the Fish Lake Valley wetlands. Blue hashing represents placer claims, orange represents lode claims. As can be seen, essentially the entirety of the Tecopa bird's beak's habitat is within mining claims. Data for this map was obtained from BLM's Mineral & Land Records System (BLM 2023).  *Figure 5: Map of mining claims in the Fish Lake Valley population area of Tecopa bird's beak. (Data per BLM 2023)* Lithium Corporation claims to hold 11,360 acres of mining claims in Fish Lake Valley, targeting brines underneath the playa (Lithium Corporation 2023). These claims are "covering the most prospective portions of the playa," (Lithium Corporation 2019). Lithium Corporation announced they were beginning exploration activities on the playa on September 7, 2023, mobilizing a reverse circulation drill to drill what will eventually be 1200 foot deep boreholes (Junior Mining Network 2023). Exploration activity was observed on the eastern edge of the playa on September 14, 2023. Acme Lithium Inc. claims to hold 4,139 acres of mining claims in Fish Lake Valley (Acme Lithium 2023). Their claims are lode claims, meaning they would be targeting lithium claystones for an open-pit mine. They have conducted geophysical surveys and surface sampling (*Id.*). Nevada Alaska Mining Company holds a significant number of claims in the area, but the exact acreage or number of claims is unknown. Any of these claims or active exploration projects could become a full-fledged mineral development project at any time. Should development ensure, those with placer claims are likely to become brine extraction projects; those with lode claims are likely to become open-pit mines. Either project type can have substantial impacts to the groundwater system and physical and human	

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		environments of the Fish Lake Valley area. Without reciting them here, it's clear that appreciable new groundwater pumping for mining in Fish Lake Valley would have compounding effects in concert with the anticipated impacts of the Rhyolite Ridge Mine, and that such projects needs to be considered in the cumulative impacts analysis.	
108 and 183	108.28 and 183.27	**IV. THE PROJECT WOULD VIOLATE WESTERN SHOSHONE TREATY RIGHTS.** Under the U.S. Constitution, treaties between the United States and another sovereign government are the "supreme law of the land," on equal footing with federal statutes and the Constitution itself. U.S. Const., Art. VI. Federal courts interpret treaties between Native American tribes and the U.S. government as they were understood by the tribes who negotiated them. *Tulee v. Washington*, 315 U.S. 681, 684-85 (1942). Courts must interpret treaties liberally and resolve ambiguities in favor of Native Americans. *Seneca Nation of Indians v. New York*, 382 F.3d 245, 259 (2d Cir. 2004). Courts should not construe treaties to the prejudice of the tribes, *Antoine v. Washington*, 420 U.S. 194, 199 (1975), *Squire v. Capoeman*, 351 U.S. 1, 7 (1956), and should rule against tribes only when the clear language of the treaty warrants such a ruling. *Or. Dep't of Fish and Wildlife v. Klamath Indian Tribe*, 473 U.S. 753, 774 (1985). In addition, the "reserved rights" doctrine provides that whatever rights were not ceded in a treaty or divested by statute are retained as Native American rights. *Winters v. United States*, 207 U.S. 564, 576-77 (1908); *United States v. Winans*, 198 U.S. 371, 381-82 (1905); *Worcester v. Georgia*, 31 U.S. 515, 552-53 (1832). The reserved rights doctrine can therefore impose a servitude—a restriction on land use favoring the tribe—on the federal lands to which the rights apply. *Winans*, 198 U.S. 371. In *Winans*, for example, the Court held that fishing rights were part of a larger set of rights the Yakima Tribe of Washington retained. *United States v. Winans*, 198 U.S. 371, 380 (1905). The Treaty was not "a grant of rights to the Indians, but a grant of right from them." *Id.* at 381. The Western Shoshone have occupied their land "[s]ince time immemorial." *W. Shoshone Nat'l Council v. United States*, 73 Fed. Cl. 59, 61 (2006). In 1863, seeking to gain uncontested access to Shoshone lands the United States entered into a series of five treaties known as the Doty Treaties, including the Treaty of Ruby Valley. *Id.* The treaty gave the United States only non-possessory rights in Shoshone lands; specifically, it granted "routes of travel . . . military posts . . . telegraph and overland stage lines . . . construction of a railway . . . [and] that the Shoshone country may be explored and prospected for gold and silver, or other minerals." Thus, according to the terms of the treaty, the Shoshone ceded no land. Although the U.S. Supreme Court has ruled that the Western Shoshone subsequently "relinquished" their land claims, *United States v. Dann*, 470 U.S. 39 (1985); *Shoshone Nat'l Council v. United States*, 73 Fed. Cl. 59 (2006), this outcome has been disputed under principles of international law. In 2002 the Inter-American Commission on Human Rights concluded that the United States had violated the human rights of the Western Shoshone under the American Declaration of the Rights and Duties of Man, by denying the right to due process (Article XVIII), the right to equality before the law (Article II), the right to a fair trial (Article XVIII) and the right to property (Article XVIII), in connection with determination and protection of Western Shoshone property rights in their ancestral lands. Mary and Carrie Dann, Case No. 11.140, Inter-Am. C.H.R., Report No. 75/02, OEA/Ser.L./V/II.117, doc. 1 rev. 1 (2002). And in 2006, the U.N. Commission for the Elimination of Racial Discrimination urged the United States to "[d]esist from all activities planned and/or conducted on the ancestral lands of Western Shoshone or in relation to their natural resources, which are being carried out without consultation with and despite protests of the Western Shoshone peoples." U.N. Comm. for the Elimination of Racial Discrimination [CERD], Early Warning and Urgent Action Procedure, Decision 1 (68), U.N. Doc. CERD/ C/USA/DEC/1 (Apr. 11, 2006).	Consultation with Tribes has been conducted in accordance with applicable laws and regulations. The EIS describes ongoing consultation with the Tribes in Sections 4.8 and 5.2. Several Indian Claims Commission and federal court cases have addressed alleged taking of land including territory described in the Treaty of Ruby Valley. Judgement on these cases found that a taking occurred and aboriginal title was extinguished. In response to these cases, Congress passed the Western Shoshone Claims Distribution Act to provide for distribution of the settlement funds.
108 and 183	108.29 and 183.28	**V. THE PROJECT WOULD VIOLATE THE FEDERAL GOVERNMENT'S RESPONSIBILITIES TOWARD INDIGENOUS PEOPLES AND SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT.** **A.** Tribal Consultation As sovereign nations, tribes have a role and a relationship with the federal government that makes them distinct from other stakeholder groups throughout the NEPA process, as the "[f1ederal government and Indian tribal relationships reflect the political and historical development of the Nation." BLM Manual § 1780, Tribal Relations (Dec. 15, 2016). The federal trust responsibility requires the BLM to engage in government-to-government consultation, and this mandate is reflected in the BLM's own governing documents. (*Id.*) BLM's Tribal Relations Manual provides that "[t]he BLM conducts government-to-government consultation with Indian tribes to improve collaborative and informed Federal decision making." (*Id.*) The handbook also recognizes that "Indian tribes are knowledgeable sources and experts concerning their own cultures," and that "[t]hey can provide unique insight and explanation of tribal history and land uses. When provided with such information, the BLM will take this into account when making decisions related to the identification, evaluation, treatment, and management of natural and heritage resources." (*Id.*) This consultation responsibility is also affirmed by Executive Order No.13175 (Consultation and Coordination with Indian Tribal Governments dated November 6, 2000, which requires all agencies, bureaus, and offices within the Federal Government to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications). In addition, Presidential Memorandum for the Heads of Executive Departments and Agencies on Tribal Consultation dated November 5, 2009 (74 Fed. Reg. 57881), Presidential Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships dated January 26, 2021 (86 Fed. Reg. 7491), and Joint Secretarial Order on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters No. 3403 dated November 15, 2021 serve to strengthen and supplement Executive Order No. 13175. Collectively, these policies require that management decisions fulfill the "United States' unique trust obligation to federally recognized Indian Tribes and their citizens" (DOI 2021). The U.N. Declaration on the Rights of Indigenous Peoples (UNDRIP), to which the United States is a signatory, requires States to consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them (article 19). States must have consent as the objective of consultation before any of the following actions are taken: The adoption of legislation or administrative policies that affect indigenous peoples (article 19); The undertaking of projects that affect indigenous peoples' rights to land, territory and resources, including mining and other utilization or exploitation of resources (article 32). In certain circumstances, there is an obligation to obtain the consent of the indigenous peoples concerned, beyond the general obligation to have consent as the objective of consultations. For example, the Declaration explicitly requires States to obtain consent of indigenous peoples in cases of: The relocation of indigenous peoples from their lands or territories (article 10); The storage or disposal of hazardous materials on indigenous peoples' lands or territories (article 29). Finally, pursuant to Section 106 of the National Historic Preservation Act, federal agencies are required to consult with any Tribe that attaches religious and cultural significance to historic properties that may be affected by an undertaking. 36 C.F.R. § 800.2(c)(2)(ii). At a minimum, the consultation shall provide Tribes a reasonable opportunity to: (1) identify their concerns about historic properties; (2) advise on identification and evaluation of historic properties, including those of traditional religious and cultural importance; (3) articulate their views on the undertaking's effects on such properties; and (4) participate in the resolution of adverse effects. 36 C.F.R. § 800.1(c). The Section 106 consultation process must respect Tribal sovereignty and represent the government-to-government relationship between Tribes and the federal government. 36 C.F.R. § 800.2(c)(2)(ii).	The Project is consistent with NHPA and applicable Executive Orders (EOs). Section 4.8 of the EIS contains the analysis as related to Native American Traditional Values. Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0 of the Final EIS. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts. While the United States government supports UNDRIP, the declaration is not legally binding but is an inspirational international instrument that includes a broad range of provisions regarding the relationship between nations, organizations and indigenous peoples and individuals. The DOE loan program has no effect on environmental impacts associated with the Proposed Action and alternatives and is not considered in the EIS.

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		Here, by the BLM's own admission, the planning process for the Rhyolite Ridge project has been carried out at an unusually rushed timeline. This has precluded meaningful government-togovernment consultation with affected Tribal communities. BLM's arbitrarily compressed timeline is insufficient for affected Tribes to become fully educated about the project, identify concerns and potential impacts, and engage in consultation with the BLM such that those concerns could inform the DEIS prior to publication. Tribes hold certain values and knowledge regarding the Project Site that should be considered and incorporated into the decision-making process, as is required by the BLM's own governing documents. Unfortunately, BLM has failed to adhere to its Tribal consultation duties due to its insistence on a rushed and ultimately unrealistic permitting schedule. **B. Due Diligence Regarding DOE Financing** In January of 2023 the DOE's Advanced Technology Vehicles Manufacturing (ATVM) loan program announced a conditional agreement to provide a loan of $700 million to Ioneer for the development of the Rhyolite Ridge Mine. The DOE reports that the loan comes with due diligence including environmental review, finances, and technical due diligence. DOE as a cooperating agency should conduct Tribal consultation as part of their due diligence process. This mine would destroy Cave Springs, a nearby sacred site, and impact other cultural land values such as potentially denying water to pinyon trees. Pine nuts are an essential Indigenous food source and denying water to a local recovering Bighorn Sheep population. The project is sited with Western Shoshone treaty lands. DOE was one of 17 agencies at Biden's second Tribal Nations Summit in November 2022 to approve new best practices of integrating treaty rights into decision making (United States 2022). Accordingly, DOE should incorporate Western Shoshone Treaty Rights as enshrined in the Treaty of Ruby Valley 1863 into decision making relating to due diligence. To meet expected due diligence standards the DOE should follow the UN Guiding Principles (UNGP's) on due diligence. The inclusion of Indigenous Human Rights in due diligence is required to meet the UNGPs and OECD guidance which say companies should commit to respecting Human Rights. In the context of Rhyolite Ridge, it is within the Western Shoshone treaty lands detailed in the Treaty of Ruby Valley 1863. The United Nations CERD committee found in 2006 that Western Shoshone treaty rights and thus human rights were being violated by the US federal government. This was upheld in 2022 through inclusion in the concluding observations of CERD's August convening. DOE should follow these international due diligence standards, and communicate through due diligence how the violation of treaty rights will be considered and mitigated through this due diligence process. Additional due diligence requirements to meet the standards set in UNGP and OECD are that the process is ongoing, and that there is public transparency. Finally, should the current Plan of Operations, dated May 2020, be found to provide undue risks to the Tiehm's Buckwheat or otherwise require updates to further avoid the endangered species, will DOE revisit due diligence in respect to the new plan or will the current conditional agreement carry over without additional approvals?	
108 and 183	108.30 and 183.29	**VI. CONCLUSION** Thank you for the opportunity to comment on this important project. Please include all of the undersigned groups and representatives in all correspondences and public notices, etc. These comments fully incorporate the following appendices: **Appendix A:** Naomi S. Fraga PhD, Assessment of the Buckwheat Protection Plan for the Draft Environmental Impact Statement of the Rhyolite Ridge Lithium-Boron Mine, Esmeralda County, Nevada (May 30, 2024). **Appendix B:** Steven H. Emerman, Assessment of the Operating and Post-Closure Stability of the Open Pit at the Proposed Ioneer Rhyolite Ridge Lithium-Boron Mine, Esmeralda County, Southwestern Nevada (May 29, 2024). **Appendix C:** Michael C. McCarthy, PhD, Review of Dust Deposition and Suppression Impacts on Tiehm's Buckwheat from the Rhyolite Ridge Lithium-Boron Project (May 31, 2024). **Appendix D:** Tom Myers, PhD, Technical Memorandum: Review of Rhyolite Ridge Draft Environmental Impact Statement (June 1, 2024). **Appendix E:** Tom Myers, PhD, Technical Memorandum: Review of Rhyolite Ridge Hydrogeology and Quarry Lake (April 23, 2021). Sincerely, */s/ Patrick Donnelly* Patrick Donnelly Great Basin Director Center for Biological Diversity pdonnelly@biologicaldiversity.org */s/ John Hadder* John Hadder Director Great Basin Resource Watch P.O. Box 207 Reno, NV 89504 john@gbrw.org */s/ Fermina Stevens* Fermina Stevens	Comment noted.

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		Western Shoshone Defense Project defenseprojectwesternshoshone@gmail.com */s/ Ian Bigley* Ian Bigley Earthworks ibigley@earthworksaction.org */s/ Linda Stout* Linda Stout Conservation Committee Chair lindasuestout@icloud.com Sierra Club Toiyabe Chapter */s/ Kevin Emmerich* Kevin Emmerich Basin and Range Watch atomicquailranch@gmail.com */s/ Laura Cunningham* Laura Cunningham Western Watersheds Project PO Box 70 Beatty NV 89003 lcunningham@westernwatersheds.org	
108 and 183	108.31 and 183.30	**References** Acme Lithium, Inc. 2023. Fish Lake Valley Claims: Project Highlights, available at: https://acmelithium.com/projects Albano, C.M. et al. 2021. Baseline Assessment of Groundwater Dependent Vegetation in relation to Climate and Groundwater Levels in select Hydrographic Basins of Nevada Pueblo, Continental Lake, Mud Meadow, Dixie, Railroad-North, Steptoe, Goshute, and Independence Valleys. Division of Hydrologic Sciences, Desert Research Institute. Publication No. 41283. ANCOLD (Australian National Committee on Large Dams), 2012. Guidelines on tailings dams— Planning, design, construction, operation and closure, 84 p. Available online at: https://www.resolutionmineeis.us/sites/default/files/references/ancold-2012.pdf Bayer, P. et al. 2015. Geothermal Power. In: Green Energy Choices: The Benefits, Risks, and Trade-Offs of Low-Carbon Technologies for Electricity Production. BLM. 2008. Special Status Species Handbook § 6840. BLM. 2014. Haile Gold Mine Final EIS Chapter 4. BLM. 2016. BLM Manual § 1780 – Tribal Relations. BLM. 2018. Final Environmental Impact Statement, Donlin Gold Project, Chapter 3.6: Groundwater Hydrology. BLM. 2019. Copper Flat Copper Mine Final EIS. Vol. 1. BLM. 2022. Decision and Letter to Control Technology, Inc. re: N-101255 (Dec. 13, 2022). BLM. 2023. Email from Scott Distel, BLM, to Doug Furtado, BLM re: Rhyolite Ridge permitting schedule (December 21, 2023). BLM. 2023. Lone Mountain and Pearl Projects Environmental Assessment. DOI-BLM-NV-B020-2022-0038-EA. BLM. 2024. Email from Doug Furtado, BLM to Scott Lake, Center for Biological Diversity re: Rhyolite Ridge Project (May 20, 2024). BLM. 2024. Email from Scott Distel, BLM to Patrick Donnelly, Center for Biological Diversity, re: GIS information for Rhyolite Ridge (May 20, 2024). Center for Biological Diversity. 2021. Petition to List The Fish Lake Valley Tui Chub (*Siphateles bicolor* ssp. 4) as a Threatened Or Endangered Species Under The Endangered Species Act (March 9, 2021). Center for Biological Diversity. 2023. Petition to the U.S. Fish And Wildlife Service to List The Tecopa Bird's Beak (*Chloropyron Tecopense*) Under The Endangered Species Act as a Threatened Or Endangered Species And To Concurrently Designate Critical Habitat. Coates, P.S., et al. 2023. Geothermal energy production adversely affects a sensitive indicator species within sagebrush ecosystems in western North America. Bio. Cons. 280. Coates, P.S., Ricca, M.A., Prochazka, B.G., O'Neil, S,T., Severson, J.P., Mathews, S.R., Espinosa, S., Gardner, S., Lisius, S., and Delehanty, D.J., 2020, Population and habitat analyses for greater sage-grouse (Centrocercus urophasianus) in the bi-state distinct population segment—2018 update: U.S. Geological Survey Open-File Report 2019–1149, 122 p., https://doi.org/10.3133/ofr20191149. Eakin, T.E. 1950. Preliminary Report on Ground Water in Fish Lake Valley, Nevada and California. State of Nevada, Office of the State Engineer, Water Resources Bulletin No. 11. Esmeralda County, NV. 2022. Esmeralda County Water Resource Plan. Executive Order No.13175: Consultation and Coordination with Indian Tribal Governments (November 6, 2000), available at: https://www.govinfo.gov/content/pkg/FR-2000-11-09/pdf/00-29003.pdf Harju, S.M. et al. 2010. Thresholds and Time Lags in Effects of Energy Development on Greater Sage-Grouse Populations. Journal of Wildlife Management 74(3):437–448; 2010; DOI: 10.2193/2008-289 Henderson, M. and K.F. Morrison, 2022. Chapter 10—Stage-gate process: In Morrison, K.F. (Ed.), Tailings management handbook—A life-cycle approach (pp. 143-152), Society for Mining, Metallurgy and Exploration, Englewood, Colorado, 1004 p. Hunt, T.M. 2000. Five Lectures on Environmental Effects of Geothermal Utilization. The United Nations University Geothermal Training Program, Report 2000, No. 1. Huntington, J.M., Garcia, C.A., and Rosen, M.R., 2014, Hydrogeologic framework and occurrence, movement, and chemical characterization of groundwater in Dixie Valley, west-central Nevada: U.S. Geological Survey Scientific Investigations Report 2014–5152, 60 p., http://dx.doi.org/10.3133/sir20145152.	References noted.

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108 and 183	108.31 and 183.30	**Appendix A** Naomi S. Fraga PhD, Assessment of the Buckwheat Protection Plan for the Draft Environmental Impact Statement of the Rhyolite Ridge Lithium-Boron Mine, Esmeralda County, Nevada (May 30, 2024). Assessment of the Buckwheat Protection Plan for the Draft Environmental Impact Statement of the Rhyolite Ridge Lithium-Boron Mine, Esmeralda County, Nevada. Prepared by: Naomi S. Fraga PhD, Director of Conservation Programs, California Botanic Garden. 1500 North College Avenue, Claremont, CA 91711 nfraga@calbg.org Prepared for the Center for Biological Diversity. Submitted: May 30, 2024	Comment noted.

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108 and 183	108.32 and 183.31	**Executive Summary** *Eriogonum tiehmii* (Tiehm's buckwheat) is a low-growing, mat-forming perennial in the Polygonaceae (buckwheat family). Research has identified it as a soil specialist, indicating that plants are specifically adapted to their native soil type (McClinton et al. 2022a p 19). On December 16, 2022, the U.S. Fish and Wildlife Service (Service) listed Tiehm's buckwheat as endangered under the U.S. Endangered Species Act (ESA). Concurrently, the Service designated 910 acres of critical habitat, encompassing its entire range, as well as a 500 meter buffer surrounding the population (USFWS 2022b). The primary threat identified to Tiehm's buckwheat is the curtailment of its habitat and range from mineral exploration and development due to the Rhyolite Ridge Lithium-Boron Project (USFWS 2022b p. 77368). Tiehm's buckwheat's entire range is located within the proposed Rhyolite Ridge Lithium-Boron Project boundary, including 100% of the 910 acres that are designated as critical habitat (BLM 2024a Figure 2-11). Due to the extremely narrow global range of Tiehm's buckwheat and the scale of the proposed project, the agency preferred alternative, North and South OSF Alternative, described in the Draft Environmental Impact Statement (DEIS), continues to pose existential threats to the species. These include significantly altering subpopulations connectivity, habitat integrity, pollinator communities, and other ecosystem processes. The direct and indirect impacts of mining are of such magnitude, and taken in combination with other documented threats (e.g. competition with invasive species, dust deposition, impact to pollinator communities and co-occurring native plant species), that the Project leaves Tiehm's buckwheat in danger of extinction throughout all of its range. This report found the following: 1. Avoidance measures do not sufficiently protect Tiehm's buckwheat and critical habitat due to its highly specific habitat requirements and narrow range. 2. Mining restoration plans such as the pollinator habitat reclamation and invasive species treatment plans are not developed or inadequate and cannot sufficiently mitigate proposed impacts to Tiehm's buckwheat. 3. The Buckwheat Protection Plan does not rely on the best available science. 4. The North and South OSF Alternative poses an existential threat to the species.	The Buckwheat Protection Plans referenced in the Draft EIS were dated July 2022 for the Proposed Action and December 2023 for the North and South OSF Alternative. The Buckwheat Protection Plan was updated in July 2024 for the North and South OSF Alternative and incorporated into the Final EIS. 1) The July 2024 Buckwheat Protection Plan was revised in coordination with the BLM and USFWS and includes applicant committed conservation measures including: • APCM-1: Avoidance of Tiehm's Buckwheat and Designated Critical Habitat. • APCM-2: Geotechnical Design of the Quarry Walls to Provide Appropriate Margins of Safety. • APCM-3: Geotechnical Monitoring. • APCM-4: Establish Fencing and Signage to Protect Tiehm's Buckwheat and Critical Habitat Designated for Tiehm's Buckwheat. • APCM-5: Restrict Public Access to the County Road. • APCM-6: Pollinator Habitat Reclamation within Critical Habitat. • APCM-7: Control of Nonnative, Invasive, and Noxious Species. • APCM-8: Light Management to Minimize Adverse Impacts to Pollinators. • APCM-9: Dust Control and Monitoring of Fugitive Dust Emissions within Tiehm's Buckwheat Subpopulations. • APCM-10: Remove Fencing and Debris from the three UNR Transplant Experimental Sites that are Located within Tiehm's Buckwheat Critical Habitat. • APCM-11: Utilize Blasting Mats When any Blasting is to Occur in Proximate to Tiehm's Buckwheat Subpopulations and Trims Blasting Techniques and Charge Delays. • APCM-12: Demographic and Recruitment Monitoring. • APCM-13: Develop an ERTI-Specific Environmental Awareness Program for Project Employees, Contractors, and Guests. • APCM-14: Monitor Stormwater Control Measures for Project Activities Located in or with the Potential to Discharge. • APCM-15: Critical Habitat Subpopulation Monitoring. • APCM-16: Monitor Insect Visitor and Pollinator Diversity and Abundance. • APCM-17: Monitor Noise Proximate to Tiehm's Buckwheat Subpopulations. • APCM-18: Develop an Ex-Situ Conservation Program in Cooperation with the USFWS and BLM.

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			2) APCM-6: Pollinator Habitat Reclamation within Critical Habitat was included in the July 2024 Buckwheat Protection Plan, which outlines the planning and design, implementation, and performance criteria, monitoring, and reporting for pollinator habitat reclamation. 3) The July 2024 Buckwheat Protection Plan was revised in coordination with the BLM and USFWS, including incorporating recent studies and reports (i.e. best available science). 4) Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS for the North and South OSF Alternative.
108 and 183	108.33 and 183.32	**Introduction** *Eriogonum tiehmii* (Tiehm's buckwheat) is a low-growing, mat-forming perennial in the Polygonaceae (buckwheat family). It blooms from May to June with cream to pale yellow flower clusters that age red as the seeds develop (Fig. 1). The species is known from one global population in the Silver Peak Range in Esmeralda County, NV, which is composed of eight subpopulations that occupy just 10 acres, across 3 square miles (USFWS 2022a). Tiehm's buckwheat occurs entirely on federal public lands managed by the Bureau of Land Management (BLM) in the Tonopah Field Office of the Battle Mountain District (BLM 2024a). It has specific habitat requirements, occurring in relatively sparsely vegetated, light colored clay soils that are derived from interbedded claystones, shales, tuffaceous sandstones, and limestones (Morefield 1995). Research has identified it as a soil specialist, indicating that plants are specifically adapted to their native soil type (McClinton et al. 2022a p 19). On December 16, 2022, the U.S. Fish and Wildlife Service (Service) listed Tiehm's buckwheat as endangered under the U.S. Endangered Species Act. Concurrently, the Service designated 910 acres of critical habitat, encompassing its entire range, as well as a 500 meter buffer surrounding the population (USFWS 2022b). The primary threat identified to Tiehm's buckwheat is the curtailment of its habitat and range from mineral exploration and development due to the Rhyolite Ridge Lithium-Boron Project (USFWS 2022b p. 77368). Other threats identified as affecting Tiehm's buckwheat and its habitat include road development and off-highway vehicle (OHV) use, livestock grazing, non-native and invasive species, herbivory, and climate change (USFWS 2022b p.77368). The activities proposed for the Rhyolite Ridge Lithium-Boron Project (Project) are linked to three of the six major threats identified at the time of listing, including mining exploration and development, road development, and the spread of non-native, invasive plant species (BLM 2024b; USFWS 2022a). As such, the Project represents the single greatest threat to the species. Tiehm's buckwheat's entire range is located within the proposed Project boundary, including 100% of the 910 acres that are designated as critical habitat (BLM 2024a Figure 2-11). The preferred alternative (North and South OSF Alternative) described in the Draft Environmental Impact Report (DEIS) outlines a large, industrial-scale mine that would create 2,271 acres of total surface disturbance on public lands, including a 960 ft deep open pit that spans more than 200 acres, more than 1,300 acres of mine waste dump piles that are stacked over 250 ft high, 106 acres of access and haul roads, and over 200 acres of industrial facilities such as a sulfuric acid plant, septic leach fields, and explosive storage area (BLM 2024a p. 44). The over 200 acre open pit would be located just 44 ft from occupied habitat and 114 ft away from the largest known subpopulation (Fraga 2021a; BLM 2024b Attachment A, Tiehm's Buckwheat Population Count Status Report p. 2; Table 1). Due to the magnitude and scale of the proposed Project and its geographic scope that encompasses the global range of Tiehm's buckwheat, it remains an existential threat to the species and its habitat. This document provides comments on the preferred North and South OSF Alternative and "conservation" measures proposed by Ioneer in the "Buckwheat Protection Plan" (Plan) and its associated supporting attachments.  **Fig. 1.** Tiehm's buckwheat in flower. Photo taken on May 23, 2023.	Comment noted.
108 and 183	108.34 and 183.33	**Avoidance Measures Do Not Sufficiently Protect Tiehm's Buckwheat and Critical Habitat.** The Plan identifies direct avoidance of individual plants as its primary protective measure (APCM1 in BLM 2024b p. 17), however "direct avoidance" fails to mitigate the magnitude, scale, and duration of a 2,271 acre industrial-scale mining project that would encompasses the entire global range of the species (Fig. 2). The numerous proposed activities would occur within and adjacent to occupied and critical habitat and would have a cumulative effect across the 23 years of proposed mine life (BLM 2024a p. 2-1). This magnitude of impact would fundamentally alter habitat integrity, pollination, and dispersal. It would also exacerbate the effects of limited habitat availability (e.g. suitable soil) and the species' inherently poor dispersal capabilities (USFWS 2022a p. 50), ultimately affecting its long-term survival.	The EIS contains detailed effects analysis for Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER. The effects analysis includes impacts from disturbance in critical habitat, dust, and impacts to pollinators. Different avoidance areas were considered as alternatives and are discussed in detail in the SIR.

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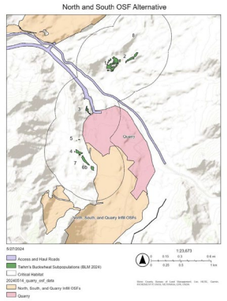
		Habitat-altering activities would include a 960 ft deep mining pit located just 44 ft and 114 ft from subpopulations 3 and 6 respectively (BLM 2024b p. 46). Construction of new haul and access roads would be approximately 50 m from subpopulation 3 and less than 300 m from subpopulation 1 which is the second largest subpopulation for the species (USFWS 2022a; Fraga 2021a; BLM 2024b; Table 1). The haul and access roads would transport 150-ton trucks traveling 35 mph, up to 1050 times daily (BLM 2024b p. 164). This scale of disturbance would not only impact individual plants from the deposition of dust (see more below in Impacts from Dust Deposition), but it would also contribute to further habitat fragmentation and degradation, compounding the isolation of small subpopulations and increasing the likelihood that they will be threatened more strongly by stochastic processes in the future (Matties et al. 2004 p. 481). The Project would permanently destroy 197 acres or 22% of the 910 acres of designated critical habitat deemed essential for Tiehm's buckwheat conservation (BLM 2024b p. 18; USFWS 2022a). In particular it would have a major impact on the southern subpopulations (3, 4, 5, 6, 7) which together constitute 60-68% of the global population and approximately 4 of the almost 10 acres of occupied habitat (Table 1, USFWS 2022a p. 23). Subpopulation 6 would be only 114 away from the 960 ft deep mining pit. Subpopulation 6 alone constitutes a significant portion of the species range with 7,784-19,871 individuals, or 45-50% of the known global population occurring there (Fraga 2021a p. 6; USFWS 2024b p. 23, Table 1). **Table 1**. Summary of Tiehm's buckwheat subpopulation estimates (aUSFWSa 2022, bFraga 2021a, cBLM 2024b Appendix A). | Subpopulation | Area (acres)[a] | 2019[a] | 2021[b] | 2023[c] | |---|---|---|---|---| | 1 | 4.81 | 9,240 | 4,420 | 5,600 | | 2 | 1.56 | 4,541 | 1,719 | 4,190 | | 3 | 0.63 | 1,860 | 1,165 | 1,943 | | 4 | 1.04 | 8,159 | 649 | 1,888 | | 5 | 0.04 | 199 | 3 | 31 | | 6 | 1.88 | 19,871 | 7,787 | 7,784 | | 7 | 0.00 | 50 | 14 | 3,476 | | 8 | 1 plant | 1 | NA | 4 | | **Total** | **9.96** | **43,921** | **15,757** | **24,912** | | *southern subpopulation total* | *4* | *30,139* | *9,618* | *13,122* | | *southern subpopulation percent of total* | *56.07%* | *68.62%* | *61.04%* | *60.70%* |  **Fig. 2**. Map of North and South OSF Alternative showing Tiehm's buckwheat subpopulations and critical habitat relative to the North and South OSF Alternative presented in the DEIS. *Single-site endemics are inherently vulnerable to extinction* As a single-site endemic, Tiehm's buckwheat occupies only 10 acres globally (Table 1), making it an extremely narrow range species that is inherently vulnerable to extinction (Chichorro et al. 2019 p. 225; Fahrig, 2001, p. 65; Knapp et al. 2021, p. 362; Purvis et al. 2000 p. 1949, Staude et al. 2019, p. 21). Extinction risk and rarity have been extensively studied (Chichorro et al. 2019; Enquist et al. 2019; Pimm et al. 2014; Knapp et al. 2020; Matties et al. 2004; Purvis et al. 2000; Rabinowitz 1981; Staude et al. 2019) and are frequently examined in relation to a species geographic range size, habitat specificity, and population size (Rabinowitz 1981). Species with both narrow geographic ranges and narrow habitat specificity are considered among the most vulnerable to extinction risk (Chichorro et al. 2019 p. 225, Rabinowitz 1981 p. 210). Range size is related to dispersal ability and determines a species potential to escape pressures and occupy new areas, whereas habitat specificity relates to a species ability to adapt to habitat modification or loss (Chichorro et al. 2019 p. 225). Studies have found that geographic range size may play an outsized role in determining extinction risk, suggesting that reductions in geographic range size and available habitat can lead to pronounced increases in extinction risk even if local populations are relatively large (Chichorro et al. 2019 p. 225; Staude et al. 2019 p. 21). Another study found that of the 65 extinctions documented in the United States and Canada, 42 of them (or 64%), were single-site endemics, with the majority of known extinctions resulting from habitat loss (Knapp et al. 2021, p. 365). This highlights that narrow-range species subject to habitat-altering modifications such as development, invasion of non-native species, energy production and mining and other major threats, are at extreme risk of endangerment and extinction (Lughada et al. 2020 p. 397). Tiehm's buckwheat has already experienced habitat loss and degradation due to historic and recent mining exploration activities (USFWS 2022a). The Project's exploration activities altered 15 acres of native habitat, or 0.7% of the land disturbance that is proposed in the preferred alternative (BLM 2024a 4-83). Authorized mining exploration activities included road grading, test-well drilling, borehole drilling, and pit-digging. The 15 acres of existing exploration disturbance has had a profound impact on Tiehm's buckwheat subpopulations and has led to degradation of critical habitat including the loss of native vegetation cover, proliferation of invasive species, altered soil structure, and the creation of pathways that resulted in OHV incursion into occupied habitat (Fraga 2021a, p. 7; USFWS 2022a p. 30).	The July 2024 Buckwheat Protection Plan was revised in coordination with the BLM and USFWS and includes applicant committed conservation measures including: • APCM-1: Avoidance of Tiehm's Buckwheat and Designated Critical Habitat. • APCM-2: Geotechnical Design of the Quarry Walls to Provide Appropriate Margins of Safety. • APCM-3: Geotechnical Monitoring. • APCM-4: Establish Fencing and Signage to Protect Tiehm's Buckwheat and Critical Habitat Designated for Tiehm's Buckwheat. • APCM-5: Restrict Public Access to the County Road. • APCM-6: Pollinator Habitat Reclamation within Critical Habitat. • APCM-7: Control of Nonnative, Invasive, and Noxious Species. • APCM-8: Light Management to Minimize Adverse Impacts to Pollinators. • APCM-9: Dust Control and Monitoring of Fugitive Dust Emissions within Tiehm's Buckwheat Subpopulations. • APCM-10: Remove Fencing and Debris from the three UNR Transplant Experimental Sites that are Located within Tiehm's Buckwheat Critical Habitat. • APCM-11: Utilize Blasting Mats When any Blasting is to Occur in Proximate to Tiehm's Buckwheat Subpopulations and Trims Blasting Techniques and Charge Delays. • APCM-12: Demographic and Recruitment Monitoring. • APCM-13: Develop an ERTI-Specific Environmental Awareness Program for Project Employees, Contractors, and Guests. • APCM-14: Monitor Stormwater Control Measures for Project Activities Located in or with the Potential to Discharge. • APCM-15: Critical Habitat Subpopulation Monitoring. • APCM-16: Monitor Insect Visitor and Pollinator Diversity and Abundance. • APCM-17: Monitor Noise Proximate to Tiehm's Buckwheat Subpopulations. • APCM-18: Develop an Ex-Situ Conservation Program in Cooperation with the USFWS and BLM.

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Figure 3. Disturbances from exploration activities conducted by Ioneer in 2019 (top, A.) and 2024 (bottom, C.). Saltlover was not yet established in 2019 (C), but became established subsequent to exploration activities (A.). The exploration disturbance served as a vector for the spread of saltlover into occupied habitat (B & D). Photos taken at the north edge of subpopulation 6B looking northeast.

Efforts to re-establish plant cover and mitigate impacts from mining exploration have not been effective to date, leading to continued degradation of critical habitat including the integrity of pollinator communities and native vegetation. For example, the exploration activities near subpopulation 6B created a zone of disturbance that has facilitated the spread of *Halogeton glomeratus* (salt lover) into occupied habitat (Fig. 3, Fraga 2021b). The North and South OSF Alternative outlined in the DEIS would be 151 times larger than the 15 acres of existing disturbance, and operations would be more than 20 years longer in duration (23 years of total mine life). The magnitude of the proposed daily operations relative to the exploratory activity is difficult to quantify but it would likely be orders of magnitude larger with pit blasting, increased haul road traffic including over 1,000 truck trips daily, air pollution, and the creation of 250 ft tall mining waste piles, among the many disturbances that would present adverse effects.

The proposed reclamation measures outlined in the Plan are either wholly untested, known to be challenging and largely unsuccessful, or are inappropriate for an arid-lands ecosystem which is well known for high levels of difficulty in restoration, especially within mining sites (Svejcar et al. 2017 p. 82; Sheoran et a. 2010 p. 2). More discussion on the inadequacies of the proposed restoration measures can be found below in Pollinator Habitat Reclamation is Unproven and Impacts of Invasive Species in Critical Habitat.

Impacts from dust deposition within the critical habitat

Dust deposition is known to have a significant impact on plant health by limiting reproduction, reducing light availability, CO2 uptake, and thus reducing photosynthetic capacity (Wijayratne et al. 2009, Lewis et al. 2017, Waser et al. 2017). It can also reduce transpiration leading to higher leaf temperatures and reduced water use efficiency (Sharifi et al. 1997, p. 844). Particulate matter deposited directly to the soil can influence soil chemistry and nutrient cycling, potentially having effects on the soil microbiome near the rhizosphere (Grantz et al. 2003 p. 228). A prior study found plants growing within 1 km of unprotected mining stockpiles were in degraded habitats and highly impacted by dust deposition (Padgett et al. 2007). Another study examined plants 100 to 700 meters from heavily used roads used for oil and gas development in the Uinta Basin, Utah and found dust impacts to fruit set across all distances examined (Lewis et al. 2017 p. 436).

The Project has the potential to greatly increase the quantity and rates of dust deposition on plants of Tiehm's buckwheat from the construction of new facilities, use of access and haul roads, and blasting a 960 ft mere feet away from occupied habitat (Fig. 2). The new haul and access roads would transport 150-ton trucks traveling 35 mph, up to 1,050 times daily and would be less than 60 m from subpopulation 3 and less than 300 m from subpopulation 1 (Fig. 2). The open pit would be closest to the southern subpopulations, and blasted just 44 ft and 114 ft from subpopulations 3 and 6 respectively.

To examine the potential effects of dust deposition on Tiehm's buckwheat, the Plan references several studies including a study on *Astragalus jaegerianus* (Lane Mountain milkvetch), a rare and federally listed herbaceous perennial in the pea family (Fabaceae; BLM 2024b p. 59). That study found that shoot growth declined, but that plants recovered from experimental dusting one year after application and following heavy winter rains (Wijayratne et al. 2009). The Plan notes that "As a perennial herb we suspect Tiehm's buckwheat will have the same resilience." (BLM 2024b p. 60). However, Lane Mountain milkvetch is a herbaceous perennial that twines up through shrubs and dies back completely to the ground during the hot summer months (USFWS 2008 p. 5; Fig. 4). In contrast, Tiehm's buckwheat is a low growing cushion buckwheat that remains above ground, and it is photosynthetically active throughout much of the calendar year (Fig. 4), going dormant in the late fall and winter months (USFWS 2022a p. 15). It would be an erroneous assumption to imply that these two species, with different life history strategies, would respond similarly to dust deposition. Tiehm's buckwheat occurs in sparsely vegetated habitats with no overstory, whereas Lane Mountain milkvetch occurs within other host shrubs that provide structural support and some cover (USFWS 2008 p. 5; Fig. 4). As such, dust deposition could have a more significant impact on the physiology and reproduction of Tiehm's buckwheat plants compared to Lane Mountain milkvetch.

Figure 4. A. Tiehm's buckwheat in flower on September 11, 2021 and B. Lane Mountain milkvetch in fruit on April 29, 2010.

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		The primary method proposed in the DEIS to mitigate fugitive dust is to irrigate roads (BLM 2024b). The DEIS specifies a goal to achieve 95% control efficiency as part of the overall Air Quality Impact Assessment (BLM 2024b p. 59) which would require an application of 0.8 L/m2 of water every 35 minutes in the winter and 26 minutes in the summer during peak years of haul road traffic (BLM 2024 p. 58). This amount of water has the potential to significantly increase the spread of invasive plant species across the project area, including *Lepidium draba* (tall whitetop), which is a class C noxious weed and is known to occur at Cave Spring (see Impacts of Invasive Plant Species to Critical Habitat below). The frequent use of water trucks would also increase truck traffic on roads near Tiehm's buckwheat populations, thereby increasing particulate pollution such as nitrogen deposition. Nitrogen deposition is well known to exacerbate the spread of invasive plants (Valliere et al. 2017). The potential effects of nitrogen deposition on Tiehm's buckwheat and its habitat has not been analyzed in the DEIS, including the amount of nitrogen per hectare that would be estimated to be deposited within critical habitat during peak traffic years. No mitigation measures specific to nitrogen deposition were outlined in the Plan (BLM 2024b). *Impacts to pollinators within the critical habitat* The genus *Eriogonum* (wild buckwheat) is one of the most species-rich genera in North America, yet little is known about pollination biology across the group (James et a. 2014). . Self-compatibility has been documented in some species of wild buckwheat, although rare species of *Eriogonum* are known to be primarily outcrossing, and several species are known to attract a large diversity of pollinators, including beneficial insects (Neel et a. 2001, James et al. 2014). Habitat loss, modification, and fragmentation have severe consequences not only for rare plant populations, but also for their pollinators. Fragmentation of habitat can further impact plant reproduction, including seed set and recruitment by reducing pollinator communities and limiting pollinator service (Tepedino et al. 2011, Neel et al. 2001). Reduction and limitation of pollinator service can be detrimental to rare plant populations that rely on cross pollination for successful reproduction and recruitment of fit offspring. For example, a change in pollinator availability and behavior could lower outcrossing rates in self-compatible species. Decline of rare plant populations can also be further exacerbated by the number and kinds of pollinators that are available to pollinate flowers. A study investigating arthropod and pollinator diversity and abundance in Tiehm's buckwheat was initiated in 2020 (McClinton 2022a). Sampling for arthropod diversity and abundance and observations of flower visitation were documented at two Tiehm's buckwheat subpopulations and compared with two adjacent sites where Tiehm's buckwheat does not occur. In addition, flowers were bagged to test for the ability of Tiehm's buckwheat to produce seed via self-pollination (self-compatibility). The study found that Tiehm's buckwheat receives a relatively large number of insect visitors when flowers are open in May and June. Like many other species of Eriogonum, Tiehm's buckwheat appears to be pollinated by a diversity of generalist species, with 12 orders, 73 families and 130 species documented at Tiehm's buckwheat sites in just one season of sampling. Temporal variation in arthropod composition and abundance was also documented indicating that there could also be interannual variation of the arthropod community. Generalist pollinators are important in pollinator communities because they are known to increase pollinator network connectivity and contribute to the overall structure and stability of pollinator networks (Cusser and Goodell 2013). Abundance and diversity of arthropods was similar between the occupied and unoccupied Tiehm's buckwheat sites. This is significant because the Tiehm's buckwheat habitat is largely dominated by Tiehm's buckwheat itself, and plant species that co-occur and form any significant cover are primarily wind pollinated and are not insect pollinated (e.g *Atriplex confertifolia*, *Hilaria jamesii*, *Sporobolus airoides*, and the exotic invasive *Halogeton glomeratus*). The adjacent sites have higher species richness and cover of other insect pollinated species, indicating that Tiehm's buckwheat disproportionately supports arthropods within its habitat. In addition, the report notes that the diversity of insects at Tiehm's buckwheat sites was remarkably high when compared to studies of other wild buckwheats, including *E. crosbyae* and a study of beneficial insects in *Eriogonum* in Washington (McClinton et al. 2022a, James et al. 2014). Open pollinated flowers of Tiehm's buckwheat produced a higher seed set than those flowers that were bagged and excluded from pollinators, indicating that it is self-compatible, but that pollinators greatly increase seed production. Thus, pollinator diversity and abundance is essential to facilitate outcrossing and is critical to reproduction in Tiehm's buckwheat. A recent study detected negative effects to pollinator communities in the Mojave Desert due to anthropogenic disturbance including habitat fragmentation and modification (Grodsky S.M. et al. 2021). Significantly lower species richness and counts in non-bee insect flower visitors were detected within disturbed areas when compared to non-disturbed areas. Further, the study found that disturbance of desert soils such as compaction and erosion and removal of vegetation during site preparation affected the cover of desert plant species as much as seven years post-construction (Grodsky et al. 2021). Pollinator abundance and species richness are tightly associated with abundance and diversity of plants, and decrease with distance from high quality habitat (Cusser and Goodell 2013). Thus, establishing a buffer that is large enough to maintain high quality habitat is essential to maintain diverse pollinator communities. Habitat protection and protection of areas surrounding the Tiehm's buckwheat sub-populations will be important to encourage insect diversity and abundance, to promote outcrossing within and between subpopulations, and to reduce self-pollination Tepedino et al. 2011, Neel et al. 2001). Pollinators are highly sensitive to disturbance (Borchardt et al. 2021). Designating a sufficient buffer to ensure ecological security, including maintenance of the pollinator communities will be essential to maintain genetic diversity within and between populations. Considering the flight distance of potential floral visitors is an important factor to evaluate the potential impacts of disturbance, especially with regard to establishing an appropriate buffer size that is sufficient to maintain pollinator communities. Distances as short as 100 m to disturbed areas have been documented to serve as a filter, reducing pollinator diversity by eliminating nesting habitat or other essential resources. Plant-pollinator networks have also been shown to be temporally dynamic and thus protecting areas of sufficient size will increase stability of generalist pollinator networks through space and time. *Cumulative impacts within the critical habitat* Due to the extremely narrow global range of Tiehm's buckwheat and the scale of the proposed project, the North and South OSF Alternative continues to pose existential threats to the species including significantly altering subpopulations connectivity, habitat integrity, pollinator communities, and other ecosystem processes. The direct and indirect impacts of mining are of such magnitude, and taken in combination with other documented threats (e.g. competition with invasive species, dust deposition, impact to pollinator communities and co-occurring native plant species), the Project leaves Tiehm's buckwheat in danger of extinction throughout all of its range. To date, surveys of potential habitat have not yielded newly documented populations, and the known range remains essentially the same as reported in the 1993 surveys. Based on past and present surveys of potential habitat, it is unlikely that additional populations will be documented outside of the known range. The narrow range of the species combined with the external anthropogenic threats such as the proposed Project makes this species highly vulnerable to extinction. Therefore, protection of the entire 910 acres of critical habitat is essential to conserve sufficient habitat to support pollinator communities, potential future migration, and large enough populations to prevent inbreeding and genetic drift, thus supporting viable populations into the future.	

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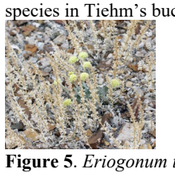
		In order to avoid the worst impacts of mining from the Project or other future mining proposals, a one mile buffer of protection around Tiehm's buckwheat was proposed (CBD and Fraga 2021) in 2021. This would provide 4,015 acres of protected area surrounding the extant buckwheat populations. Tiehm's buckwheat is an extremely limited range plant species at risk of extinction, and occurs only on BLM-managed public lands in the Silver Peak Range. The proposed Rhyolite Ridge Area of Critical Environmental Concern would protect the species and a one-mile buffer, providing essential protection to help prevent its extinction.	
108 and 183	108.35 and 183.34	**Plan to Control Non-Native, Invasive, and Noxious Species Treatment Plan is Not Developed** Applicant Proposed Conservation Measure (APCM)-7 specifies the control of nonnative, invasive, and noxious species as a protection measure for Tiehm's buckwheat. However, a plan is not available for review in the DEIS. Instead the protection measure states that "*a weed monitoring and control plan will be developed prior to the implementation of the Project construction in coordination with the Weeds Coordinator at BLM NVSO and USFWS* (BLM 2024b p. 35)". The spread of invasive species has been identified as a major threat to Tiehm's buckwheat (Fraga 2021b; USFWS 2022a) and is a known as a major threat to rare plant species in Nevada and globally (Dangermond et al. 2010 p. 2266; Heintz et al. 2019 p.180; Lughadha et al. 2020 p. 397; McClinton et al. 2022b p. 10). Invasive plant species can interfere with plant reproduction, decrease establishment of native plant species, change disturbance regimes and or soil chemistry, and compete for resources and space (Dangermond et al. 2010 p. 2266 ; Heintz et al. 2019 p.180; McClinton et al. 2022 p. 5). Prior surveys have established that mining exploration conducted by Ioneer has facilitated the spread of non-native and invasive plant species within occupied and critical habitat for Tiehm's buckwheat (Fraga 2021b). An implementation and weed management plan is needed to ensure Tiehm's buckwheat is protected from further spread of invasive species, including possible new invasions from mining activities, while simultaneously protecting the species from treatment methods. With no plan to review, we find the DEIS to be insufficient as it does not adequately account for protection measures that need to be in place and reviewed prior to project approval. Further, because a plan has not been included the public do not have an opportunity to fully comment on the proposed use of chemical herbicides in an environmentally sensitive area. *Impacts from the spread of invasive species within critical habitat* Exploration has already significantly increased the spread and cover of invasive plant species within Tiehm's buckwheat critical habitat including *Halogeton glomeratus*, *Salsola australis*, and *Amaranthus albus* (Fraga 2021b; Fig. 5). *Halogeton glomeratus* (saltlover) in the Chenopodiaceae, is an invasive plant species that currently occurs across all subpopulations of Tiehm's buckwheat (BLM 2024b p. 8). Salt lover is well established in mining exploration sites including drill sites, well pads, graded roads, and other disturbance areas within the Project boundary (Fraga 2021b; BLM 2024b Attachment D, Cedar Creek Plant Cover Memoranda, Table 1). *Salsola australis* (tumbleweed) in the Chenopodiaceae has been documented spreading from exploration disturbance into subpopulation 6B and subpopulation 1 (Fraga 2021b). *Amaranthus albus* (pigweed amaranth) in the Amaranthaceae was documented spreading from disturbed exploration areas near subpopulations 1 and 2 (Fraga 2021b). Overall non-native plant cover has increased in areas where exploration activities took place in 2019, especially at the north end of subpopulation 6 near test wells, on the exploration road between subpopulations 4 and 5, and along the access road in between subpopulations 1 and 2 (Fraga 2021b, Fig. 3). Morefield (1995, p. 13) did not document these invasive plant species in Tiehm's buckwheat subpopulations, but salt lover is now known across all subpopulations (BLM 2024b).  **Figure 5**. *Eriogonum tiehmii* (Tiehm's buckwheat) surrounded by *Halogeton glomeratus* (saltlover) on May 21, 2020. A study examining leachate of saltlover mulch found significant soil alteration including: increases in pH, exchangeable sodium, potassium, magnesium, electrical conductivity, and decreases in water percolation (Kinsinger and Eckert1960). High salts are known to inhibit micro-organisms aiding nitrification, which depresses plant growth. Salt lover does not form mycorrhizal associations and does well in mine waste (e.g. overburden) with diminished or eliminated vesicular-arbuscular mycorrhizae present in overburden soils (Paveck 1992). While research has been conducted on soil texture and mineral composition of occupied and unoccupied soils for Tiehm's buckwheat, very little is known regarding the soil microbiome that supports Tiehm's buckwheat which is likely to provide key insights into plant health and its distribution. At least four additional non-native plant species are known to occur within the Project area: *Chlorispora tenella* (crossflower, Brassicaceae), *Descurania sophia* (flixweed), *Lepidium draba* (tall whitetop), and *Rumex crispus* (curly dock) (https://www.inaturalist.org/observations?project_id=129835). *Lepidium draba* (synonym: *Cardaria draba*) is rated as a Noxious Category C Weed in Nevada indicating that it is already established and widespread in many areas and it is subject to active eradication (NDA 2024). The non-native plant species listed above appear to be currently limited to the vicinity of Cave Spring within the Project boundary. However, under the preferred alternative they are likely to spread, especially along haul roads, due to the large amounts and high frequency of water application that is proposed to occur to reduce fugitive dust (BLM 2024b p. 58). Ioneer proposes to achieve 95% control efficiency as part of the overall Air Quality Impact Assessment (BLM 2024b p. 59) which would require an application of 0.8 L/m2 every 35 minutes in the winter and 26 minutes in the summer during peak years of haul road traffic (BLM 2024b p. 58). This amount of water is significant and would increase the spread of invasive plant species across the Project area that might otherwise be limited to Cave Spring.	The Buckwheat Protection Plan: Applicant Proposed Conservation Measures for Tiehm's Buckwheat and its Critical Habitat (July 2024) provides specific details on noxious and invasive weed control regarding pollinator habitat reclamation. The EIS contains detailed effects analysis of the spread of invasive species on Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER.
108 and 183	108.36 and 183.35	**Construction of Fencing and Restriction of Public Access Threatens Independent Research and Monitoring of Tiehm's Buckwheat** The North and South OSF Alternative identifies 19,342 linear feet of fencing in the area of planned disturbance and 22,400 linear feet of fencing in otherwise undisturbed areas for a total of 41,742 linear feet of fencing or 8.4 total miles of fence (BLM 2024b p. 19). In addition to fences, locked gates would restrict public access and limit independent monitoring, research, and assessment from conservationists and researchers. Environmental advocates and independent researchers have played an essential role in identifying threats, conducting surveys, documenting invasive species, and pursuing legal frameworks for protection and long-term conservation of Tiehm's buckwheat. This includes successfully petitioning the species for Endangered Species Act listing, pursuing legal remedies to terminate harmful mining exploration activities, on-the-ground threats assessment including identifying and documenting cattle trespass, OHV trespass, invasive species (Fraga 2021b), and mining exploration misconduct (CBD 2023), and establishing the first total census of Tiehm's buckwheat after a major disturbance event (Fraga 2021 a, USFWS 2022a).	Impacts to access are described in EIS Section 4.13. The public will continue to be able to access the Tiehm's buckwheat and critical habitat. Because the area is adjacent to the proposed active quarry, coordination with Ioneer should occur for safety and to comply with MSHA regulations. Any studies on the Tiehm's buckwheat would be required to be coordinated through the USFWS, under the ESA.

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		Public access is essential for efficient population assessment and for independent long-term monitoring, and identification of new and emerging threats. The Project proponent was found to be out of compliance during exploration activities in 2023, when they conducted unauthorized activities within critical habitat.(CBD 2023). Having controlled gated access would limit transparency and erode public confidence and efficient access of subpopulations towards gathering knowledge of the status of a federally protected species on public lands. It is well established that an increase in transparency helps improve the public's trust in government (U.S. Office of Government Ethics 2024). Ultimately limiting access to the proposed Project area will lead to adverse impacts to Tiehm's buckwheat and its long-term conservation.	
108 and 183	108.37 and 183.36	**Pollinator Habitat Reclamation is Unproven.** In the Plan, APCM-6 focuses on the development of a pollinator habitat reclamation program with the stated goal to support the restoration of ecosystem processes and function. The Plan indicates that "*the reclaimed ecosystem is not expected to be similar to the undisturbed native ecosystem in critical habitat*" (BLM 2024b p. 20). At best the restoration methods outlined in the Plan lack feasibility, and at worst they are wholly inappropriate for arid lands ecosystem reclamation, especially for sensitive rare plant habitat. Specifically, the use of dozers to track in seeds, the use of hydroseeding which is frequently found to be ineffective (Abella et al. 2012, Clemente et al. 2016), and the use of excessive amounts of mulch which are at suggested levels for agricultural application are wholly inappropriate for desert ecosystem restoration (NRCS 2002). It is well documented that arid land ecosystem restoration is challenging with high rates of failure due to the difficulty of treating non-native species and low native plant establishment (Jonas et al 2018 p. 177; Svejcar et al. 2017 p. 81). Given the lack of a pilot study or any proof of concept, it is a highly speculative proposition to initiate disturbance prior to establishing effective restoration activities in a highly sensitive habitat. Comments from the agencies indicate that this is a concern and after careful review of the Plan, it appears that many of these concerns have yet to be addressed. For example, a comment from USFWS in comment matrix for the Draft Buckwheat Protection Plan issued June 16, 2023 (BLM 2024c) states: *"We recommend a substantially earlier phasing of reclamation in the project plan. Vegetation establishment techniques should be explored **now**. Seed collection of common species should be happening this year and multiple subsequent years from now. This seed should be cleaned, and either sent to agricultural increase (grasses and forbs) or plug* *establishment in a greenhouse setting (shrubs). Validation and effectiveness should not wait until damage has be done to determine if techniques are successful or not."* The DEIS indicates that reclamation efforts would be initiated in **year 3 to 18** of mine operations or after the initiation of habitat alering disturbance (BLM 2024b p. 24) without assurances of feasibility, metrics for success, or ground-tested methods. Further, review of the pollinator habitat reclamation plan identifies several issues with the proposed methods outlined below. 1. Growth media used for pollinator habitat reclamation within critical habitat will consist of salvaged and stockpiled materials (BLM 2024b p. 24). Alternative growth media is identified as material removed from the quarry footprint and is essentially mine waste. Soil reclamation is a complex process and the existing Plan lacks details on methods to adequately review effectiveness (Sheoran et a. 2010 p. 14). 2. The plan to create a living topsoil stockpile is extremely vague, with a lack of detail on methods for minimizing weed establishment and the purpose of seeding while it is stockpiled. Stockpiling of topsoil in mounds during mineral extraction has been shown to affect the biological, chemical and physical properties of soil (Sheroan et. al. 2010 p. 12). There are no citations referencing existing studies where these methods have been piloted and are successful. The feasibility of the topsoil and stockpile preparation is dubious, lacks scientific credibility, and is not a well-established procedure. 3. The target plant species list (BLM 2024b p. 29) for reseeding is based in part by vegetation surveys conducted at the site and recommendations made by the Service, however there are no explicit plans as to how to ensure that appropriate seed will be procured including a seed collection plan. While the majority of the species listed are known to be native to the region, a non-native *Penstemon* is still listed. *Penstemon laevis* which is native to northern Arizona and southern Utah is inappropriate for the list given the number of native *Penstemon* species at the site and their propensity to hybridize (BLM 2024b p. 29). 4. Broadcast seeding is proposed and widely known to be ineffective. Abella (2012) found that when comparing seeding to containerized planting that seeding efforts failed to establish new plants, despite protecting seeds from granivory, and irrigating. In addition some of the methods for seeding may be inappropriate, for example "Broadcast-seeded areas may be dozer-tracked perpendicular to the slope to cover the seed" (BLM 2024b p. 28). There is no evidence that this is effective and will cause soil compaction and increased erosion. 5. The levels of mulch suggested for use in hydroseeding are similar to levels recommended for agricultural fields at 2 tons per acre and are inappropriate for restoration in arid land ecosystems to support native plants (BLM 2024b p. 29). In a technical guide developed by the National Resource Conservation Service (NRCS 2002), criteria for mulching for grass and legumes crops include adding "*approximately 1-1/2 to 2 tons of dry material (straw, hay, etc.) to the surface after fertilizing and seeding. (Eight tons of manure will have about the same effect as two tons of straw.)*". This was identified in a comment by the BLM in the comment matrix but was not addressed in the DEIS (BLM 2024c p. 5). 6. The Plan suggests that when hydroseeding is used "*seed, fertilizer (if the analytical data support its use) and mulch (about 250 pounds per acre) will be sprayed in one application. A second application will be required to spray the remainder of the cellulose fiber mulch (to achieve a total of about one ton per acre) and a tackifier (at the manufacturer's recommended application rates*" (BLM 2024b p. 28). In addition "*Strawmulch will be applied at a rate of up to two tons per acre on steeper slopes where conventional broadcast methods are used*." (BLM 2024b p. 29). The BLM comment on the proposed quantity of mulch states that "*The seeding methods listed are not entirely appropriate for the environment and are unlikely to be successful as written. For instance, drill seeding would likely be more successful, hydroseeding has demonstrated very low success in wild environments (likely due to the unnecessary mulch and fertilizer), mulching at this high rate is an unusual practice in the deser* *t, and harrowing* *would likely be more successful*." (BLM 2024c p. 5). These comments were not resolved in the DEIS. 7. The Plan cites a study by McCormick et al. (2019) as a model for containerized planting to support pollinators. The study investigates invertebrate floral visitor response to floral richness, floral abundance and distance between floral patches within newly planted pollinator restoration habitat in an arid ecosystem. A key finding from the study was that restoration plantings in support of pollinators must contain sufficient floral resources to support resident communities of pollinators over the season which is achieved by establishing patches within habitat instead of uniformly	The effects analysis for Tiehm's buckwheat presented in the EIS considers the proposed pollinator habitat reclamation program and its impacts to Tiehm's buckwheat critical habitat. APCM-6: Pollinator Habitat Reclamation within Critical Habitat was included in the July 2024 Buckwheat Protection Plan, which outlines the planning and design, implementation, and performance criteria, monitoring, and reporting for pollinator habitat reclamation.

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		distributed plantings across the habitat (McCormick et al. 2019 p. 1282). The planting design consists of concentric rings around a densely planted central garden (McCormick et al. 2019 p. 1283). Each 1 meter plot contained a density of 17 plants. The Plan in the DEIS proposes to use a density of 125 shrubs per acre for revegetation efforts (BLM 2024b p. 30), which is relatively low when compared to the densities used in the experiment, even when considering isolated patches. A density of 125 plants per acre would allow for approximately seven patches of similar density compared to the experiment, but does not factor in mortality which would need to be considered when scaling up an experiment. In addition the McCormick et al. (2019) study included insect pollinated annuals and perennials, which are important resources for pollinators but the proposed species list in the Plan includes only two annuals (BLM 2024b p. 29). A comment by the BLM states "*Perennial shrubs per acre is only one component of successful reclamation. Successful reclamation should be based on achieving similar vegetative cover, species richness and diversity as pre mining activities. The Cedar creek evaluation of vegetation in critical habitat could be used to establish baseline conditions and criteria for successful reclamation."* (BLM 2024c p. 5). Ioneer responded with a comment that the primary purpose of the reclamation is to support pollinators, however incorporating annual and perennial herbaceous plants would be important to support pollinators (McCormick et al. 2019). 8. Specific timelines and plans to achieve desired vegetation cover (14.7 percent) are non-specific, vague, and unrealistic (BLM 2024b p 33). Given the issues cited above there is no indication that this level of plant cover for "final success" could be met and no timeline for "success" is given. Overall the Pollinator Habitat Reclamation Plan lacks clear methods, does not cite literature that would indicate feasibility at a landscape scale, and uses methods that are inappropriate for desert ecosystem restoration.	
108 and 183	108.38 and 183.37	**Buckwheat Protection Plan Relies on Unpublished Reports and Memos and Discounts the Best Available Science.** Industry funded research presents a potential conflict of interest, as it provides an opportunity for the sponsoring company to influence scientific results in favor of their proposed projects (Hall and Scott 2001, Nature 2001). If research outcomes do not align with desired results, corporate funders may seek to discredit, or suppress findings (Holzman 2021). Ioneer has gone to great lengths in an attempt to dispute and discredit the only available published scientific study focusing on Tiehm's buckwheat which they funded. The McClinton et al. (2022a) study identified Tiehm's buckwheat as a soil specialist that supports a relatively diverse assemblage of Arthropods. In comment matrix for the Draft Buckwheat Protection Plan issued June 16, 2023, the Service and the BLM identified that the Plan relied heavily on unpublished and non-peer reviewed reports and technical memos in an effort to discredit and counter the McClinton et al. (2022a) study. Comment from the Service: "*Much of the background evidence section of the report relies on internal reports and personal communications, while simultaneously dismissing the few peer-reviewed articles available on E. tiehmii or simply hand-picking tidbits from the McClinton report. This weakens the overall findings and conclusions of the plan.*" (BLM 2024c p. 2) "*USFWS is required to use the best available science. While the research, reviews, reports, and memos that have been commissioned by Ioneer over the past few years can contribute to our collective understanding of Tiehm's buckwheat, many documents referenced in the Protection Plan have not been provided to USFWS or BLM, do not provide detailed methods or locations of the studies, and/or are not peer reviewed.*" (BLM 2024c p. 2) Comment from the BLM: "*Overall, there is a lot of effort in this document to try to counter the SSA and McClinton et al study. The document often refutes the McClinton study but then cites the report in other locations. The full McClinton report is also not included. BLM must take into consideration all available information. USFWS provided a Draft Tiehm's buckwheat conservation measures for the proposed Rhyolite Ridge Project. This document does not incorporate several of these recommendations*…" (BLM 2024c p. 2) The emphasis on producing technical reports and research commissioned by Ioneer to counter the McClinton et al. (2022a) study fails recognize that the resolving the conflict between the proposed Project and efforts to conserve of Tiehm's buckwheat does not hinge on its status as a soil specialist or a species that supports a disproportionate level of arthropods. But instead the conflict centers on the magnitude of the proposed disturbance surrounding the global range of a single-site endemic, creating a scenario in which the proposed Project would cause extinction of Tiehm's buckwheat.	The July 2024 Buckwheat Protection Plan was revised in coordination with the BLM and USFWS, including incorporating recent studies and reports (i.e. best available science). Consideration of the BLM and USFWS comments were incorporated into the July 2024 Buckwheat Protection Plan.
108 and 183	108.39 and 183.38	**Translocation Efforts, Living Collections and Seed Collections Cannot Replace In Situ Conservation** Decades of scientific research support the need to protect plants in their native habitat as the best means of protection and long-term conservation, especially for single-site endemics (Harrison et al. 2008; Knapp et al. 2020). Further the Endangered Species Act states in Section 2(b) that its purpose is, "*to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved.*". While ex-situ or offsite conservation programs such as seed banking and greenhouse propagation are important tools necessary to support in-situ or onsite conservation, they should never be used to replace habitat or as an excuse to destroy habitat. Unfortunately, Ioneer continues to promote its propagation measures as a substitute for onsite conservation despite conservation best practices that call for protecting Tiehm's buckwheat in its native habitat (Guerrant et al. 2004). This raises the question of whether proposed plant translocation research can undermine protection strategies and the highest priority conservation outcomes (Fraga 2020). The Project fails to address onsite conservation and threatens to erode the reputation and effectiveness of conservation seed banks and propagation programs which are vital components to enhancing a species persistence in the wild. The Center for Plant Conservation (2019) provides guidelines regarding justification for rare plant reintroductions; pertinent guidelines as they relate to conservation from Tiehm's buckwheat. Plant translocation (moving plants to an alternative site) is never a substitute for conserving plant populations in their native habitat. This is well established in the plant conservation literature and it is stressed as a guiding principle in a plant reintroduction best practices manual compiled by the Center for Plant Conservation (page 152 section 4-4). See excerpt below. https://saveplants.org/wp-content/uploads/2020/12/CPC-Best-Practices-5.22.2019.pdf "*CPC does not support or promote reintroduction as an alternative to in situ ecosystem protection. All those working in plant conservation firmly agree that the priority is to conserve species in situ and to preserve wild populations in natural habitats in as many locations as possible. Reintroduction is never the first action to take for a critically endangered species, even when crisis is imminent. First steps for species in dire straits must be ex situ collection, threat control, and habitat management (Guerrant et al. 2004).*"	The Proposed Action and North and South OSF Alternative Tiehm's Buckwheat Protection Plans incorporate in situ conservation of the species.

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108 and 183	108.40 and 183.39	**DEIS has Inconsistencies and Errors Indicating a Flawed Analysis** There are several errors throughout the Plan that identify inconsistencies, poor quality of work, indicating a flawed analysis. Here are some of the errors I was able to find during my review of the DEIS and Plan. 1. The distance of the mining pit to occupied subpopulations is not consistent with GIS files provided for our evaluation by the BLM. The DEIS identifies distances of 44 ft and 114 ft to subpopulations 3 and 6 respectively, whereas an independent analysis identifies the open pit being as close as 15 ft to subpopulation 3 and 177 ft to subpopulation 6. 2. Communications with BLM indicated that " the haul road location is currently being adjusted by Ioneer based on the consultation process between the BLM and the U.S. Fish & Wildlife Service." during the public comment period for the DEIS. Plan revisions during the comment period indicate that perhaps the DEIS was rushed and released too early. 3. One page 4 of the Plan there is a citation with an empty bracket. It is unclear if a federal register number should have been included. 4. PBF is never defined in the Plan (BLM 2024b p. 46). If one was not familiar with terms frequently used by the Service, it would be impossible to know it refers to "Essential Physical and Biological Features of Critical Habitat." 5. The monitoring methods outlined in the census summary (BLM 2024b, Attachment A) are not fully described. The results of the population estimate were compared to the direct count as an evaluation of the accuracy of the method, but this was not described in the methods of the census survey. This was identified by the USFWS (BLM 2024c p. 6) and is said to have been addressed by Ioneer, but the methods are still vague and lacking in detail. 6. Several comments relating to the Pollinator Habitat Reclamation are still outstanding and have not been fully addressed, despite the fact that these comments were responding to a draft of the plan issued June 16, 2023 (BLM 2024c).	1) The distance of proposed disturbance to the nearest subpopulation has been updated to 15 feet. 2) Ioneer has continued to coordinate with the BLM and USFWS to minimize effects to Tiehm's buckwheat and designated critical habitat. Any changes committed to have been included in the Final EIS analysis. 3) The Buckwheat Protection Plan was updated in July 2024 and the empty bracket has been resolved to include 86 FR 29975. 4) PBF is the acronym for physical and biological features. This is defined in the July 2024 Buckwheat Protection Plan. 5) The Buckwheat Protection Plan was updated in July 2024 and includes monitoring methods for the census summary. 6) APCM-6: Pollinator Habitat Reclamation within Critical Habitat was included in the July 2024 Buckwheat Protection Plan, which outlines the planning and design, implementation, and performance criteria, monitoring, and reporting for pollinator habitat reclamation.
108 and 183	108.41 and 183.40	**Conclusions** Tiehm's buckwheat was listed as endangered under the ESA on December 16, 2022; concurrently, the Service designated 910 acres of critical habitat, which included a 500 meter buffer surrounding the entire global range (USFWS 2022a). Importantly, the ESA not only conserves species, but also the habitats upon which they rely, recognizing the interdependency of a species and its ecosystem. Specifically, section 7(a)(1) of the ESA charges Federal agencies to aid in the conservation of listed species, and section 7(a)(2) requires the agencies to ensure that their activities will not jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat (50 CFR §402). The best available science demonstrates that the North and South OSF Alternative described in the DEIS will both jeopardize the continued existence of Tiehm's buckwheat and adversely modify its critical habitat. As a single site endemic, Tiehm's buckwheat is inherently vulnerable to extinction (Chichorro et al. 2019 p. 225; Fahrig, 2001, p. 65; Knapp et al. 2021, p. 362; Purvis et al. 2000 p. 1949, Staude et al. 2019, p. 21). The Project would encompass the entire range of the species, irreparably harming 22% of the habitat deemed critical to its survival and causing adverse effects to the remaining 78% , ultimately having a major adverse impact on 100% of the global range of the species. The North and South OSF Alternative would place Tiehm's buckwheat on a direct path towards extinction. As currently proposed the Project would violate the ESA and contribute to our global extinction crisis. I urge the BLM to use the best available science and to select the **No Action Alternative**. The Project should not move forward as proposed to ensure the long term survival and conservation of Tiehm's buckwheat. In 2021, a petition to establish the Rhyolite Ridge Area of Critical Environmental Concern (ACEC) on BLM managed public land in the Tonopah Field Office was submitted (CBD and Fraga 2021). The proposed Rhyolite Ridge ACEC boundary includes all six subpopulations of Tiehm's buckwheat, and a one-mile buffer surrounding them, for a total of 4,015 acres. This proposal would be consistent with the No Action Alternative, as it would provide the opportunity to reclaim any roads or other disturbances from mining exploration that have already occurred. We also request that BLM should also deny any future requests to develop or extract locatable minerals within the proposed ACEC. This would be consistent with the purpose of the ACEC designation, BLM's special status species policy, and BLM's statutory mandate to prevent "unnecessary and undue degradation" of the public lands. (The Federal Land Policy and Management Act, 43 U.S.C § 1732(b).) In addition to prohibiting future mining development, BLM should take steps to re-acquire any interests in mineral rights within the proposed ACEC that may have already vested. The ACEC designation should also include management direction to reclaim any roads or other disturbances from mining exploration that have already occurred. Motorized travel, including OHV use, should be limited to existing, designated routes within the ACEC. Finally, BLM should develop appropriate and effective conservation and recovery measures for Tiehm's buckwheat.	In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS for the North and South OSF Alternative. Consideration of Area of Critical Environmental Concern (ACEC) designation is outside the scope of this analysis. Avoidance of all Tiehm's buckwheat critical habitat was considered as an alternative and is discussed in the SIR.
108 and 183	108.42 and 183.41	**Literature Cited** Abella,S.R. Donovan J Craig, Alexis A Suazo. 2012. Outplanting but not seeding establishes native desert perennials Native Plants Journal, 13 (2) 81-90; DOI: 10.3368/npj.13.2.81 Bureau of Land Management [BLM]. 2024a. Draft Environmental Impact Statement for the Rhyolite Ridge Lithium Boron Project. DOI-BLM-NV-B020-2021-0020-EIS. Bureau of Land Management [BLM]. 2024b. Supplemental Environmental Report 17: Threatened and Endangered Species. Appended to the Draft Environmental Impact. Statement for the Rhyolite Ridge Lithium Boron Project. DOI-BLM-NV-B020-2021-0020-EIS. Bureau of Land Management [BLM]. 2024c. USFWS & BLM Comment Matrix and Ioneer Response June 16, 2023Draft of the Buckwheat Protection Plan: Applicant Proposed ConservationMeasure. Appended to the Draft Environmental Impact. Statement for the Rhyolite Ridge Lithium Boron Project. DOI-BLM-NV-B020-2021-0020-EIS. Borchardt KE, Morales CL, Aizen MA, Toth AL. 2021. Plant-pollinator conservation from the perspective of systems-ecology. Curr Opin Insect Sci. ;47:154-161. doi: 10.1016/j.cois.2021.07.003. Center for Biological Diversity [CBD]. 2023. Re: Unauthorized Use and Occupation of Bureau of Land Management Lands; Adverse Modification of Critical Habitat; and Unlawful Use of a Categorical Exclusion from the National Environmental Policy Act. Submitted to BLM. Available at: https://www.biologicaldiversity.org/species/plants/pdfs/Tiehms-exploration-BLM-letter-011223.pdf	Comment noted.

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108 and 183	108.43 and 183.42	**Appendix B** Steven H. Emerman, Assessment of the Operating and Post-Closure Stability of the Open Pit at the Proposed Ioneer Rhyolite Ridge Lithium-Boron Mine, Esmeralda County, Southwestern Nevada (May 29, 2024). **Assessment of the Operating and Post-Closure Stability of the Open Pit at the Proposed Ioneer Rhyolite Ridge Lithium-Boron Mine, Esmeralda County, Southwestern Nevada** Steven H. Emerman, Malach Consulting, 785 N 200 W, Spanish Fork, Utah 84660, USA, Email: SHEmerman@gmail.com, Tel: 1-801-921-1228 Report prepared at the request of the Center for Biological Diversity Submitted May 29, 2024	Comment noted.
108 and 183	108.44 and 183.43	**ABSTRACT** The Draft Environmental Impact Statement (DEIS) for the proposed Ioneer Rhyolite Ridge lithium-boron mine in Esmeralda County, southwestern Nevada, would involve an open pit only 15 feet from the only population of Tiehm's buckwheat. The stability analyses in the DEIS argue that the Tiehm's buckwheat could not be impacted by slope instability neither during mine operation nor after mine closure (when buttresses would be constructed for additional pit slope stability). The calculated factors of safety cannot be regarded as reliable. Although the raw data that were used to develop the geotechnical parameters show considerable scatter, the geotechnical parameters and factors of safety are stated with no uncertainties and there is no sensitivity analysis. No source has been identified for the buttress material, so that the geotechnical parameters for the buttress are purely hypothetical. The DEIS chose a minimum factor of safety of 1.2 for both the operational and the post-closure periods. However, according to the Guidelines for Open Pit Slope Design (published by the Large Open Pit Project) and the SME Surface Mining Handbook (published by the Society for Mining, Metallurgy and Exploration), based upon the data uncertainty and the consequences of slope failure, the minimum factor of safety should be 1.5 and the maximum probability of failure should be 5% during the operational period (prior to buttress construction). Moreover, according to the Guidelines for Mine Closure (published by the Large Open Pit Project), based upon the same considerations, the minimum factor of safety should be 2.0 during the post-closure period (after buttress construction). Based upon the guidelines for calculating the Zone of Instability by the Western Australian Department of Industry and Resources, the minimum separation distance between the quarry and the Tiehm's buckwheat population ought to be 450 feet before buttress construction and 240 feet after buttress construction along the profile where the proposed quarry would be only 15 feet from the population. The assumption in the DEIS that the slope materials will remain unsaturated indefinitely does not consider the hydrogeological and meteorological processes by which the current state of saturation and over-pressurization was achieved, nor the time period over which re-saturation and re-pressurization could occur. The Adaptive Management plan lacks any specifics or details, and states the mine could be closed in response to an indication of slope instability, although without any apparent commitment on the part of the mining company. The recommendation of this report is that the geotechnical sections of the DEIS should be completely re-written.	Comment noted.
108 and 183	108.45 and 183.44	**EXECUTIVE SUMMARY** The Australian mining company Ioneer has proposed the Rhyolite Ridge Lithium-Boron Project in Esmeralda County, southwestern Nevada. The open-pit mine would operate for 26 years with average annual production of 22,340 metric tons of lithium carbonate in the first three years, 21,951 metric tons per year of lithium hydroxide over the remaining mine life, and 174,378 metric tons per year of boric acid over the entire lifespan. The proven and probable mineral reserves have been estimated at 60.2 million metric tons with average grades of 0.1797% lithium and 1.5418% boron. The Draft Environmental Impact Statement (DEIS) for the project was released by the Bureau of Land Management (BLM) on April 19, 2024. Although the DEIS refers to the open pit as a "quarry," its maximum depth would be 960 feet and "quarry" typically refers to a shallow excavation for the extraction of aggregate. Since this report compares the DEIS with mining industry guidelines, the words "quarry" and "open pit" are used interchangeably. A central issue regarding the potential environmental impact is the presence of the world's only population of Tiehm's buckwheat only 15 feet from the edge of the proposed quarry on the northern side. Thus, the DEIS includes geotechnical analyses that argue that the Tiehm's buckwheat could not be affected by instability of the mine pit slopes. The DEIS chose a value of 1.2 as the minimum factor of safety for both the operational and post-closure periods. The factor of safety is the ratio of the resistance to the load, so that a factor of safety of 1.0 indicates a slope at the cusp of failure, equivalent to 50% probability of failure. A report by Geo-Logic Associates, which was an attachment in the DEIS, updated previous stability analyses by considering six sections across the quarry, including TR02E-11, which is close to the population of Tiehm's buckwheat that has a separation distance of 15 feet from the quarry. The limit equilibrium method was used to show factors of safety for the operational period ranging from 1.20 to 1.26, thus satisfying the minimum value set by the DEIS. By adding buttresses to promote slope stability for the post-closure period, the factors of safety increased to the range 1.25 to 1.57. The stability analyses assumed that, after depressurization and dewatering, the slope materials would remain unsaturated indefinitely. The Adaptive Management plan called for the cessation of mining activity if monitoring indicated instability near Tiehm's buckwheat habitat. The objective of this report was to answer the following questions regarding the geotechnical analysis in the DEIS: 1) Are the calculated factors of safety reliable? 2) Was the choice of 1.2 for the minimum factor of safety appropriate for the operational period? 3) Was the choice of 1.2 for the minimum factor of safety appropriate for the post-closure period? 4) Was the Zone of Instability for open pits as specified in Western Australian guidelines properly taken into account?	A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report. The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report. For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022

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		5) Was the assumption that slope materials will remain unsaturated justified? 6) Is the proposed Adaptive Management plan adequate? To facilitate reading by non-specialists, this report includes a tutorial on key geotechnical concepts, including the limit equilibrium method, factor of safety, and probability of failure. Some information in the DEIS is inconsistent with information in other sources and the BLM has indicated that other information is already out of date. For example, the Tiehm's buckwheat population map in the DEIS, which was created by Ioneer, is not the same as the map used by the Center for Biological Diversity (CBD). In particular, the CBD map shows the closest separation distance between the Tiehm's buckwheat and the quarry to be 17 feet. According to the CBD map, subpopulations of Tiehm's buckwheat are found 380 feet, 332 feet, 283 feet, and 177 feet from the quarry on the western side. The Ioneer map places those same subpopulations 208 feet, 329 feet, 281 feet, and 165 feet, respectively, from the edge of the quarry. From a geotechnical standpoint, a critical issue is that BLM has stated that the position of the haul road is going to change, although the quarry as mapped has the exact dimensions to accommodate the haul road as currently mapped. Thus, if the position of the haul road changes, then the location of the quarry will also change, even though the location as shown in the DEIS was the basis for the stability analyses in the DEIS. No attempt was made in this report to document all inconsistencies or outdated information in the DEIS. The factors of safety that are calculated in the DEIS cannot be regarded as reliable. The geotechnical parameters for each geologic unit that are the input data for the stability analysis are stated with ultra-precision, sometimes with five significant digits, and with no range of uncertainty. Some of the geotechnical parameters were obtained from another consulting report that is not available for public review, while other parameters were simply the judgment of Geo- Logic Associates. The DEIS does not specify which parameters were developed from data and which were based on "judgment." The DEIS presents some of the raw data that were used to develop the geotechnical parameters, which show a very small number of measurements for each rock sample with a high degree of scatter. The calculated factors of safety are also stated as single values with no range of uncertainty. In particular, there is no sensitivity analysis that would show the range of possible factors of safety that could result from reasonably possible alternative values for the geotechnical parameters and there is no distribution of possible values for the factor of safety that would make it possible to estimate the probability of failure. In the same way, there is no sensitivity analysis that would show the range of possible locations of the critical failure surface that could result from reasonably possible alternative values for the geotechnical parameters. The DEIS does not identify any source or type of material for the buttress, so that the geotechnical parameters of the buttress should be regarded as strictly hypothetical. Failures of mine pit slopes are incredibly common in comparison with other types of industrial accidents. The mean annual probability of failure of a mine pit slope is about 6% with a range of 2-20%. The high failure frequency of mine pit slopes was part of the motivation for the writing of the Guidelines for Open Pit Slope Design by the Large Open Pit Project. According to the Guidelines for Open Pit Slope Design, for mine pit slopes with High consequences of failure, the minimum factor of safety should be in the range 1.3-1.5 and the maximum probability of failure over the entire design life (as opposed to an annual probability) should be 5%. Since the Adaptive Management plan calls for the cessation of mining activity as a response to slope instability affecting sensitive habitat, the consequences of slope failure at the Rhyolite Ridge mine should be placed into the High category (on a three-level scale of Low, Medium, and High). Another five-level scale for consequences of slope failure places closure of pit production for a significant period as Major consequences and permanent closure as Catastrophic consequences. The SME Surface Mining Handbook (published by the Society for Mining, Metallurgy and Exploration) has confirmed the recommendations of the Large Open Pit Project. The range of 1.3-1.5 for the minimum factor of safety depends upon the uncertainty in the input data with the upper end corresponding to high uncertainty. Based upon both the high data uncertainty and lack of attention to data uncertainty addressed above, the appropriate minimum factor of safety during the operational phase should be 1.5, which is significantly greater than the value of 1.2 that was chosen in the DEIS. The appropriate minimum factor of safety should increase in the transition from the operational to the post-closure period. Some industry publications have argued that the postclosure factor of safety should be greater than 2.0 or as high as credible with the probability of failure reduced to the ALARP (As Low as Reasonably Practicable) level. There are two principal reasons for the need to increase the minimum acceptable factor of safety. After pit closure, there will be a long-term degradation in the strength of the adjacent rock masses due to rewetting of the pit and the time-delayed responses to blasting and the radical changes in topography and stress levels that accompanied construction of the pit. For example, the removal of the weight of overlying rock could result in the slow opening of joints (cracks). Thus, the first reason is that there is considerable uncertainty as to the rate or degree to which the rock masses will degrade. There is even considerable theoretical uncertainty regarding the coupled interactions of erosion and slope instability and how those interactions are coupled with climate change. The second reason is that the post-closure period will see a reduction in or a complete lack of slope monitoring and trained on-site personnel, thus limiting the ability to detect and respond to changes in slope stability. It should be noted that, in addition to raising the minimum value of the factor of safety for the post-closure period, the factor of safety should be calculated based upon the anticipated future reduced rock strength, not the rock strength that exists during the operational period. In response to the above concerns, the Large Open Pit Project published the Guidelines for Mine Closure, which describe a procedure for determination of the appropriate minimum factor of safety for the post-closure period. The procedure involves the calculation of a Relative Stability Guideline (RSG), which is the product of the score for the Pit Wall Condition Class (on a scale of 1 to 7 with lower scores indicating more competent slopes), the Adjacent Impact Consequence (on a scale of 1 to 5 with higher scores indicating more severe consequences), and the Existing Design Confidence (on a scale of 1 to 5 with higher scores indicating less design confidence or greater data uncertainty). Since the pit slopes at the Rhyolite Ridge mine would have factors of safety slightly greater than 1.2 (although those calculations are highly unreliable, as explained above), the pit slopes would be placed into Pit Wall Condition Class C, corresponding to a score of 5. Pit Wall Condition Class C is described in the Guidelines for Mine Closure as "unvegetated slopes with uncontrolled rockfall risk and undesirable risk of failure" with a "high level of concern." In terms of failure consequences, the Guidelines for Mine Closure do not address the irreplaceable loss of biological resources, but other five-level consequence classifications, such as the Global Industry Standard for Tailings Management place accidents with "catastrophic loss of critical habitat or rare and endangered species" into the most severe category of Extreme consequences. Thus, a score of 5 for Adjacent Impact Consequences, corresponding to Very High consequences would yield an RSG score of 25 multiplied by the score for Existing Design Confidence. The Guidelines for Mine Closure require a minimum factor of safety greater than 1.5 for RSG in the range 20 to 50 and a minimum factor of safety greater than 2.0 for RSG in the range 50 to 100. On that basis, the minimum post-closure factor of safety of 1.2, which was assumed by the DEIS, would not be appropriate even if the Existing Design Confidence could be raised to the level of Very High (corresponding to a score of 1). The Existing Design Confidence is certainly not at the level of Very High, based on the low-quality geotechnical data that are currently available. If the Existing Design Confidence could be raised to a level of Medium with a score of 3, then the RSG score would be 75, which would demand a post-closure factor of safety greater than 2.0. In summary, the appropriate minimum factor of safety for the postclosure period would be 2.0 with the factor of safety calculated based on the anticipated future degraded rock strengths. The Department of Industry and Resources (Western Australia) has detailed guidelines for calculating the post-closure Zone of Instability. There is no application of these or similar guidelines or any corresponding discussion of the width of the unstable zone anywhere in the DEIS. The Western Australian guidelines specify that a safety bund wall with a width of 5 meters should be constructed at least 10 meters outside of the Zone of Instability, so that the safe region begins 15 meters (roughly 50 feet) beyond the Zone of Instability. The calculation involves connecting a line from the toe of the pit to the surface with an angle of 45° for unweathered (strong) rocks and an angle of 25° with respect to the horizontal for weathered (weak) rocks. Some studies have shown the calculation procedure to be insufficiently conservative (insufficiently protective) because some pit slope failures have resulted in breakback angles significantly less than 25°. In the application of the Western Australian guidelines to the Rhyolite Ridge mine, all rock units at the stratigraphic level of geologic unit B5 of the Cave Spring Formation or higher were regarded as weak based on the description of the units in the DEIS. In the absence of any information, the unknown buttress material was also regarded as weak or weathered. The widths of the Zones of Instability were calculated for the same six sections for which stability analyses were updated in the DEIS. All widths were reduced when a buttress was added to the section, except in the single section in which there was no Zone of Instability even without a buttress. Thus, the widths ranged from 0 to 450 feet without a buttress and from 0 to 225 feet with a buttress. Adding 50 feet to establish a safe region resulted in safe regions ranging from 50 to 500 feet upslope from the edge of the quarry without a buttress and 50 to 275 feet upslope from the	incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report. To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site. The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure. GLA did not use Guidelines for Mine Closure published by the LOPP, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of "Guidelines for Open Pit Slope Design" (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA's proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase.

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		edge of the quarry with a buttress. It is most important that Section TR02E-11, which is closest to the population of Tiehm's buckwheat that has separation distance of 15 feet from the quarry, has a Zone of Instability of 400 feet, with the safe region beginning 450 feet from the edge of the quarry. In other words, the Zone of Instability at Section TR02E-11 would extend far into the population of Tiehm's buckwheat. It should be noted that, according to the Western Australian guidelines, the Tiehm's buckwheat population that has a separation distance of 15 feet from the quarry could not be in the safe region even if there were no Zone of Instability (setting the safe region at 50 feet beyond the edge of the quarry). The mining plan involves the depressurization and the dewatering of the geologic units prior to construction of the quarry. The DEIS expresses the opinion that the slope materials will not be rewetted even by extreme precipitation or snowmelt events because the water will infiltrate to a very shallow depth and then evaporate. The preceding is only an opinion because it is not accompanied by any data, calculations or modeling. In particular, there is no consideration as to the hydrogeological and meteorological processes by which the geologic units became saturated and then pressurized in the first place. Thus, it should be assumed that the relevant geologic units will eventually become re-saturated and re-pressurized and there should be some consideration as to the time period over which this will occur. In addition, there should be some consideration as to the localized impact of the large volume of water that will be applied to the haul roads for dust suppression. Along the same lines, there should be some consideration as to the impact of the weight of vehicular traffic on the haul roads on slope stability. At the present time, nearly all large-scale mining projects involve the application of an Adaptive Management plan (also called the Observational Method). For complex projects, not all actions can be planned in advance. Instead, a monitoring program is set up together with a set of pre-planned actions ready for execution as a response to every possible adverse observation. The DEIS does describe a plan for monitoring slope instability, but only in terms of the particular instruments that will be used. The description of pre-planned responses to indications of instability consists of a single sentence that states that the mining activity could cease in response to any evidence of slope instability that could affect sensitive habitat. It is difficult to determine whether the assertion is meant to be taken literally, since it is found in a report by Geo-Logic Associates that is an attachment to the DEIS, and certainly does not represent a binding commitment by the mining company. The recommendation of this report is that the geotechnical sections of the DEIS be completely rewritten with special attention to the following: 1) A specific source should be identified for the buttress material with estimation of the geotechnical parameters for that particular source. 2) All of the raw geotechnical data should be presented with a complete explanation as to how those data were used to develop the geotechnical parameters. 3) The DEIS should specify which parameters were developed from data and which were based on judgment. Parameters that were based on judgment should be rigorously defended. 4) The discussion of the geotechnical parameters should include the uncertainty in the parameters. 5) The calculated factors of safety should include the uncertainty, such as the standard deviation. 6) A sensitivity analysis should be carried out in which the factor of safety for each section is re-calculated based on the entire range of reasonable values for the geotechnical parameters, such as the lowest reasonable values for cohesion and friction angle. If the factors of safety vary significantly for the reasonable range of input data, the results should be used with great caution. 7) A sensitivity analysis should be carried out in which the critical failure surface for each section is re-calculated based on the entire range of reasonable values for the geotechnical parameters, such as the lowest reasonable values for cohesion and friction angle. If the positions of the critical failure surfaces vary significantly for the reasonable range of input data, the results should be used with great caution. 8) It should not be assumed that all slope materials will remain unsaturated. The factors of safety should be re-calculated for a range of possible pore pressures and water tables, including the eventual possibility that pore pressures and the water table will return to premining levels. If the factors of safety are strongly dependent upon the assumption that all slope materials will be unsaturated, then the results for unsaturated materials should be used with great caution. 9) The localized re-saturation of slope materials that could result from the surface application of water for dust suppression on the haul roads should be calculated and the potential impact on slope stability should be assessed. 10) The weight of vehicular traffic on the haul roads should be taken into consideration for analyses of slope stability. 11) The distribution of possible values of the factor of safety should be developed for each section, so that the probability of failure can be calculated. 12) The stability analyses should be carried out in accordance with the most up-to-date map for the intended quarry. 13) The DEIS should adhere to the recommendations of Guidelines for Open Pit Slope Design (published by the Large Open Pit Project) and the SME Surface Mining Handbook (published by the Society for Mining, Metallurgy and Exploration) that the minimum factor of safety should be 1.5 and the maximum probability of failure should be 5% during the operational period (prior to buttress construction). 14) The DEIS should adhere to the recommendations of the Guidelines for Mine Closure (published by the Large Open Pit Project) that the minimum factor of safety should be 2.0 during the post-closure period (after buttress construction). 15) The factors of safety and the critical failure surfaces for the post-closure period should be calculated based on reasonable expectations for the rock mass degradation that will occur during the post-closure period. 16) For each section, the Zone of Instability should be calculated according to the guidelines of the Western Australian Department of Industry and Resources. The connecting lines for the geologic units that are at the stratigraphic level of Unit B5 of the Cave Spring Formation or higher should have an angle of 25° with respect to the horizontal. Local and regional outcrops should be investigated to determine whether some geologic units show breakback angles less than 25°, in which case, the connecting lines should be assigned the lower angle for those units. 17) Unless it can be convincingly argued to the contrary, the quarry should be designed so that the Tiehm's buckwheat population is at least 50 feet beyond the Zone of Instability, as specified in Western Australian regulations. 18) The Adaptive Management plan for the response to indications of slope instability should be specific and detailed with intermediate steps that would occur prior to a cessation of mining activity. Any claims that the mine will be closed in response to evidence of slope instability should be supported by a binding commitment from the mining company.	The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey (2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines. The current geotechnical report details the location of the Tiehm's buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12). The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability. Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species SER. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.
108 and 183	108.46 and 183.45	TABLE OF CONTENTS 	Comment noted.

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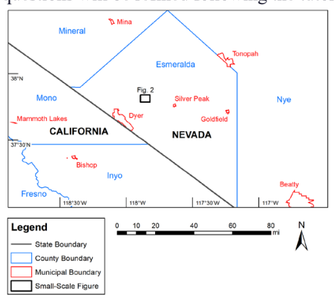
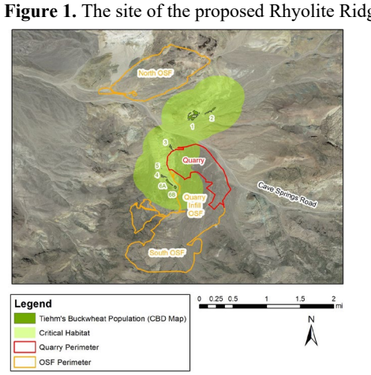
108 and 183	108.47 and 183.46	**OVERVIEW** The Australian mining company Ioneer has proposed the Rhyolite Ridge Lithium-Boron Project in Esmeralda County, southwestern Nevada (see Fig. 1). The open-pit mine would operate for 26 years with average annual production of 22,340 metric tons of lithium carbonate in the first three years, 21,951 metric tons per year of lithium hydroxide over the remaining mine life, and 174,378 metric tons per year of boric acid over the entire lifespan. The proven and probable mineral reserves have been estimated at 60.2 million metric tons with average grades of 0.1797% lithium and 1.5418% boron (Mining Technology, 2024). The Draft Environmental Impact Statement (DEIS) for the project was released by the Bureau of Land Management (BLM) on April 19, 2024 (Bureau of Land Management, 2024a). A portion of the open pit would be left permanently open after the closure of the mine, while the remainder would be backfilled with overburden and referred to as the "Quarry Infill OSF [Overburden Storage Facility]" (see Fig. 2). Additional Overburden Storage Facilities, called the North OSF and South OSF would be constructed to the north and southwest, respectively, of the open pit (see Fig. 2). Although the DEIS refers to the open pit as a "quarry," its maximum depth would be 960 feet (Bureau of Land Management, 2024b) and "quarry" typically refers to a shallow excavation for the extraction of aggregate. Since this report compares the DEIS with mining industry guidelines, the words "quarry" and "open pit" are used interchangeably. A central issue regarding the potential environmental impact of the Rhyolite Ridge mine is the presence of the world's only population of Tiehm's buckwheat only 15 feet from the edge of the proposed quarry on the northern side (see Figs. 2 and 3a-b). A subpopulation of Tiehm's buckwheat also occurs 208 feet from the western edge of the proposed quarry, while three subpopulations are found 329 feet, 281 feet, and 165 feet from the western edge of the Quarry Infill OSF (see Figs. 4a-b). The critical habitat for Tiehm's buckwheat (based on a 500-meter buffer) occurs well within both the quarry and the Quarry Infill OSF (see Fig. 2). The preceding distances were measured from the population map created by Ioneer and used in the DEIS, and for which the GIS shapefile was provided to the Center for Biological Diversity by the BLM. The Ioneer map is not identical to the map that has been in use by the Center for Biological Diversity (compare Figs. 3a and 4a with Figs. 3b and 4b). The issues of information in the DEIS that is inconsistent with information in other sources and of information in the DEIS that has already been acknowledged to be out-of-date will be discussed in the "Methodology" section. Based on the close proximity of the proposed quarry to Tiehm's buckwheat, the DEIS includes two attachments by the consulting company Geo-Logic Associates (2022, 2023) that argue that the Tiehm's buckwheat could not be impacted by instability of the mine pit slopes. The purpose of this report is to review the conclusions in the attachments and to address the following questions with regard to the Rhyolite Ridge mine: 1) Will the mine pit slopes be stable during the period of operation of the mine? 2) Will the mine pit slopes be stable after the closure of the mine? To facilitate reading by non-specialists, this report includes a tutorial on key geotechnical concepts, including the limit equilibrium method, factor of safety and probability of failure. The preceding questions will be refined following the tutorial and a summary of the stability analyses by Geo-Logic Associates (2022, 2023).  **Figure 1.** The site of the proposed Rhyolite Ridge Lithium-Boron Project is located in Esmeralda County in southwestern Nevada, close to the border between California and Nevada.  **Figure 2.** The quarry for the Proposed Ioneer Rhyolite Ridge Lithium-Boron Project would be constructed in close vicinity to the only existing population of Tiehm's buckwheat. The purpose of this report is to evaluate geotechnical analyses by Geo-Logic Associates (2022, 2023) that argue that instability of the quarry walls could not impact the Tiehm's buckwheat population either during mine operation or after mine closure. Maps of Tiehm's buckwheat population and critical habitat were provided by the Center for Biological Diversity. Maps of the quarry and Overburden Storage Facilities (OSF) were provided to the Center for Biological Diversity by the Bureau of Land Management. The green numbers refer to the Tiehm's buckwheat subpopulations. Figs. 3a-b and 4a-b show smallerscale views. Background is Google Earth imagery from August 9, 2013. The map is projected onto the WGS84 coordinate system.	A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report. The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report. For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report. To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site. The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure. GLA did not use Guidelines for Mine Closure published by the, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of "Guidelines for Open Pit Slope Design" (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the

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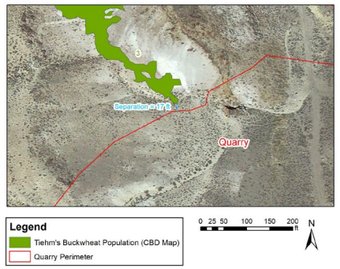
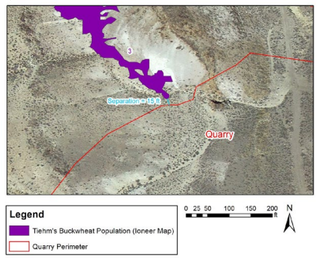
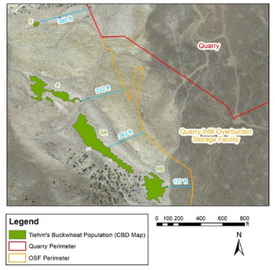
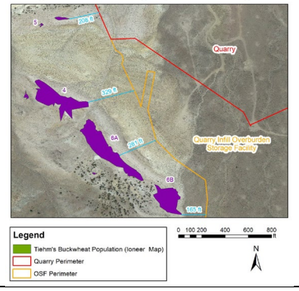
		 **Figure 3a.** According to the map of Tiehm's buckwheat that is used by the Center for Biological Diversity (CBD), the edge of the quarry would be 17 feet from the Tiehm's buckwheat population (see Figs. 3b and 16a for a different map that is used by Ioneer). The quarry map was provided to the Center for Biological Diversity by the Bureau of Land Management. The green number refers to the subpopulation. Fig. 2 shows a larger-scale view with labeled subpopulations. Background is Google Earth imagery from August 9, 2013. The map is projected onto the WGS84 coordinate system.  **Figure 3b.** According to the map of Tiehm's buckwheat that is used by Ioneer, the edge of the quarry would be 15 feet from the Tiehm's buckwheat population (see Figs. 3a and 16a for a different map that is used by the Center for Biological Diversity). The quarry map was provided to the Center for Biological Diversity by the Bureau of Land Management. The purple number refers to the subpopulation. Fig. 2 shows a larger-scale view with labeled subpopulations. Background is Google Earth imagery from August 9, 2013. The map is projected onto the WGS84 coordinate system.  **Figure 4a.** According to the map of Tiehm's buckwheat that is used by the Center for Biological Diversity (CBD), subpopulations 5, 4, 6A, and 6B would be 380 feet, 332 feet, 283 feet, and 177 feet, respectively, from the edge of the quarry (see Figs. 4b and 16b for a different map that is used by Ioneer). The perimeters of the quarry and Overburden Storage Facility (OSF) were provided to the Center for Biological Diversity by the Bureau of Land Management. The green number refers to the subpopulation. Fig. 2 shows a larger-scale view with labeled subpopulations. Background is Google Earth imagery from August 9, 2013. The map is projected onto the WGS84 coordinate system. 	guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA's proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase (Geo-Logic Associates, Inc. 2023. Supplemental Geotechnical Report. Rhyolite Ridge Lithium-Boron Project. Esmeralda County, Nevada. March 2023. Revised June 14, 2023). The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey (2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines. The current geotechnical report details the location of the Tiehm's buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12). The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability. Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species SER. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.

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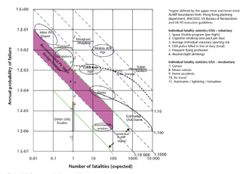
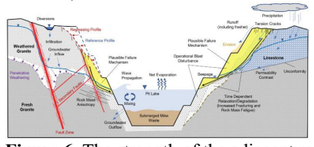
		Figure 4b. According to the map of Tiehm's buckwheat that is used by Ioneer, subpopulations 5, 4, 6A, and 6B would be 208 feet, 329 feet, 281 feet, and 165 feet, respectively from the edge of the quarry (see Figs. 4a and 16b for a different map that is used by the Center for Biological Diversity). The perimeters of the quarry and Overburden Storage Facility (OSF) were provided to the Center for Biological Diversity by the Bureau of Land Management. The purple number refers to the subpopulation. Fig. 2 shows a larger-scale view with labeled subpopulations. Background is Google Earth imagery from August 9, 2013. The map is projected onto the WGS84 coordinate system. It is important to consider the different issues that arise regarding pit slope stability during mine operation and after closure of the mine. During mine operation, the key issue is that failures of mine pit slopes are incredibly common, especially in comparison with other types of industrial accidents (Steffen et al., 2006; Wesseloo and Read, 2009; see Fig. 5). The mean annual probability of failure of a mine pit slope is about 6% with a range of 2-20%, which is considerably more common than failure rates of critical infrastructure in such high-risk industries as merchant shipping and offshore drilling (see Fig. 5). Steffen et al. (2006) pointed out that one would need to look at an ultrahigh-risk enterprise such as the Space Shuttle program to see a comparable failure rate (see Fig. 5). According to Steffen et al. (2006), in order to bring the failure rate of mine pit slopes into line with other types of industrial accidents, the annual probability of failure ought to be 1-10% for failure of a pit slope with a probability of one fatality of 1% and 0.1-1% for failure of a pit slope with a probability of one fatality of 10% (see Fig. 5). The high failure rate of mine pit slopes was part of the motivation for the creation of the industry-funded Large Open Pit Project in 2005 (LOP, 2024) and the subsequent publication of the Guidelines for Open Pit Slope Design (Read and Stacey, 2009). Some of the key recommendations of the Guidelines for Open Pit Slope Design have been incorporated into other mining industry guidance documents, such as the SME Surface Mining Handbook (Darling, 2023), which was published by the US-based Society for Mining, Metallurgy and Exploration in March 2023. Therefore, part of the approach of this report will be the comparison of the safety criteria selected by Geo-Logic Associates (2022, 2023) with the recommendations of the preceding and other mining industry standards. It should be noted that there is no information as to whether adherence to the preceding standards has reduced the failure rate of mine pit slopes over the past 15 years. A discussion of the comparative definition and significance of "failure" among different high-risk industries goes beyond the scope of this report and has been reviewed elsewhere (e.g., Whitham, 1984; Steffen et al., 2006; Wesseloo and Read, 2009). However, it is essential to respond to the assertion by Geo-Logic Associates (2023) that weaker safety criteria should be applied to open pit slope design in comparison to other industries. According to Geo-Logic Associates (2023), "The design criteria applied to mine pit slopes is complex and can vary depending on circumstances and consequences. Criteria applied to civil engineering structures are poor surrogates for mining applications." Geo-Logic Associates (2023) then quotes from Guidelines for Open Pit Slope Design in writing, "In open pit mining slope failure is not easily defined. Whereas in some engineering systems failure occurs immediately and is not reversible (e.g. the buckling of a structural column or the failure of a dam), in an open pit mine slope failure may take place gradually so that determining the stage at which the pit wall ceases to perform adequately may be highly subjective" (Wesseloo and Read, 2009). The statement is correct and it is fortunate that the vast majority of mine pit slope failures are sufficiently minor or sufficiently slow that they do not result in mineworker fatalities. However, it is still the case that the probability of an expected fatality resulting from a mine pit slope failure is about 4% (see Fig. 5), which would certainly correspond to a major, rapid and irreversible failure. At this point, it suffices to point out that Geo-Logic Associates (2023) and the Guidelines for Open Pit Slope Design reach very different conclusions, although relying on the same interpretation of a mine pit slope failure.  **Figure 5.** Failures of mine pit slopes are incredibly common in comparison with other types of industrial accidents. The mean annual probability of failure of a mine pit slope is about 6% with a range of 2-20%. Note that other figures related to probability of failure in this report refer not to the annual probability, but the probability of failure over the entire design life. The high failure frequency of mine pit slopes was part of the motivation for the writing of the Guidelines for Open Pit Slope Design (Read and Stacey, 2009) by the Large Open Pit Project (LOP, 2024). According to Steffen et al. (2006), in order to bring the failure rate of mine pit slopes into line other types of industrial accidents, the annual probability of failure ought to be 1-10% for failure of a pit slope with a probability of one fatality of 1% and 0.1-1% for failure of a pit slope with a probability of one fatality of 10%. There is no available data as to whether the annual probability of failure of a mine pit slope has changed since the release of the Guidelines for Open Pit Slope Design. Figure from Wesseloo and Read (2009). After closure of an open-pit mine, the key issues become the reduction in or complete lack of slope monitoring and on-site trained personnel who could detect and respond to signs of slope instability, as well as the typical long-term degradation of the strength of the rock masses adjacent to the open pit (see Figs. 6-7). Strength reduction can result from the rewetting of rock masses that eventually takes place after the cessation of dewatering and depressurization that accompanies open-pit mining. Other causes of long-term strength degradation are weathering of newly exposed slope materials and time-delayed responses to blasting and the radical changes in topography and stress levels that resulted from pit excavation. For example, the loss of the weight of overlying rocks and the loss of confinement by the rocks that were extracted from the open pit could allow the opening of vertical and horizontal joints (cracks), which could then lead to rockfalls (de Bruyn et al., 2019).  **Figure 6.** The strength of the adjacent rock mass typically decreases after closure of an open pit. This decrease results from time-delayed responses to blasting and the radical changes in topography and stress levels that accompanied the excavation of the open pit, as well as the eventual rewetting of the pit. For example, the removal of the weight of overlying rock could promote the opening of pre-existing joints (cracks) and there could be a slow creep of the adjacent rock faces toward the open pit. Figure from de Graaf et al. (2024).

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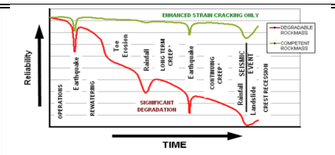
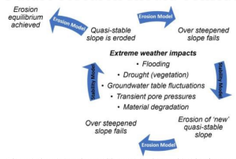
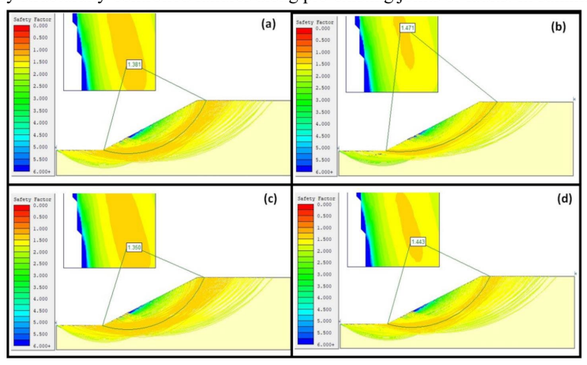
		 Figure 5 Influence of time-dependent and temporal changes on slope stability (*long-term creep active throughout, but rate assumed to accelerate with increased degree of rock mass degradation) **Figure 7.** The decrease in the strength of the adjacent rock mass can be moderate for a competent rock mass, but can be profound for a degradable rock mass. In any event, the strength (called the "reliability" on the y-axis) of the adjacent rock mass tends to decrease with time since pit closure. Figure from Carter et al. (2022). 8) and how the erosion-slope stability interaction is then driven by climate change. According to de Graaf (2024), "There is no tool for assessing the interdependency between erosion and slope stability: where progressive undercutting can destabilise local and overall slope stability. Typical erosion modelling assumes ongoing denudation and deposition of material (until equilibrium is achieved), but doesn't consider slope instability (which might accelerate the process to reaching a long term equilibrium profile – but could be very different from the 'erosion only' model). There currently isn't a process to integrate this feedback loop into the erosion and stability models … This is of most significance for highly erodible materials and for quasi stable longterm slopes … Future research should consider a coupled erosion-stability-climate analysis tool with quantification of time-dependent material strength degradation."  Figure 9: Coupled erosion-stability models with consideration for extreme weather impacts. **Figure 8.** At the present time, there is a lack of conceptual or theoretical knowledge regarding the coupled processes of erosion, slope instability and climate change that will drive a long-term reduction in the strength of the rock masses adjacent to open mining pits during the post-closure period (see Figs. 6-7). Figure from de Graaf et al. (2024). In light of the additional issues that occur for mine pit slopes in the post-closure period, the Large Open Pit Project has prepared the Guidelines for Mine Closure, which is scheduled for release in 2024 (LOP, 2024). Although the full guidelines have not yet been released as of the date of this report, the key recommendations are already present in a series of conference proceeding papers by the principal authors (de Graaf et al., 2021, 2024; Carter et al., 2022). Just as this report compares the safety criteria selected by Geo-Logic Associates (2022, 2023) with the recommendations of the Guidelines for Open Pit Slope Design for the operational period, it also compares the safety criteria selected by Geo-Logic Associates (2022, 2023) for the postclosure period with the recommendations of the Guidelines for Mine Closure. In terms of the revision of the DEIS or the preparation of a Supplemental Environmental Impact Statement (SEIS) or Final Environmental Impact Statement (FEIS), it would certainly be appropriate for the BLM to either wait for the release of Guidelines for Mine Closure or to consult with the authors of that volume.	
108 and 183	108.48 and 183.47	**TUTORIAL ON KEY GEOTECHNICAL CONCEPTS** ***Limit Equilibrium Method and Factor of Safety*** The limit equilibrium method evaluates the stability of a mass of rock or soil by assessing the tendency of a slope or structure to fail by one rigid block sliding over another (see Fig. 9). The output of the limit equilibrium method is the factor of safety, which is the ratio of the resistance to the load, or the ratio of the shear strength to the shear stress. Thus, a factor of safety equal to 1.0 indicates a slope on the cusp of failure, while higher factors of safety indicate slopes with increasing stability. The limitation of the limit equilibrium method is that not all failures involve the sliding of one rigid block over another. For example, the limit equilibrium method does not assess the tendency of a slope to fail by slow creep that could accelerate into more rapid motion, by rockfall, or by structurally-controlled failures along pre-existing joints or faults. In summary, the limit equilibrium method is a useful starting point, but should not be the totality of a slope stability analysis.  **Figure 9.** The factor of safety is the ratio of the shear strength to the shear stress (ratio of the resistance to the load) at some point within a slope, embankment or other type of earthen structure. The limit equilibrium method uses the unit weight, the shear strength parameters (cohesion and friction angle), pore water pressure, and position of the water table to calculate the factor of safety as averaged along every possible failure surface. The failure surface with the minimum factor of safety is called the critical failure surface. The factor of safety of the critical failure surface is regarded as the factor of safety of the structure. A factor of safety equal to 1.0 indicates that a structure is on the cusp of failure or, more precisely, that the probability of failure is 50% (see Fig. 10). It should	A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report. The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report. For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report.

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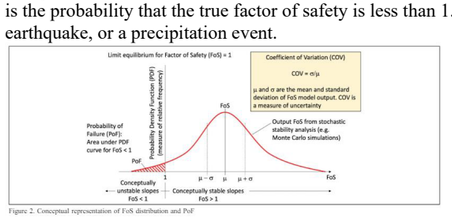
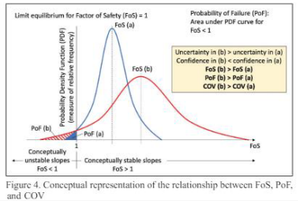
		be noted that the limit equilibrium method does not address all possible modes of failure, such as rockfall or structurally-controlled failures (movement along joints, faults, or other pre-existing planes of weakness). Figure from Sengani and Allopi (2022). The input data for the limit equilibrium method are the topography (geometry), the unit weights (densities), shear stress parameters (cohesion and friction angle), and pore water pressures throughout the slope or structure and its foundation, as well as the position of the water table. The precise meanings of cohesion and friction angle are not necessary for this report, except that higher cohesion and higher friction angle correspond to greater shear strength. Materials that are saturated (below the water table) have lower shear strength and materials that are over-pressurized with water have even lower shear strengths. The limit equilibrium method considers all possible failure surfaces and calculates the factor of safety at each point along a possible failure surface (see Fig. 9). The factor of safety of a failure surface is the average of the factors of safety along every point of a surface. The failure surface with the lowest factor of safety is called the critical failure surface and the factor of safety of the critical failure surface is regarded as the factor of safety of the slope or structure (see Fig. 9). It cannot be overemphasized that a factor of safety is not a measurement that is made, but the outcome of a model that depends upon a wide range of measurements, estimates and assumptions. There can be considerable uncertainty in the factor of safety as a result of uncertainty in the measurements of the input data and the incomplete sampling of structures for which the geotechnical parameters can have considerable spatial variability. There are also multiple computational methods for carrying out the limit equilibrium method for a given set of input data, each with its advantages and disadvantages, so that there is uncertainty as to whether the correct computational method has been used (Fell et al., 2015). As a consequence of the uncertainty in the data and the computational method, the calculated factor of safety cannot be assumed to be the same as the true factor of safety. A slope should be stable as long as the true factor of safety is greater than 1.0, although it should be kept in mind that the limit equilibrium method and its resulting factor of safety are evaluating only a narrow class of types of slope failures. However, because of the uncertainty in the calculated factor of safety, the engineering practice is to require a calculated factor of safety significantly greater than 1.0 in order to ensure that the true factor of safety (which could be less than the calculated factor of safety) is actually greater than 1.0. There are numerous publications, industry guidance documents, and regulations regarding the appropriate minimum factor of safety. These minimum factors of safety depend upon the application and the context, but a minimum factor of safety of 1.5 is common for many geotechnical applications (ANCOLD, 2012, 2019; Fell et al., 2015). ***Probability of Failure*** Based on the preceding subsection, the factor of safety should not be understood as a single value, but as the mean of a distribution of possible values, each of which corresponds to a possible set of input data (see Fig. 10). The area under the distribution curve is then the probability that the true factor of safety is less than 1.0, that is, the probability of slope failure (see Fig. 10). This probability of failure is the probability over the entire design life of the slope or structure, which is different from the annual probability of failure that was discussed in the "Overview" section (see Fig. 5). For example, an annual probability of failure of 0.1% corresponds to a probability of failure of 5% in at least one year over a 50-year period. In other words, a mine pit slope with a probability of failure of 5% over a 50-year life of active operation would have a stability that was quite close to the annual probability of failure of 0.1% that has been recommended to bring the safety of mine pit slopes into line with other types of industrial infrastructure (Steffen et al., 2006; Wesseloo and Read, 2009; see Fig. 5). From another perspective, the annual probability of failure is the probability that the true factor of safety is less than 1.0 (see Fig. 10) multiplied by the annual probability of an event that could trigger slope failure, such as blasting, vehicular traffic, an earthquake, or a precipitation event.  Figure 2. Conceptual representation of FoS distribution and PoF **Figure 10.** The factor of safety is not a measurement, but the outcome of an model that involves input data of unit weight, shear strength parameters (cohesion and friction angle), pore water pressure, and position of the water table, together with a computational method, such as one of the computational variations on the limit equilibrium method (see Fig. 9). For that reason, the factor of safety should not be regarded as a single value, but as the mean of a distribution of values that reflects the uncertainty in the input data. The area under the distribution curve for which the calculated factor of safety is less than 1.0 is the probability of failure, that is, the probability that the true value of the factor of safety is less than 1.0. Thus, a calculated factor of safety equal to 1.0 indicates that the probability of failure is 50%. The standard deviation is a measure of the spread of the distribution curve or the uncertainty in the input data. The coefficient of variation (COV) is the ratio of the mean to the standard deviation, so that a high COV indicates a high level of data uncertainty, and a high probability of failure for a given factor of safety (see Figs. 11 - 12). Figure from Macciotta et al. (2020). For a given mean factor of safety, the probability that the true factor of safety is less than 1.0 depends upon the spread in the distribution of possible values of the factor of the safety (see Fig. 10). One measure of the spread is the standard deviation, in which the range between one standard deviation less than the mean and one standard deviation greater than the mean includes 67% of the possible values of the factor of safety, assuming that the distribution follows a bellshaped or normal curve (see Fig. 10). The ratio of the standard deviation to the mean is called the coefficient of variation (COV) (see Fig. 10). The important point is that a slope or structure with a large mean factor of safety and large standard deviation can have a greater probability of failure than a slope or structure with a small mean factor of safety and small standard deviation (see Fig. 11). The preceding point emphasizes the danger of an excessive reliance on achieving a target factor of safety without regard for the standard deviation, which reflects the uncertainty in the data that were used to calculate the factor of safety. Fig. 12 illustrates the same point, in which, for a given mean factor of safety greater than 1.0, the probability of failure increases as the standard deviation increases (left-hand side), while, for a given COV, the probability of failure increases as the factor of safety decreases (right-hand side).  Figure 4. Conceptual representation of the relationship between FoS, PoF, and COV	To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site. The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure. GLA did not use Guidelines for Mine Closure published by the LOPP, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of "Guidelines for Open Pit Slope Design" (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA's proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase. The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey (2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines.

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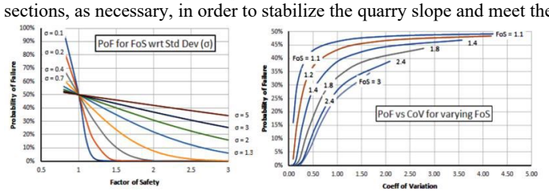
		Figure 11. The blue curve (a) represents a structure or slope with a low factor of safety and low data uncertainty, equivalent to low coefficient of variation (COV) (see definition of COV in Fig. 10). The red curve (b) represents a structure or slope with a high factor of safety and high data uncertainty, equivalent to high COV. The structure or slope corresponding to the red curve has a greater probability of failure, that is, a greater area under the distribution curve in the region for which the factor of safety is less than 1.0 (see a different way to show the same concept in Fig. 12). The diagram indicates the danger of excessive reliance on meeting a minimum factor of safety without giving due consideration to the uncertainty in the factor of safety. Thus, modern guidelines on open pit design require meeting requirements for both a minimum factor of safety and maximum probability of failure (see Figs. 20a-b and 22) or on basing the required minimum factor of safety on the uncertainty in the input data (see Figs. 23a and 26a-c). Figure from Macciotta et al. (2020).	The current geotechnical report details the location of the Tiehm's buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12). The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability. Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species SER. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.
108 and 183	108.49 and 183.48	**SUMMARY OF STABILITY ANALYSIS FOR RHYOLITE RIDGE OPEN PIT** The mine pit slopes at the proposed Rhyolite Ridge mine have been designed to achieve a minimum factor of safety of 1.2. According to Geo-Logic Associates (2022), "Cross sections that did not meet the project minimum factor of safety criteria of 1.2 or greater were reconfigured by stepping the quarry wall in or out, adjusting bench heights, and/or implementing a system of ground anchors in an iterative process until the slope was stabilized (i.e. until a minimum factor of safety of 1.2 or greater was attained for each cross section)." The justification for the selection of a minimum factor of safety of 1.2 was only that the minimum factor of safety of 1.2 had been set by the client. According to Geo-Logic Associates (2022), "The following scope of services was performed: … ▪ Performed static stability analysis for 19 cross sections around the proposed Quarry TR02- E provided by Ioneers's subcontractor NewFields. ▪ Developed conceptual recommendations for cross sections, as necessary, in order to stabilize the quarry slope and meet the project's minimum factor of safety criteria of 1.2 … "  **Figure 4 Characteristic relationships between Probability of Failure and Factor of Safety for differing analysis confidences (reliability)** **Figure 12.** On the left-hand side, for a given mean value of the factor of safety greater than 1.0, the probability of failure (area under the distribution curve for which the value of the factor of safety is less than 1.0) increases for increasing values of the standard deviation, which is a measure of the uncertainty in the input data (see Fig. 10 for a definition of standard deviation). On the right-hand side, for a given value of the coefficient of variation (COV), which is the ratio of the standard deviation to the mean (see Fig. 10), the probability of failure increases as the factor of safety decreases. See a different way to illustrate the same concept in Fig. 11. Figure from Carter et al. (2022). In a critique of the slope stability analysis, U.S. Fish and Wildlife Service (2022) wrote in an email to BLM, "What has changed to allow for support and stability structures to be developed in the quarry? For years we have heard because of the geology/soils of this area, there was no way to avoid the Tiehm's subpopulations. The geology and soils haven't changed, so what engineering wise makes this structurally sound? The quarry analysis is in Appendix N [Geo- Logic Associates (2022)] and was done by GLA (Geo-Logic Associates Inc.). This is downslope of the Tiehm area. There are no calculations shown or PE (Professional Engineer) stamps on the documents; these items will make the analysis more reliable as they will better fix the responsibility and liability of the engineers involved … One item that stood out to me was the Factor of Safety (FS) being used of 1.2. This is very low. Typically a FS of 1.5 is the minimum for most engineering work, and sometimes much higher depending on the risk. It could be that previous analyses used a higher FS and could not justify the stability; when the FS was lowered, it could be justified." The response of Geo-Logic Associates (2023) was simply that the minimum factor of safety of 1.2 was appropriate without reference to any guidance documents. According to Geo-Logic Associates (2023), "The assignment of a design criteria to any given quarry slope sector is typically a function of the potential consequences of failure and for these analyses is a FOS [Factor of Safety] of 1.20 or greater." **Table 1. Lithology of open pit1** **Unit Code** / **Formation** / **Lithologic Description** Q1 / Quaternary Alluvium / Young alluvium; unconsolidated coarse gravels, rounded to subangular clasts, dominant volcanic composition S3 / Cave Spring Fm. / Siltstone, medium bedded, occasional thin sandstone or gritstone, compact, some silicic zones, gray, green-gray and yellow-gray G4 / Cave Spring Fm. / Gritstone; lapilli tuff, fine to coarse, massive to poorly bedded, locally pumice rich, gray to orange, grades upward into siltstone M4 / Cave Spring Fm. / Carbonate and marl, dominant white massive limestone or tufa, some zones laminated stromatolite, dense to porous, minor thin siltstone or gritstone interbeds, irregular silicic zones, white, beige G5 / Cave Spring Fm. / Gritstone, coarse lapilli tuff, often vuggy and very porous from leached pumice, very rough texture, much friable, angular volcanic fragments in lower portion; dominantly orange to yellow oxidized, some leisegang banding, gray when unaltered M5 / Cave Spring Fm. / Claystone and marl, some upper swelling clay locally waxy and friable, thin to medium bedded marl, distinct zone of medium banded gray and white marl, toward base increasing possibility of calcite pseudomorphs after borates; off-white, light gray, beige to tan	A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report. The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed in figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report. For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report. To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site. The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on

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B5	Cave Spring Fm.	Marl, minor claystone and siltstone, thin to medium bedded, all very fine grained, dense where dominated by searlesite, occasional calcite pseudomorphs after borate, rare ulexite, sedimentary breccia near base; gray to bluish-gray to white
S5	Cave Spring Fm.	Siltstone, locally interbedded thin marl, sandstone, medium bedded, some pebbly beds bearing ostracods, brown and tan at top, some thin green layers, rest gray to gray-brown
G6	Cave Spring Fm.	Gritstone, sandstone, mostly massive, lapilli tuff and diamictite, locally coarse pumiceous, gray; grades upward into siltstone
L6	Cave Spring Fm.	Marl, minor siltstone and claystone, often finely banded, much medium wavy bedded, locally silicic beds, gray, tan, brown, beige, cream; may include sections of gritstone or diamictite
Lsi	Cave Spring Fm.	Marl, carbonate with abundant silica, medium bedded, siliceous knobs or lenses, gray, white, tan or brown
G7	Cave Spring Fm.	Diamictite, massive, some crude bedded sandstone, mixed angular volcanic clasts of all sizes but mostly coarse, occasional carbonate, dark gray to gray
Tlv	Argentite Canyon Volcanics	Porphyritic latite, massive, dense, commonly large feldspar phenocrysts, often brecciated, may grade into diamictite: gray to dark gray
Tbx	Rhyolite Ridge Tuff	Tuff breccia, massive, lithic angular volcanic fragments in fine tuffaceous matrix, some crystal fragments, cream, pink, light gray; occasional zones welded tuff to vitrophyre
Z	Silver Peak Fm.	Sandstone, siltstone, mostly unsorted, pebbly sandstone or conglomerate, massive to faintly bedded, subrounded clasts, possibly volcanic, brown or gray-brown

1Redrawn from Geo-Logic Associates (2023)

Table 1 - Material Properties

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion 2 (psf)	Phi 2 (deg)	Anisotropic Linear A (deg)	Anisotropic Linear B (deg)	Anisotropic Surface	Water Surface	Ru
Q1		120	Mohr-Coulomb	550	37						None	0
S3		124.4	Anisotropic Linear	555.7	23.3	7920	39.42	5	10	Anisotropic Surface 1	None	0
G4		120	Mohr-Coulomb	11376	35.53						None	0
M4		146.7	Anisotropic Linear	476.7	39.77	4608	26.23	5	10	Anisotropic Surface 2	None	0
G5		120	Mohr-Coulomb	4608	31.19						None	0
M5a		110	Mohr-Coulomb	271.85	7.78						None	0
M5		133.4	Anisotropic Linear	567.7	14.92	3168	19.58	5	10	Anisotropic Surface 3	None	0
B5		130.4	Anisotropic Linear	567.7	14.92	8784	40.17	5	10	Anisotropic Surface 4	None	0
S5		123.2	Anisotropic Linear	788.1	33.1	6768	36.18	5	10	Anisotropic Surface 5	None	0
G6		120	Mohr-Coulomb	4464	27.04						None	0
L6		134.3	Anisotropic Linear	496.47	24.6	5904	32.33	5	10	Anisotropic Surface 6	None	0
LSI		130	Anisotropic Linear	496.47	24.6	5904	32.86	5	10	Anisotropic Surface 7	None	0
G7		130.9	Mohr-Coulomb	12384	49.77						None	0
Tbx Dn0.7		145	Mohr-Coulomb	14688	45.02						None	0
Buttress		125	Mohr-Coulomb	150	37						None	0

Figure 13. The geotechnical analysis by Geo-Logic Associates (2022, 2023) states the unit weights and shear stress parameters (cohesion and friction angle ("Phi") for each geologic unit with ultra-precision, sometimes with five significant digits. Geo-Logic Associates (2022, 2023) does not provide any information on the uncertainty in the input data that would justify such a high degree of precision. In addition, the factors of safety that are calculated from the unit weights and shear stress parameters are stated as single values with no range of uncertainty (see Fig. 15). In particular, there is no sensitivity analysis that would show the range of possible factors of safety that could result from reasonably possible alternative values for the geotechnical parameters and there is no distribution of possible values for the factor of safety that would make it possible to estimate the probability of failure (see Figs. 10-11). The low degree of uncertainty and high precision that is implied in the above table is quite unlikely in light
of the raw data in Geo-Logic Associates (2022) that show a very small number of measurements for each sample with a high degree of scatter (see Fig. 19). Geo-Logic Associates (2022) states that some of the material properties were obtained from a report by the consulting company EnviroMine (2019) that is not available for public review, while other material properties were simply the judgment of Geo-Logic Associates. Geo-Logic Associates (2022, 2023) does not identify any source or type of material for the buttress, so that the geotechnical parameters of the buttress should be regarded as strictly hypothetical. Finally, it was assumed that all geologic units would be unsaturated (see column second from right-hand side) both during mine operation and indefinitely through the postclosure period. Table from Geo-Logic Associates (2022).

Geo-Logic Associates (2023) used the geotechnical properties that were provided by EnviroMine (2019) (see Table 1 and Fig. 13) to update the stability analyses for six sections across the proposed quarry, including TR02E-5, TR02E-6, TR02E-7, TR02E-8, TR02E-9, and TR02E-11 (see Fig. 14). The last five sections are of special interest for this report since they intersect subpopulations of Tiehm's buckwheat. In particular, section TR02E-11 intersects the population of Tiehm's buckwheat that would occur only 15 feet from the edge of the quarry (see Fig. 14 and compare with Figs. 2 and 3a-b). The stability analyses were updated for the slopes without buttresses, corresponding to the pit slopes as they would exist during the operational period (see column "Final Slope Configuration" in Fig. 15), and for the slopes with buttresses, corresponding to the pit slopes as they would exist during the post-closure period (see column "Condition 1" in Fig. 15). The difference between "Condition 1" and "Condition 2" in Fig. 15 is that "Condition 1" includes ground anchors. While there is a plan to construct buttresses for Sections TR02E-5 and TR02E-8, there is no plan to install ground anchors at those sections (see Figs. 14 and 15).

The factors of safety during the operational period (without a buttress) range from 1.20 to 1.26 (see Fig. 15), or just barely above the minimum factor of safety that was selected by Geo-Logic Associates (2022, 2023). The section of greatest concern (TR02E-11) because it would intersect the population of Tiehm's buckwheat that would be only 15 feet from the edge of the quarry, would have a factor of safety of only 1.21 (see Figs. 14-15). The addition of a buttress increases the factor of safety from 1.21 to 1.52, from 1.24 to 1.31, from 1.26 to 1.45, from 1.20 to 1.57, from 1.22 to 1.25, and from 1.21 to 1.33 for Sections TR02E-5, TR02E-6, TR02E-7, TR02E-8, TR02E-9, and TR02E-11, respectively (see Fig. 15). The installation of ground anchors does not appear to have any impact on the factors of safety (see Fig. 15).

"Condition 3" in Fig. 15 refers to the factor of safety that would occur after buttress construction along the critical failure surface that would have existed prior to buttress construction (see Fig. 15). It is not surprising that these factors of safety greatly increase, since failure is no longer predicted to occur along these surfaces. The point is presumably that the addition of a buttress advances the critical failure surface inward toward the quarry, so that failure occurs within the buttress, as opposed to within the pit walls (such as, beneath the population of Tiehm's buckwheat). However, there is no consideration as to how the pit walls will continue to evolve after failure of the buttress. By contrast, the possibility of progressive failure of the buttress followed by failure of the pit walls was taken into account in the postclosure recommendations of de Bruyn et al. (2019). Under the assumption that pit slope buttresses would be constructed out of waste rock (the rock

different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure.

GLA did not use Guidelines for Mine Closure published by the LOPP, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of "Guidelines for Open Pit Slope Design" (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure.

This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA's proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase.

The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey (2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines.

The current geotechnical report details the location of the Tiehm's buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12).

The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability.

Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the

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		that must be removed to reach the ore body), de Bruyn et al. (2019) wrote, “Consider the stability of the waste rock buttress in the long-term. Although the material used for the buttress will likely be dumped at its current angle of repose, it is possible that this angle will reduce in the long-term as the properties of the waste rock deteriorate. Any significant failure (not merely surficial ravelling) or erosion of the waste buttress in the long-term, reducing its effective width/volume, will reduce its effectiveness as a support measure. This could conceivably result in an increase in the risk of failure of the original slope it is meant to support, such that the acceptance criteria for the closure plan are no longer met.”	Threatened and Endangered Species SER. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.

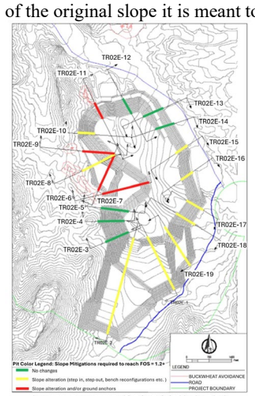

Figure 4-13 – Quarry TR03-D with Color Coded Mitigation Criteria

Figure 14. Geo-Logic Associates (2023) updated the design of Sections TR02E-05, TR02E-6, TR02E-7, TR02E-8, TR02E-9, and TR02E-11 with a goal of increasing the factor of safety (see Fig. 15). Figure from Geo-Logic Associates (2022) with overlay of larger labels for ease of reading.

Table 2 - Buttress Slope Stability Results

Section	Ground anchors included in section (yes/no)	Final Slope Configuration FOS (Prior to buttress implementation)	FOS for Condition 1*	FOS for Condition 2**	FOS for Condition 3***
TR02E-5	No	1.21	-	1.52	1.91
TR02E-6	Yes	1.24	1.31	1.31	2.71
TR02E-7	Yes	1.26	1.45	1.45	1.81
TR02E-8	No	1.20	-	1.57	1.84
TR02E-9	Yes	1.22	1.25	1.25	2.15
TR02E-11	Yes	1.21	1.33	1.33	2.45

*Condition 1 – Post-mining buttress is in place covering ground anchors and the critical failure surface is located entirely within the buttress.
**Condition 2 – The same post-mining buttress from Condition 1 is in place and ground anchors are either absent or have become passive (unloaded).
***Condition 3 –The same post-mining buttress configuration from Conditions 1 and 2 is analyzed with the exact same minimum slip surface from the Final Slope Configuration FOS. This result shows how the buttress increases the factor of safety along the Final Slope Configuration slip surface below buckwheat areas.

Figure 15. Without a buttress, the factors of safety for Sections TR02E-5, TR02E-6, TR02E-7, TR02E-8, TR02E-9, and TR02E-11 (see Fig. 14) range from 1.20 to 1.26. The stability analyses for the sections without an added buttress correspond to the operating period of the quarry, since a buttress is constructed as a part of pit closure. Thus, even without a buttress, the factors of safety fulfill the minimum factor of safety of 1.2 that was set by Geo-Logic Associates (2022, 2023), but not the minimum factor of safety of 1.3-1.5 that is recommended by the Guidelines for Open Pit Slope Design and the SME Surface Mining Handbook. The upper range of 1.5 would be preferred for the Rhyolite Ridge mine due to the high degree of uncertainty in the geotechnical data (see Fig. 19). The addition of buttresses for pit closure (Condition 1) increases the factors of safety to the range 1.25-1.57. This again fulfills the minimum factor of safety of 1.2 that was set by Geo-Logic Associates (2022, 2023), but not the minimum factor of
safety of 2.0 that would be recommended by the Guidelines for Mine Closure (see Fig. 26a-c) for the pit wall condition, failure consequences, and design confidence of the quarry at the Rhyolite Ridge mine. The right-hand column (Condition 3) states the factor of safety for a surface that is not the critical failure surface, so that its significance is not apparent. Figure from Geo-Logic Associates (2023).

The recommendations by de Bruyn et al. (2019) further considered the need for the buttress to reduce the width of the Zone of Instability as defined in Western Australian guidelines (Department of Industry and Resources, 1997). According to de Bruyn et al. (2019), “These guidelines provide generic design criteria to determine the likely zone of instability (ZoI) for long-term post-mining instability; i.e. the area designated as the potentially unstable pit edge zone … Using the identified critical failure mode(s), determine the position and level of waste material that will need to be dumped against the pit wall to maintain its stability in the long-term (i.e. which will meet the required design acceptance criteria) such that the reduced ZoI allows the abandonment bund to be located at the position required. Verify the stability of the pit slope and dumped in-pit waste material in the long-term to allow for the ZoI to be reduced as necessary.” The significance of the Zone of Instability will be further considered in the “Methodology and “Responses” sections.

An additional assumption made in Geo-Logic Associates (2022, 2023) is that, after dewatering and de-pressurization to allow construction of the open pit, all of the relevant geologic units would be above the water table both during mine operation and during the postclosure period (see Fig. 13). According to Geo-Logic Associates (2022), “For stability calculations performed herein, GLA [Geo-Logic Associates] has assumed that the quarry slopes will be dry as a result of dewatering performed during mine operations and pit development.” Geo-Logic Associates (2022, 2023) both stated, “Slopes are considered to be dewatered with no excess pore pressures as indicated by Ioneer and their consultant HydroGeoLogica.” In other words, as with the assumption of a minimum factor of safety of 1.2, the permanently low position of the water table was an assumption that was supplied to Geo-Logic Associates by their clients.

Geo-Logic Associates (2023) recognized that it was not obvious to everyone that geologic units that had been dewatered for pit construction would remain permanently dewatered. According to Geo-Logic Associates (2023), “The U.S. Fish and Wildlife Service has expressed concerns about the potential effectiveness of the proposed program for dewatering/ depressurization

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		of the quarry at Rhyolite Ridge and the potential impact of surface water infiltration during extreme snowmelt events and/or precipitation events on pore pressures and stability." In an email to the Bureau of Land Management, U.S. Fish and Wildlife Service (2022) expressed in their own words, "Stability calculations were done assuming quarry slopes were dry. What if dewatering the slopes fail or there is an intense rain or snow storm? This page also says that this area because of the type of clay it is, may be challenging to dewater. Why weren't stability calculations done for extreme weather events if there is so much concern about slope stability? … I would request slope stability analyses for wet or saturated soils and whether there is still any FS or whether the slopes will fail." The response by Geo-Logic Associates (2023) was that, even for extreme precipitation and snowmelt events, the excess water would either become surface runoff or would infiltrate to a shallow depth and then evaporate, but would not reach the geologic units that could result in slope instability. According to Geo-Logic Associates (2023), "As regards the impact of infiltration during snowmelt or precipitation events, as difficult as it may be to depressurize and remove water from these low permeability clays, it is even more difficult to put it back in. The vast majority of the water applied to the surface will simply become surface runoff. The small fraction that does infiltrate will initially form a shallow saturated wetting front at the surface that will continue to grow as long as the source of water at the surface persists and will exhibit small positive pore water pressures. As soon as the surface water source goes away, the water in the wetting front will continue to redistribute at depth, but now as an unsaturated wetting front with negative pore water pressures (soil suction). The depth of penetration in these low permeability soils will remain very near the surface and the effects of potential evaporation at the surface will eventually remove most if not all of the water in the wetting front as long as it remains above the 'extinction depth' (the depth below which potential evaporation at the surface is no longer effective). In summary, there is no risk of any significant volume of water from surface infiltration reaching the deep critical failure planes associated with the weak anisotropic clays that present the most serious stability risk in the quarry." The final item of particular interest in Geo-Logic Associates (2023) is the Adaptive Management plan for slope stability. Adaptive Management is also called the Observational Method and is the approach used by nearly all large-scale mining and other engineering projects at the present time. For complex projects, it is not possible to determine all actions in advance because some later actions will depend on the unknown outcomes of earlier actions. Instead, a monitoring plan is created together with a set of preplanned actions ready for execution in response to every possible adverse observation. According to the Global Industry Standard on Tailings Management (GISTM), the Observational Method is "a continuous, managed, integrated, process of design, construction control, monitoring and review that enables previously defined modifications to be incorporated during or after construction as appropriate … The key element of the Observational Method is the proactive assessment at the design stage of every possible unfavourable situation that might be disclosed by the monitoring programme and the development of an action plan or mitigative measure to reduce risk in case the unfavourable situation is observed" (ICMM-UNEP-PRI, 2020). The GISTM continues, "Full implementation of the Observational Method shall be adopted for non-brittle failure modes" (ICMM-UNEP-PRI, 2020), referring to failure modes that occur with some warning or precursors, so that there is sufficient time for observations and pre-planned responses. The GISTM would be strictly applicable only to tailings facilities, not mine pits. Thus, the GISTM should be applicable to the proposed Spent Ore Storage Facility (SOSF) for the Rhyolite Ridge mine (Bureau of Land Management, 2024a), which is not reviewed in this report. The potential relevance of the GISTM to the proposed quarry will be discussed in the "Responses" section. At this point, it suffices to point out that Company Members of the International Council on Mining and Metals (ICMM) have been obligated to fully comply with the requirements of the GISTM since August 5, 2023 (ICMM, 2021). Ioneer is not a Company Member of ICMM, but it is noteworthy that Association Members of ICMM include the Australasian Institute of Mining and Metallurgy (AusIMM), the International Lithium Association (ILiA), the Minerals Council of Australia (MCA), the US-based National Mining Association (NMA), and the US-based Society for Mining, Metallurgy and Exploration (SME) (ICMM, 2024). It is not clear to what industry guidelines Ioneer adheres, since the company is not a member of either the Minerals Council of Australia (MCA, 2024), nor the International Lithium Association (ILA, 2024). The Adaptive Management plan (Observational Method) in Geo-Logic Associates (2023) consists largely of descriptions and photographs of types of instruments that could be used to monitor slope stability, but without any specific plan as to how those instruments would be used. The set of preplanned actions then consists of the single sentence stating, "Preliminary concepts for adaptive management actions include suspending mining activity, stopping mining activity and implementing mitigation measures in an area if detrimental instability near sensitive habitat is identified, based on monitoring" (Geo-Logic Associates, 2023). There is no clarification as to how or whether "suspending mining activity" and "stopping mining activity" are different concepts. It is most important that the mining company Ioneer has made no apparent commitment to close the mine if there is indication that slope instability could be affecting Tiehm's buckwheat habitat. Nevertheless, the preceding quote does help to clarify that a slope failure that could impact the Tiehm's buckwheat population would be an accident with very high consequences. The implied consequences of slope failure will form the context in this report for evaluating the statement by Geo-Logic Associates (2023) in the same document that "the assignment of a design criteria to any given quarry slope sector is typically a function of the potential consequences of failure and for these analyses is a FOS of 1.20 or greater." **METHODOLOGY** Based on the preceding sections, the objectives of this report can be subdivided into the following questions regarding the geotechnical analysis in the DEIS: 1) Are the calculated factors of safety reliable? 2) Was the choice of 1.2 for the minimum factor of safety appropriate for the operational period? 3) Was the choice of 1.2 for the minimum factor of safety appropriate for the post-closure period? 4) Was the Zone of Instability for open pits as specified in Western Australian guidelines properly taken into account? 5) Was the assumption that slope materials will remain unsaturated justified? 6) Is the proposed Adaptive Management plan adequate? Before addressing the methodology for answering the preceding questions, it is appropriate to return to the issues raised in the "Overview" section that some information in the DEIS is inconsistent with information in other sources and that some information in the DEIS has already been acknowledged by the Bureau of Land Management to be out-of-date. The maps of the Tiehm's buckwheat populations prepared by Ioneer for the DEIS and in use by the Center for Biological Diversity are compared in Figs. 16a-b. On the northern side of the quarry, the Ioneer version of the population is shifted toward the east and the south, although not in a consistent manner (see Fig. 16a). On the western side of the quarry, the Ioneer version of the population appears more generalized and may show additional subpopulations or clusters to the northeast of subpopulation 5, to the west of subpopulation 4, and to the southwest of subpopulation 6A (see Fig. 16b). The correct location of the quarry is of critical importance, since that is the basis for the slope stability analyses. Without a correct location for the quarry, due to the very complex geology of faulted and folded geologic units, there is no way of knowing which geologic units will be intersected by the quarry walls, at what depths the units will be intersected, and what will be the inclinations (dips) of the units at those depths. Shapefiles for both the quarry perimeter and the haul roads were provided to the Center for Biological Diversity by the Bureau of Land Management. The quarry perimeter shows an indentation that would exactly accommodate the planned haul road (compare Figs. 17a-b). With regard to the haul road shapefile that was provided, the Bureau of Land Management (2024c) wrote, "The haul road location is currently being adjusted by Ioneer based on the consultation process between the BLM and the U.S. Fish & Wildlife Service. As such, the current shapefiles for the haul road location would provide no valuable information." Thus, if the haul road map (see Fig. 17b) does not show the haul road that would actually be constructed, then the quarry map (see Fig. 17a) is not the quarry that would actually be constructed, although the quarry map was the basis for the stability analyses in Geo- Logic Associates (2022, 2023). In the absence of any other workable procedure, the stability analyses contained in Geo-Logic Associates (2022, 2023) were evaluated in this report, even though it is clear that they must already be out-of-date. No attempt was made in this report to document all inconsistencies or outdated information in the DEIS.	

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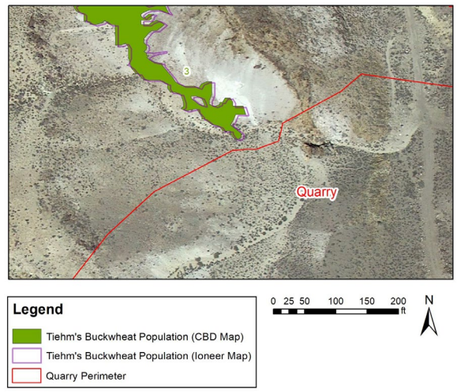

Figure 16a. The Tiehm's buckwheat population maps that are used by the Center for Biological Diversity (CBD) and Ioneer are not identical. According to the CBD map, the edge of the quarry would be 17 feet from the Tiehm's buckwheat population (see Fig. 3a), while the separation distance would be 15 feet according to the Ioneer map (see Fig. 3b). The Ioneer map was provided to the Center for Biological Diversity by the Bureau of Land Management and is the map that was used in preparation of the Draft Environmental Impact Statement. The quarry map was also provided to the Center for Biological Diversity by the Bureau of Land Management. The green number refers to the subpopulation. Background is Google Earth imagery from August 9, 2013. The map is projected onto the WGS84 coordinate system.

Figure 16b. The Tiehm's buckwheat population maps that are used by the Center for Biological Diversity (CBD) and Ioneer are not identical. According to the CBD map, subpopulations 5, 4, 6A, and 6B would be 380 feet, 332 feet, 283 feet, and 177 feet, respectively from the edge of the quarry (see Fig. 4a). According to the Ioneer map, subpopulations 5, 4, 6A, and 6B would be 208 feet, 329 feet, 281 feet, and 165 feet, respectively from the edge of the quarry (see Fig. 4b). On the west side of the quarry, in comparison with the CBD map, the Ioneer map appears more generalized and may show additional subpopulations or clusters to the northeast of subpopulation 5, to the west of subpopulation 4, and to the southwest of subpopulation 6A. The Ioneer map was provided to the Center for Biological Diversity by the Bureau of Land Management and is the map that was used in preparation of the Draft Environmental Impact Statement. The quarry map was also provided to the Center for Biological Diversity by the
Bureau of Land Management. The green number refers to the subpopulation. Background is Google Earth imagery from August 9, 2013. The map is projected onto the WGS84 coordinate system.

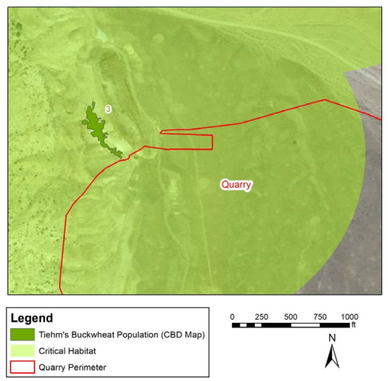

Figure 17a. The quarry perimeter shows an indentation that would exactly accommodate the planned haul road (compare with Fig. 17b). The quarry and haul road maps were provided to the Center for Biological Diversity by the Bureau of Land Management. With regard to the map that was provided, the Bureau of Land Management (2024c) wrote, "The haul road location is currently being adjusted by Ioneer based on the consultation process between the BLM and the U.S. Fish & Wildlife Service. As such, the current shapefiles for the haul road location would provide no valuable information." Thus, if the haul road map (see Fig. 17b) does not show the haul road that would actually be constructed, then the quarry map shown above is not the quarry that would actually be constructed, although the quarry map was the basis for the stability analyses in Geo-Logic Associates (2022, 2023). The green number refers to the Tiehm's buckwheat subpopulation. Background is Google Earth imagery from August 9, 2013. The map is projected onto the WGS84 coordinate system.

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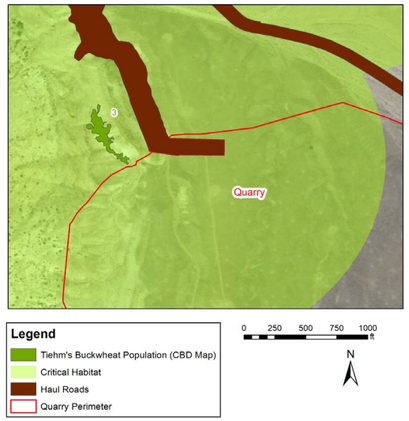


Figure 17b. The quarry perimeter shows an indentation that would exactly accommodate the planned haul road (compare with Fig. 17a). The quarry and haul road maps were provided to the Center for Biological Diversity by the Bureau of Land Management. With regard to the map that was provided, the Bureau of Land Management (2024c) wrote, "The haul road location is currently being adjusted by Ioneer based on the consultation process between the BLM and the U.S. Fish & Wildlife Service. As such, the current shapefiles for the haul road location would provide no valuable information." Thus, if the haul road map does not show the haul road that would actually be constructed, then the quarry map (see Fig. 17a) is not the quarry that would actually be constructed, although the quarry map was the basis for the stability analyses in Geo-Logic Associates (2022, 2023). The green number refers to the Tiehm's buckwheat subpopulation. Background is Google Earth imagery from August 9, 2013. The map is projected onto the WGS84 coordinate system.

The first question regarding the reliability of the calculated factor of safety was addressed based on basic scientific principles. The second question regarding the appropriate minimum factor of safety for the operational period was addressed based on the Guidelines for Open Pit Slope Design, as well as both earlier and later industry publications, and taking into account the consequences of slope failure, as discussed in the previous section. The third question regarding the appropriate minimum factor of safety for the post-closure period was addressed based on the soon to be released Guidelines for Mining Closure, as outlined in recent summaries by the principal authors. For the post-closure period, the consequences of slope failure were developed with comparison to the Global Industry Standard for Tailings Management, in addition to other industry guidance documents that relate to consequences of failure.

The fourth question regarding the Zone of Instability as specified in Western Australian guidelines was addressed by reference to Safety Bund Walls around Abandoned Open Pit Mines—Guideline (Department of Industry and Resources, 1997). Although the Western Australian governmental agency is now called the Department of Energy, Mines, Industry Regulation and Safety, recent publications on mine closure in Australia clarify that the guidelines are still in active use (Wright, 2016; de Bruyn et al, 2019; de Graaf et al., 2019). To the knowledge of the author, the only other governmental guideline or regulation regarding the unstable zone or the safe zone around a closed mining pit is Ontario Regulation 240/00—Mine Development and Closure (Government of Ontario, 2000). According to the Ontario regulations, "If boulder fencing [to indicate the boundary between the unstable zone and the safe zone] is used, the boulders … where no geotechnical study exists, shall be set back from the toe of the pit at least a distance equivalent to the pit depth so as to locate the boulder fence beyond any area of potential pit instability" (Government of Ontario, 2020). The same regulation is re-stated for the conditions "If berming is used" and "If fencing is used" (Government of Ontario, 2000). The Ontario regulation is equivalent to defining the unstable zone as the zone within a line drawn from the toe of the pit to the ground surface at a 45° angle.

According to the Western Australian guidelines, the Zone of Instability for the exterior of open pits is calculated by constructing a line from the toe of the pit to the surface. For unweathered (unoxidized) rock, the slope of the line is 45°, while the slope is 25° with respect to the horizontal for weathered (oxidized) rock. The slope of the connecting line (also called the breakback angle) changes as it passes from weathered to unweathered rock (see Fig. 18a). In pits with more complex geometry, the connecting line might intersect an interior surface before reaching the upper ground surface. In those cases, the line re-begins at the next toe (inter-ramp section) in the upward direction (see Fig. 18b). The guidelines require the construction of a safety bund wall (with a width of 5 meters) at a minimum distance of 10 meters upslope from the Zone of Instability (as measured in the horizontal direction away from the pit) (see Fig. 18a). Thus, the safe zone is regarded as 15 meters (roughly 50 feet) upslope from the Zone of Instability in the horizontal direction (see Fig. 18a). Even when there is no Zone of Instability, for example, when an open pit is constructed in unweathered rock in which the pit walls have angles shallower than 45°, the safe region still begins no closer than 50 feet from the edge of the pit. Thus, a population of Tiehm's buckwheat at a distance of 15 feet from the quarry could not be regarded as living in a safe or stable zone according to the Western Australian guidelines.

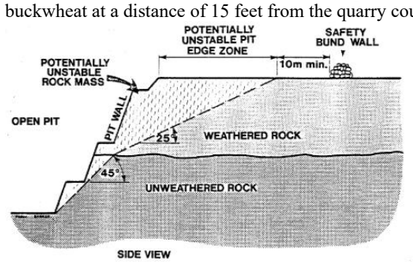
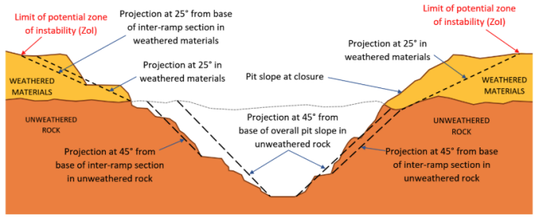


Figure 4
CASE 3: PIT WALL IN WEATHERED AND UNWEATHERED ROCK.

Comment Letter No.	Comment Number	Comment	Response
		Figure 18a. According to the guidelines of Department of Industry and Resources (Western Australia), the Zone of Instability for the exterior of open pits is calculated by constructing a line from the toe of the pit to the surface. For unweathered (strong) rock, the slope of the line is 45°, while the slope is 25° with respect to the horizontal for weathered (soft) rock. The slope of the connecting line changes as it passes from weathered to unweathered rock. The guidelines require the construction of a safety bund wall (with a width of 5 meters) at a minimum distance of 10 meters upslope from the Zone of Instability (as measured in the horizontal direction away from the pit). Thus, the safe zone is regarded as 15 meters (roughly 50 feet) upslope from the Zone of Instability in the horizontal direction. Fig. 18b shows the guidelines for a more complex pit geometry. Figure from Department of Industry and Resources (Western Australia) (1997).  Figure 2 Sectional view through the final pit showing the projected position of the potentially unstable edge zone (zone of instability – ZoI) surrounding the pit at surface **Figure 18b.** According to the guidelines of Department of Industry and Resources (Western Australia), the Zone of Instability for the exterior of open pits is calculated by constructing a line from the toe of the pit to the surface. For unweathered (strong) rock, the slope of the line is 45°, while the slope is 25° with respect to the horizontal for weathered (soft) rock. The slope of the connecting line changes as it passes from weathered to unweathered rock (see Fig. 18a). In pits with more complex geometry, the connecting line might intersect an interior surface before reaching the upper ground surface. In those cases, the line re-begins at the next toe (inter-ramp section) in the upward direction. Figure from de Bruyn et al. (2019). The Western Australian guidelines have been applied in other countries and, in some cases, have been more conservative. For example, prior to the closure of the pit at the Voorspoed diamond mine in South Africa, four slope failures had already occurred with breakback angles ranging from 13° to 20° with respect to the horizontal (de Graaf et al., 2019). Therefore, for the purpose of defining the Zone of Instability, the connecting lines were drawn at angles of 13° with respect to the horizontal. In fact, the Western Australian guidelines allow for the use of shallower angles for the connecting lines if such shallow breakback angles or zones of weakness are observed in the pit walls or in local or regional rock exposures. According to the guidelines, "The use of these design criteria is based on the assumption that no major unfavourably oriented geological features are present within the pit walls, which could induce failure at flatter slope angles" (Department of Industry and Resources, 1997). The Zone of Instability was not taken into account by Geo-Logic Associates (2022, 2023), so that this report represents the first attempt to calculate the Zone of Instability and the safe region for the quarry at the proposed Rhyolite Ridge mine. Since the DEIS does not explicitly describe any of the geologic units as weathered or unweathered, this report follows de Graaf et al. (2019) in setting the breakback angle at 25° for weak rock units and 45° for strong rock units, since the difference in shear strength is the reason for the difference in breakback angles (see Figs. 18a-b). The B5 Unit of the Cave Spring Formation (see Table 1 and Fig. 13) is the host of the ore body and has been described as very weak. The overlying units have also been described as very weak, especially the M5 Unit of the Cave Spring Formation, which immediately overlies the B5 Unit (see Table 1 and Fig. 13). According to Geo-Logic Associates (2022), "The proposed Rhyolite Ridge Lithium-Boron Project quarry encounters problematic adversely oriented bedding conditions where very low strength materials (i.e. layers M5a, M5, and B5) daylight on the proposed slope faces … The most important stratigraphic unit for the purposes of slope stability is the Cave Spring Formation M5 unit. The top 5-10 feet of the M5 unit [called M5a] contains swelling clays that are the weakest material within the deposit." According to Bureau of Land Management (2024b), "Within the Cave Springs Formation, the various geologic units have varying degrees of rock competence or strength (the ability for the rock to withstand pressure put upon it). The M5 unit has the lowest rock strength and tends to move or flow under pressure. The ore zone (Unit B5), which is in one of the more competent units, is in outcrop on the western part of the deposit, and dips easterly to depths greater than 700 feet below ground surface (bgs)." Thus, despite the low strength of the B5 Unit, it is still one of the more competent rock units. Geo-Logic Associates (2023) even pointed out that blasting would not be required for some of the geologic units overlying the ore body. According to Geo- Logic Associates (2023), "Some of the materials to be mined within the quarry are expected to be excavated without the need for blasting. This is particularly true of the greater than 100-foot thickness of the surficial alluvium [see Unit Q1 in Table 1 and Fig. 13] and portions of the M5 lithology." Based on the preceding discussion, for the purpose of determining the breakback angle for application of the Western Australian guidelines (see Figs. 18a-b), all geologic units at the stratigraphic level of B5 or higher (see Table 1 and Fig. 13) were regarded as weak (weathered), while geologic units stratigraphically lower than B5 were regarded as strong (unweathered). After calculating the Zone of Instability, the beginning of the safe zone was set as 50 feet farther away from the edge of the quarry in accordance with the Western Australian guidelines (see Fig. 18a). For the calculation of the Zone of Instability for the post-closure period, a critical rock body is the buttress. The DEIS does not identify any source of material for the buttress, so that its shear strength is entirely unknown. In the absence of any other information, for the purpose of choosing the breakback angle, the buttress material was regarded as weathered (oxidized). The fifth question regarding the assumption that the water table will not recover after dewatering and de-pressurization was addressed based on basic scientific principles, as was the first question. The sixth question regarding the adequacy of the Adaptive Management plan was addressed by reference to industry guidance documents and failure investigation reports. In this report, all maps were created and measurements were made using ESRI ArcMap v. 10.8.2. All maps are projected onto the WGS84 coordinate system.	
108 and 183	108.50 and 183.49	**RESPONSES** ***The Calculation of the Factor of Safety is Unreliable*** There are multiple grounds for concluding that the calculations of the factor of safety by Geo-Logic Associates (2022, 2023; see Fig. 15) are unreliable. Whether the minimum factor of safety of 1.2 was the correct choice is a different matter, which is discussed in the following two subsections. The geotechnical parameters for each geologic unit that were the input data for the calculation of the factor of safety are stated with ultra-precision, sometimes with as many as five significant digits (see Fig. 13). Geo-Logic Associates (2022, 2023) does not provide any information on the uncertainty in the input data that would justify such a high degree of precision. As mentioned earlier, the DEIS does not identify any source of construction material for the buttress, so the material properties of the buttress must be regarded as purely hypothetical (see Fig. 13). Geo-Logic Associates (2022) states that some of the material properties were obtained from a consulting report by EnviroMine (2019) that is not available for public review. In the report by EnviroMine (2019), some of the geotechnical parameters were developed from laboratory data, but the final values were based partly on the "judgment" of EnviroMine (2019). Other parameters were selected by Geo-Logic Associates (2022) without basis in documented measurements of the geologic units at the site of the proposed Rhyolite Ridge mine, so that they were presumably also based on "judgment." According to Geo-Logic Associates (2022), "Shear strength characteristics and material properties were taken from EnviroMine (2019) and used for GLA's analyses documented herein. Laboratory test results from EnviroMine (2019) … The final strength values utilized for each lithology within the limit equilibrium analyses was derived from the lab testing data	A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report. The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report.

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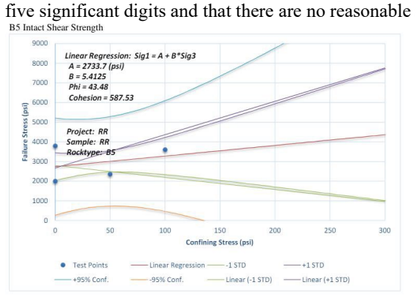
		and selected based on analyses and engineering judgment by EnviroMine. Some materials noted on the cross sections provided by NewFields do not have material parameters developed by EnviroMine. For these cases, GLA utilized conservative material parameters consistent with the described properties of other materials." Geo-Logic Associates (2022) does not clarify which parameters were obtained from EnviroMine (2019) and which were chosen by Geo-Logic Associates, nor does Geo-Logic Associates (2022) explain the procedures by which material properties were derived from laboratory data by EnviroMine (2019). There is also no explanation as to the bases for the "engineering judgments" by EnviroMine (2019) nor the choices of "conservative material parameters consistent with the described properties of other materials" by Geo-Logic Associates (2022). Geo-Logic Associates (2022) does present a portion of the raw geotechnical data that were used by EnviroMine (2019) to develop the material properties (see Fig. 13). These raw data do not provide confidence in the lack of uncertainty and ultra-precision that is shown in the list of material properties (see Fig. 13). Many of the raw data involve only three or four measurements on a single rock sample. For example, Fig. 19 shows four measurements of the failure stress as a function of the confining stress on a sample from Unit B5. The four measurements are widely scattered and do not in any way appear to fall along a straight line (see Fig. 19). Of course, it is always possible to construct a best-fit straight line to any four points and to state the slope and intercept of the line to five significant digits, as was done in Fig. 19. However, for this rock sample, the correct procedure would have been to observe that the failure stress was independent of the confining stress, to compute the intercept by averaging the four values of failure stress, and to set the slope of the line at zero. Such a procedure would have been more consistent with the "engineering judgment" that was claimed by Geo-Logic Associates (2022) to have been used by EnviroMine (2019). In the same way that the geotechnical parameters are stated with no uncertainty (see Fig. 13), the calculated values for the factor of safety are also stated as single values with no uncertainty (see Fig. 15). There is no discussion of the standard deviations of the factors of safety and no presentations of the distributions of possible values of the factor of safety (compare Fig. 15 with Fig. 10) that would make it possible to calculate the probability of failure. In this respect, the danger of excessive reliance on the mean value of the factor of safety without consideration of the width of the distribution of values (such as the standard deviation) should be recalled (see Fig. 11). It is most important that there is no sensitivity analysis that would show the range of possible factors of safety that could result from reasonably possible alternative values for the geotechnical parameters. If a calculated factor of safety would fall below the selected minimum factor of safety for some reasonable choice of geotechnical parameters, then results such are shown in Fig. 15 should be used with great caution. The possibility that the material properties are actually known to five significant digits and that there are no reasonable alternative values is simply absurd, especially in light of the large scatter in the raw geotechnical data (see Fig. 19).  **Figure 19.** Geo-Logic Associates (2022) presented some of the raw laboratory data that was used to derive the material properties of the geologic units (see Fig. 13). The raw data show a small number of measurements (3 or 4) for each rock sample with a high degree of scatter. Although a straight line can be fit to the four scattered points in the above graph, the slope and intercept of the line should be regarded as highly uncertain. The high degree of uncertainty in the raw data does not justify the ultraprecision with which the slope and intercept are written on the graph nor the ultraprecision and lack of any uncertainty in the material properties (see Fig. 13). The high degree of data uncertainty should be taken into account in the determination of the minimum factor of safety and the maximum probability of failure for both the operating (see Figs. 22 and 23a) and post-closure (see Figs. 26a-c) periods. Figure from Geo-Logic Associates (2022). At the present time, a sensitivity analysis is a standard feature of evaluations of slope stability. According to the textbook Geotechnical Engineering of Dams, "In any slope stability analysis it is good practice to check the calculated factor of safety for a range of strengths, e.g. lower quartile and lower bound, to determine the sensitivity of the factor of safety to the assumed strength" (Fell et al., 2015). According to a guidance document by the Australian National Committee on Large Dams, "It is good practice that analyses are carried out to assess the sensitivity of the factor of safety to assumptions on shear strength, pore pressures and geometry of sliding, and that the embankment is designed to be stable within a range of assumptions" (ANCOLD, 2012, 2019). It is noteworthy that the DEIS carries out sensitivity analyses for dust generation and for the chemical risk to wildlife from the quarry lake, but not for stability of the quarry slopes. According to the DEIS, "The North OSF, Quarry Infill OSF, and West OSF were modeled for PM10 [particulate matter smaller than 10 microns] under the Proposed Action. The first and sixth highest concentrations were determined (7.03 and 8.20 µg/m3). For the sensitivity analysis, the stockpiles were shifted to reflect the new geographic locations for the North and South OSF Alternative. Based on a sensitivity analysis that assessed the alternative's proposed locations of the OSFs, the highest impact areas were increased by 2.0 to 3.5 µg/m3 (8.98 and 11.91 µg/m3) … The purpose of the ERA [Ecological Risk Assessment] was to evaluate the potential for chemical risk to wildlife from exposure or ingestion of the water in the quarry lake. The ERA evaluated two scenarios: a base case scenario (Proposed Action) and twelve sensitivity analyses in which climatic input, groundwater inflow rate, and quarry wall runoff was manipulated within the model" (Bureau of Land Management, 2024a).	For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report. To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site. The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure. GLA did not use Guidelines for Mine Closure published by the LOPP, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of "Guidelines for Open Pit Slope Design" (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA's proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments

<table>
<tr><th>Comment Letter No.</th><th>Comment Number</th><th>Comment</th><th>Response</th></tr>
<tr><td></td><td></td><td></td><td>like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase.

The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey (2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines.

The current geotechnical report details the location of the Tiehm’s buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12).

The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability.

Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species SER. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.</td></tr>
<tr><td>108 and 183</td><td>108.51 and 183.50</td><td>The Choice of the Minimum Operating Factor of Safety is too Low

The choice of a minimum factor of safety of 1.2 for the operating period is now compared with mining industry standards. Wesseloo and Read (2009) reviewed the history of minimum factors of safety for mine pit slopes prior to stating the recommendations that were made in Guidelines for Open Pit Slope Design (Read and Stacey, 2009). For consequences of failure in the Very Serious category, Priest and Brown (1983) recommended a minimum factor of safety of 2.0 with a maximum probability of failure of 0.30% and a maximum probability of 5% that the true factor of safety is less than 1.5 (see Fig. 20a). Even for the Moderately Serious category, Priest and Brown (1983) recommended a minimum factor of safety of 1.6 with a maximum probability of failure of 1% and a maximum probability of 10% that the true factor of safety is less than 1.5 (see Fig. 20a). Wesseloo and Read (2009) clarified that the intention of Priest and Brown (1983) was that a stable slope was a slope that satisfied all three of the design acceptance criteria (factor of safety, probability that the true factor of safety is less than 1.0, probability that the true factor of safety is less than 1.5) (see Figs. 20a-b). Since Geo-Logic Associates (2023) has stated that the cessation of mining activity would be an appropriate response to slope instability that affected Tiehm’s buckwheat habitat, the consequences of slope failure should certainly fall into the Very Serious category. According to Swan and Sepulveda (2000), for the final (outer) wall of an open pit, the minimum factor of safety against slope failure should be 1.30-1.60 with maximum probabilities of failure of 8-12%, depending upon the volume of material that would be involved in the landslide (see Fig. 21).
The recommendation of the Guidelines for Open Pit Slope Design was that, for High consequences of failure, the minimum factor of safety should be in the range 1.3-1.5 with maximum probability of failure of 5% (see Fig. 22). The recommendations state explicitly that the minimum factor of safety plus the maximum probability of failure must both be satisfied (in addition to a minimum factor of safety of 1.1 during seismic loading) (see Fig. 22). Thus, the recommendation of the Guidelines for Open Pit Slope Design cannot be fulfilled without a consideration of the standard deviation and the distribution of possible values of the factor of safety (see Fig. 10). As mentioned above, the cessation of mining activity in response to slope instability would certainly constitute a High consequence of failure. The range of 1.3-1.5 depends upon the uncertainty in the factor of safety, which reflects the uncertainty in the input data, with the upper end of the range corresponding to high uncertainty. Based on the preceding subsection, the uncertainty is high, so that the appropriate minimum factor of safety against slope failure during pit operation should be 1.5 plus a maximum probability of failure of 5%. Therefore, the minimum factor of safety of 1.2 that was chosen by Geo-Logic Associates (2022, 2023) for the operational period is far too low.
Table 9.3: FoS and PoF guidelines
<table><tr><th rowspan="2">Consequence of failure</th><th rowspan="2">Examples</th><th colspan="3">Acceptable values</th></tr><tr><th>Mean FoS</th><th>Minimum P[FoS < 1.0]</th><th>Maximum P[FoS < 1.5]</th></tr><tr><td>Not serious</td><td>Individual benches; small (< 50 m), temporary slopes, not adjacent to haulage roads</td><td>1.3</td><td>10%</td><td>20%</td></tr><tr><td>Moderately serious</td><td>Any slope of a permanent or semi-permanent nature</td><td>1.6</td><td>1%</td><td>10%</td></tr><tr><td>Very serious</td><td>Medium-sized (50–100 m) and high slopes (<150 m) carrying major haulage roads or underlying permanent mine installations</td><td>2.0</td><td>0.30%</td><td>5%</td></tr></table>Source: Priest & Brown (1983)
Figure 20a. According to Priest and Brown (1983), the factor of safety against failure for mine pit slopes should be 1.3, 1.6, and 2.0 during mine operation for consequences of failure that are Not Serious, Moderately Serious, and Very Serious, respectively. Moreover, the maximum probability of failure (probability that the true factor of safety is less than 1.0) should be 10%, 1% and 0.3% for consequences of failure that are Not Serious, Moderately Serious, and Very Serious, respectively. Compared with the guidelines by Priest and Brown (1983), the minimum factor of safety of 1.2</td><td>A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report.

The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report.

For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports</td></tr>
</table>

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		during mine operation that was assumed by Geo-Logic Associates (2022, 2023) is completely inadequate. Since Geo-Logic Associates (2023) has identified the suspension or cessation of mining activity as an appropriate response if there is slope instability near sensitive habitat, the consequences of slope failure at the proposed Rhyolite Ridge mine should be regarded as Very Serious. The significance of specifying both a minimum factor of safety and maximum probabilities of failure is clarified in Fig. 20b. The heading “Mean FoS” in the above table should be understood as the mean of the distribution of all possible values of the factor of safety (see Fig. 10). Table from Wesseloo and Read (2009). **Table 9.4:** Interpretation of Priest & Brown (1983) FoS and PoF guidelines **Performance of slope with respect to Table 9.3** / **Interpretation** Satisfies all three criteria / Stable slope Exceeds minimum mean FoS but violates one or both probabilistic criteria / Operation of slope presents risk that may or may not be acceptable; level of risk can be reduced by comprehensive monitoring program Falls below minimum mean FoS but satisfies both probabilistic criteria / Marginal slope: minor modifications of slope geometry required to raise mean FoS to satisfactory level Falls below minimum mean FoS and violates one or both probabilistic criteria / Unstable slope: major modifications of slope geometry required; rock improvement and slope monitoring may be necessary **Figure 20b.** The above table clarifies the significance of the guidelines for mine pit slopes in Priest and Brown (1983) that require a minimum factor of safety, a maximum probability of failure (probability that the true factor of safety is less than 1.0) and a maximum probability that the true factor safety is less than 1.5. In particular, a stable slope should satisfy all three criteria. Table from Wesseloo and Read (2009). **Table 9.7:** Acceptance criteria, FoS, PoF and category of slope instability Characteristics of instability / Acceptability Criterion Slope type / Case / Loss of ramp – berm (%) / Material affected (Kilotn/m) / FoS / PoF (%) / Comments Bench / Expansion, not adjacent to a ramp / <25 / <0.5/>1.0 / / / Berms should have a nominal width to contain a single bench failure. If probability of occurrence is >30%, controlled blasting will be used to minimise induced damage and presplitting on the final wall slopes <25 / 0.5/>1.0 / / / 25–50 / <1.0/>2.0 / / >45 / <25 / 0.5/>1.0 / / / 25–50 / <1.0/>2.0 / / >40 / >50 / >1.0/>2.0 / / >30 / Final wall, not adjacent to a ramp / <25 / <0.5/>1.0 / / / 25–50 / <1.0/>2.0 / / >35 / >50 / >1.0/>2.0 / / >25 / Final wall, adjacent to a ramp / <25 / <0.5/>1.0 / / / 25–50 / <1.0/>2.0 / / >30 / >50 / >1.0/>2.0 / / >20 / Inter-ramp / Expansion / <25 / <5 / >1.20 / >30 / Stability analysis must include explicit effect of rock mass structures. Two scenarios should be analysed: 1) Berms made to the pit bottom; measures will be implemented for slope drainage <5 / >1.25 / <25 / 25–50 / <5 / >1.25 / <25 / 5–10 / >1.30 / <22 / >10 / >1.35 / <20 / >50 / <10 / >1.30 / <22 / 10–20 / >1.35 / <20 / >20 / >1.45 / <18 / Final wall / <25 / <5 / >1.20 / <25 / <5 / >1.25 / <20 / 25–50 / <5 / >1.30 / <22 / 5–10 / >1.35 / <20 / >10 / >1.45 / <18 / >50 / <10 / >1.35 / <20 / 10–20 / >1.40 / <18 / >20 / >1.50 / <15 / Global / Expansion / <25 / >1.30 / <15 / Stability analysis must include mass structures; all mine infrastructure lie outside pit perimeter limits 25–50 / >1.40 / <12 / >50 / >1.50 / <10 / Final wall / <25 / >1.30 / <12 / 25–50 / >1.45 / <10 / >50 / >1.60 / <8 / Source: Swan & Sepulveda (2000) **Figure 21.** According to Swan and Sepulveda (2000), for the final wall of an open pit, the minimum factor of safety against slope failure should be 1.30-1.60 with maximum probabilities of failure of 8-12%, depending upon the volume of material that would be involved in the landslide. Compared with the guidelines by Swan and Sepulveda (2000), the minimum factor of safety of 1.2 during mine operation that was assumed by Geo-Logic Associates (2022, 2023) is completely inadequate. Table from Wesseloo and Read (2009). **Table 9.9:** Typical FoS and PoF acceptance criteria values Slope scale / Consequences of failure[b] / Acceptance criteria[a]: FoS (min) (static) / FoS (min) (dynamic) / PoF (max) P[FoS ≤ 1] Bench / Low–high / 1.1 / NA / 25–50% Inter-ramp / Low / 1.15–1.2 / 1.0 / 25% Medium / 1.2 / 1.0 / 20% High / 1.2–1.3 / 1.1 / 10% Overall / Low / 1.2–1.3 / 1.0 / 15–20% Medium / 1.3 / 1.05 / 5–10% High / 1.3–1.5 / 1.1 / ≤5% a: Needs to meet all acceptance criteria b: Semi-quantitatively evaluated (see Figure 13.9) **Figure 22.** The above table shows the recommendations of the industry guidance book Guidelines for Open Pit Slope Design (Read and Stacey, 2009), which have been confirmed by the SME Surface Mining Handbook (Mohanty et al., 2023) (see Table 2). For High consequences of failure, the minimum overall factor of safety against slope failure should be 1.3-1.5 during static (non-seismic) loading and 1.1 during dynamic (seismic) loading, with a maximum probability of failure of 5%. The table clarifies that all three criteria must be satisfied. Since Geo-Logic Associates (2023) has identified the suspension or cessation of mining activity as an appropriate response if there is instability near sensitive habitat, the consequences of slope failure at the proposed Rhyolite Ridge mine should be regarded as High. The range of 1.3-1.5 depends upon the uncertainty in the input data, with high certainty corresponding to the upper end of the range. Thus, based on the high uncertainty in the geotechnical data for the Rhyolite Ridge mine (see, for example, Fig. 19), a minimum static factor of safety of 1.5 and maximum probability of failure of 5% would be appropriate during mine operation. Compared with the recommendations of the Guidelines for Open Pit Slope Design and the SME Surface Mining Handbook, the minimum factor of safety of 1.2 during mine operation that was assumed by Geo-Logic Associates (2022, 2023) is completely inadequate. Table from Wesseloo and Read (2009). Mohanty et al. (2023) repeat the recommendations of the Guidelines for Open Pit Slope Design (Read and Stacey, 2009) in the SME Surface Mining Handbook (Darling, 2023) (see Table 2), thus, constituting confirmation of the guidelines by the US-based Society for Mining, Metallurgy and Exploration. Additional industry publications have clarified and, in some ways, strengthened the recommendations of the Guidelines for Open Pit Slope Design. According to Adams (2015), for a permanent pit slope with a design life longer than ten years, and with Major to Catastrophic consequences of failure, the minimum factor of safety should be 1.5 and the maximum probability of failure should be 5% if the Level of Design Confidence (data certainty) is Medium (see Fig. 23a), which is the same as the recommendations of the Guidelines for Open Pit Slope Design. However, if the Level of Design Confidence drops to Low, then the minimum factor of safety should be 1.6 and the maximum probability of failure should be 2%. Based upon the discussion in the preceding subsection, at the present time, the Level of Design Confidence for the quarry at the proposed Rhyolite Ridge mine should be regarded as Low.	means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report. To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site. The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure. GLA did not use Guidelines for Mine Closure published by the LOPP, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of “Guidelines for Open Pit Slope Design” (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA’s proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase. The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey (2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety

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		Table 2. Acceptance criteria for factor of safety and probability of failure for open pits: Recommendations of Society for Mining, Metallurgy and Exploration (SME)1	requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines. The current geotechnical report details the location of the Tiehm's buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12). The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability. Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species SER. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.

Consequence of Failure	Factor of Safety	Probability of Failure (%)
Low (operating highwall)	.2-1.3	115-20
Moderate (operating highwall)	1.3	10
High (ultimate highwall)	1.3-1.5	5
1Redrawn from Mohanty et al. (2023)		

Consequence Level[1]		Insignificant to Minor			Moderate			Major to Catastrophic		
Level of Design Confidence[2]		High	Med	Low	High	Med	Low	High	Med	Low
Permanent cut, fill or natural slope (Design Life > 10 years)	Min FOS	1.3	1.3	1.3	1.3	1.4	1.5	1.4	1.5	1.6
	Max POF	20%	20%	20%	20%	10%	5%	10%	5%	2%
	Level of Risk Management	No monitoring or access restrictions			No monitoring or access restrictions			Minimal monitoring for defined timeframe, and/or access restrictions		
Interim cut or fill slope (Design Life 0.5-10 years)	Min FOS	1.2	1.25	1.3	1.2	1.3	1.4	1.3	1.4	1.5
	Max POF	30%	25%	20%	30%	20%	10%	20%	10%	5%
	Level of Risk Management	Basic GCMP including periodic slope monitoring. Access dependant of safety risks			Comprehensive GCMP including slope monitoring and TARPS. Access dependant of safety risks			Comprehensive GCMP including slope monitoring and TARPS. Access dependant of safety risks		
Temporary cut or fill slope (Design Life < 6 months)	Min FOS	1.2	1.25	1.3	1.25	1.3	1.35	1.25	1.35	1.4
	Max POF	30%	25%	20%	25%	20%	15%	25%	15%	10%
	Level of Risk Management	Basic GCMP including periodic slope monitoring. Access dependant of safety risks			Comprehensive GCMP including slope monitoring and TARPS. Access dependant of safety risks			Comprehensive GCMP including slope monitoring and TARPS. No access to slope.		
Excavation for immediate backfill (Design Life < several days)	Min FOS	1.05	1.1	1.15	1.1	1.15	1.2	1.15	1.2	1.25
	Max POF	45%	40%	35%	40%	35%	30%	35%	30%	25%
	Level of Risk Management	Detailed risk assessment and robust operational controls, including continuous monitoring and TARPs. No access to slope			Detailed risk assessment and robust operational controls, including continuous monitoring and TARPs. No access to slope			Detailed risk assessment and robust operational controls, including continuous monitoring and TARPs. No access to slope		

Figure 15 Example Factor of Safety (FoS)-Probability of Failure (PoF) selection matrix (Adams 2015). [1] Consequence level from business risk assessment, see Figure 14. [2] Design confidence subjective rating. [3] PoF calculated for the slope sector analyses, not the global PoF

Figure 23a. According to Adams (2015), for permanent slopes in open pits, during mine operation, for Major to Catastrophic consequences of failure, the minimum factor of safety against slope failure should be 1.4-1.6 and the maximum probabilities of failure should be 2-10%. The ranges depend upon the uncertainty in the input data (or "Level of Design Confidence"), with high certainty corresponding to the upper end of the range for minimum factor of safety and the lower end of the range for maximum probability of failure. Since Geo-Logic Associates (2023) has identified the suspension or cessation of mining activity as an appropriate response if there is instability near sensitive habitat, the consequences of slope failure at the proposed Rhyolite Ridge mine should be regarded as Major to Catastrophic (see further information in Fig. 23b). Thus, based on the recommendations of Adams (2015) and the high uncertainty in the geotechnical data for the Rhyolite Ridge mine (see, for example, Fig. 19), a minimum static factor of safety of 1.6 and maximum probability of failure of 2% would be appropriate for slope failure at the Rhyolite Ridge mine. Compared with the guidelines by Adams (2015), the minimum factor of safety of 1.2 during mine operation that was assumed by Geo-Logic Associates (2022, 2023) is completely inadequate. Table from de Graaf et al. (2019).

Adams (2015) provides further information regarding the meaning of consequences of failure. Adams (2015) clarifies that the Consequence Level that is used to set the design acceptance criteria is a "business risk assessment" (as opposed to an environmental or a health and safety assessment) (see Fig. 23a). Adams (2015) then states that an example of a Major consequence level would be "production pit closed for significant period" and an example of a Catastrophic consequence level would be "failure large enough to close mine" (see Fig. 23b). On that basis, the proposed responses by Geo-Logic Associates (2023) to indications of slope instability of "suspending mining activity" or "stopping mining activity" would certainly place the consequences of quarry slope failure at the Rhyolite Ridge mine into the categories of Major or Catastrophic.

Impact Category	Consequence Level				
	Insignificant	Minor	Moderate	Major	Catastrophic
Health & Safety	First aid injury (e.g. very slow landslide with minimal safety risk)	Medical aid injury (e.g. slow to moderate pit-slope movement where people may be exposed to secondary rockfall or tension crack hazards)	Lost Time Injury (LTI)	Permanent impairment	Fatality (e.g. any rapid failure with people exposed)
Environment	Contained (e.g. wedge failure contained on bench, minimal sediment to water)	Localised impact (e.g. sediment slug from failure contained by site water controls)	Impact within mine only (e.g. highwall failure contained within pit)	Off-site impact can be remediated (e.g. waste-rock slide runout)	Severe off-site impact (e.g. toxic tailings release to external waterway)
Business	No delay, cost < $10K (e.g. small failure outside of work area)	Minor delay, $10 - $100K (e.g. inter ramp slope failure requires stabilisation)	Total loss $100K - $5M (e.g. main access ramp destroyed causing delay and re-planning)	Total loss $5M - $100M (e.g. production pit closed for significant period, ore sterilised)	Total financial loss > $100M (e.g. failure large enough to close mine)

Figure 14 Example consequence table (Adams 2015)

Figure 23b. According to Adams (2015), examples of Major consequences of failure include "production pit closed for significant period", while examples of Catastrophic consequences of failure include "failure large enough to close mine." Since Geo-Logic Associates (2023) has identified the suspension or cessation of mining activity as an appropriate response if there is instability near sensitive habitat, the consequences of slope failure at the proposed Rhyolite Ridge mine should be regarded as Major to Catastrophic (see application of this conclusion in Fig. 23a). Table from de Graaf et al. (2019).

108 and 183	108.52 and 183.51	***The Choice of the Minimum Post-Closure Factor of Safety is too Low*** There are two main reasons as to why the minimum factor of safety must increase in the transition from the operational to the post-closure period. First, any data uncertainty during the operational period is amplified into the post-closure period. Even if there is excellent knowledge of the geotechnical properties during pit operation, there is much less certainty about the rate and extent of the degradation over time of the strength of the rock masses adjacent to the pit walls (de Bruyn et al., 2019; Carter et al., 2022; de Graaf et al., 2024). In addition, it has already been mentioned that there are still gaps in theoretical knowledge regarding the processes that drive rock strength degradation (de Graaf et al., 2024; see Fig. 8). Therefore, keeping the factor of safety fixed even as the data uncertainty increases has the potential to greatly increase the probability of failure during the post-closure period (see Fig. 24). The second reason as to why the minimum factor of safety must increase is that the post-closure period will see a reduction in or complete cessation of monitoring, as well as a reduction in or the complete absence of an onsite trained workforce. Thus, the reduced ability to detect instability or to respond to instability in a timely manner means that the probability of failure must be greatly reduced.	A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report. The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This

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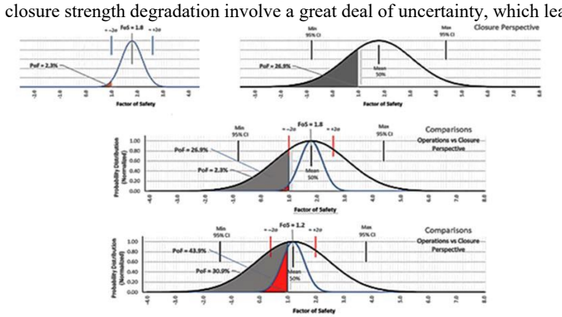
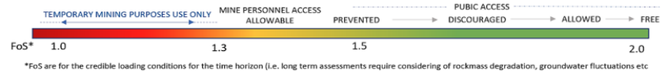
		Carter et al. (2022) has proposed a minimum factor of safety even greater than 2.0 during the post-closure period (see Fig. 25a). Carter et al. (2022) has also emphasized that the calculation of factor of safety for the post-closure period must be based upon the strength of the rock masses and the groundwater levels that will exist in the post-closure period, not the greater strength and lower water table of the operational period (see Fig. 25a). There are case studies and recommendations for estimating post-closure shear strengths (de Bruyn et al., 2019). These estimates of post-closure strength degradation involve a great deal of uncertainty, which leads precisely to the point that there must be an increase in the minimum factor of safety.	conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report.
			For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report.
		Figure 3 Differing viewpoints between short- and long-term slope stability uncertainty **Figure 24.** If the factor of safety against slope failure remains unchanged as the mine transitions from operating (short-term) to post-closure (long-term), then the probability of failure increases. As a result, the post-closure factor of safety should be greater than the operating factor of safety. For a given factor of safety, the probability of failure increases after closure because of the greater uncertainty in the input data that are used to calculate the factor of safety. The uncertainty in input data for the post-closure condition include uncertainty in the long-term degradation of the rock mass due to the time-delayed impacts of blasting and changes in topography and stress levels (see Figs. 6-7) and the lack of current theoretical knowledge regarding the long-term interactions among erosional processes, slope instability, and climatic change (see Fig. 8). The upper row compares typical probabilities of failure (shaded areas) for the operating condition (left-hand side) and the post-closure condition (right-hand side) for a given factor of safety of 1.8. The middle row superimposes the two distributions of factor of safety for the operating and postclosure conditions for a mean factor of safety of 1.8. The bottom row superimposes the two distributions of factor of safety for the operating and post-closure conditions for a mean factor of safety of 1.2. Figure from Carter et al. (2022).	To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site.
		Macciotta et al. (2020) has recommended that mine closure plans should “aim for the highest credible FoS [Factor of Safety]”, especially at the point of relinquishment of the open pit (see Fig. 25b). At the same time, the probability of failure should be lowered to the ALARP (As Low as Reasonably Practicable) level (see Fig. 25b). The word “credible” and the expression “ALARP” require clarification. “Credible” should be understood in the sense of “believable” or “reliable.” A non-credible claim that the post-closure factor of safety will be 3.0 does not benefit anyone. The issue is that, for very large factors of safety, the probability of failure is controlled not by the bulk properties of materials, but the presence of thin discontinuities or zones of weakness, which would not be revealed without extensive geotechnical field testing. According to Silva et al. (2008), “Increasing the safety factor well beyond the typical values used for earth structures provides little benefit with respect to the corresponding probability of failure. Discontinuities, weak zones, wet zones, high or low permeability zones, and other features that can elude a geotechnical investigation control the level of safety for grossly overdesigned facilities.” According to the Global Industry Standard for Tailings Management, “ALARP requires that all reasonable measures be taken with respect to ‘tolerable’ or acceptable risks to reduce them even further until the cost and other impacts of additional risk reduction are grossly disproportionate to the benefit” (ICMM-UNEP-PRI, 2020). By this point, it should be clear that the selection of the minimum factor of safety of 1.2 for the post-closure period at the proposed Rhyolite Ridge mine is grossly out-of-line with contemporary guidance.	The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes.
			GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure.
		Figure 7 Comparative scale of Factor of Safety in operations versus closure **Figure 25a.** The above color scale shows how the appropriate minimum factor of safety against slope failure might increase from less than 1.3 during mine operation to even greater than 2.0 during post-closure. There are two reasons for the increase in the appropriate minimum factor of safety in the transition from the operating state to the postclosure state. First, there is greater uncertainty in the input data that are used to calculate the factor of safety (see Fig. 24). The uncertainty in input data for the post-closure condition include uncertainty in the long-term degradation of the rock mass due to the time-delayed impacts of blasting and changes in topography and stress levels (see Figs. 6-7) and the lack of current theoretical knowledge regarding the long-term interactions among erosional processes, slope instability, and climatic change (see Fig. 8). Second, there will be a decrease in or a complete lack of monitoring and on-site trained personnel during the post-closure period and, thus, a decreased inability to respond to any indication of slope instability. The figure clarifies that, for the post-closure state, the factor of safety should be calculated based on the degraded rock mass strength that will evolve in the post-closure state, not for the greater rock mass strength that would have prevailed prior to and during open pit operation. Figure from Carter et al. (2022).	GLA did not use Guidelines for Mine Closure published by the LOPP, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of “Guidelines for Open Pit Slope Design” (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced

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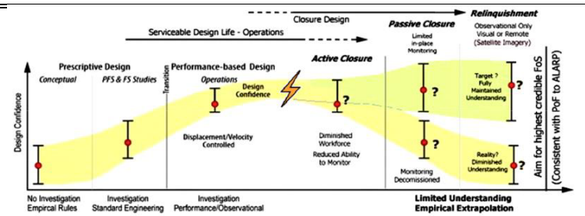
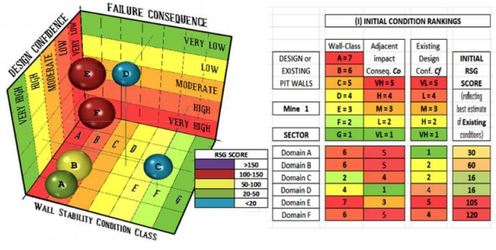
		 **Figure 2 Conceptual level of mine life geotechnical understanding with indications for possible range of understanding at relinquishment, based on slope behaviour in post-operations close-down and decommissioning, as well as long timeline forecasting into passive closure (adapted from Macciotta et al. 2020); Lightning bolt symbolises change in focus: operations to closure)** **Figure 25b.** According to the above diagram, the minimum factor of safety against slope failure during the postclosure period (or certainly by the time of the relinquishment of the open pit) should aim for the highest credible value, while the maximum probability of failure should be reduced to the ALARP (As Low as Reasonably Practicable) level. There are two reasons for the increase in the appropriate minimum factor of safety in the transition from the operating state to the post-closure state. First, there is greater uncertainty in the input data that are used to calculate the factor of safety (see Fig. 24). The uncertainty in input data for the post-closure condition include uncertainty in the long-term degradation of the rock mass due to the time-delayed impacts of blasting and changes in topography and stress levels (see Figs. 6-7) and the lack of current theoretical knowledge regarding the long-term interactions among erosional processes, slope instability, and climatic change (see Fig. 8). Second, there will be a decrease in or a complete lack of monitoring and on-site trained personnel during the post-closure period and, thus, a decreased inability to respond to any indication of slope instability. Figure from Carter et al. (2022). Carter et al. (2022) includes an excellent step-by-step summary of the procedures for recommending an appropriate minimum factor of safety for the post-closure period that will be found in the upcoming Guidelines for Mine Closure (LOP, 2024). The minimum factor of safety against slope failure during the post-closure period should be determined based upon the Relative Stability Guideline (RSG) for each slope. The RSG is the product of the score for the Pit Wall Condition Class (on a scale of 1 to 7 with lower scores indicating more competent slopes), the Adjacent Impact Consequence (on a scale of 1 to 5 with higher scores indicating more severe consequences), and the Existing Design Confidence (on a scale of 1 to 5 with higher scores indicating less confidence or greater data uncertainty). Fig. 26a shows an example for a particular open pit. For Domain F in the pit, the product of a score of 6 for Pit Wall Condition Class B, a score of 5 for Very High consequences, and a score of 4 for Low Existing Design Confidence yields an RSG of 120. This would be a very dangerous situation and the recommendation is for “avoidance of any slopes with RSGs > 100” (Carter et al., 2022). By contrast, the goal is “targeting slope geometries to achieve RSG scores of less than 20” (Carter et al., 2022). Note that the design confidence could be increased (reducing the score) by the acquisition of more high-quality data, while the failure consequences could be reduced (also reducing the score) by changing the location of the pit wall with respect to populated areas, civil infrastructure, or cultural and biological resources. The Wall Condition Class is more difficult to change and really just reflects the geotechnical materials of the pit walls, although it can be affected by changing the geometry of the pit walls or by constructing buttresses.  **Figure 9 Conceptual results of relative stability guideline assessments for hypothetical example open pit configuration and sector geometry shown in Figure 8** **Figure 26a.** According to the mining industry guidance book Guidelines for Mine Closure (de Graaf et al., 2021, 2024; LOP, 2024), the minimum factor of safety against slope failure during the post-closure period should be determined based upon the Relative Stability Guideline (RSG) for each slope. The RSG is the product of the score for the Pit Wall Condition Class (on a scale of 1 to 7 with lower scores indicating more competent slopes), the Adjacent Impact Consequence (on a scale of 1 to 5 with higher scores indicating more severe consequences), and the Existing Design Confidence (on a scale of 1 to 5 with higher scores indicating less confidence or greater data uncertainty). The figure shows an example for a particular open pit. For Domain F in the pit, the product of a score of 6 for Pit Wall Condition Class B, a score of 5 for Very High consequences, and a score of 4 for Low Existing Design Confidence yields an RSG of 120. Note that the design confidence could be increased (reducing the score) by the acquisition of more high-quality data, while the failure consequences could be reduced (also reducing the score) by changing the location of the pit wall with respect to populated areas, civil infrastructure, or cultural and biological resources. See further information regarding Guidelines for Mine Closure in Figs. 26b-c. Figure from Carter et al. (2022). The procedures in Guidelines for Mine Closure can now be applied to the quarry at the proposed Rhyolite Ridge mine. Fig. 26b shows a rough equivalence (at the screening level) between the Pit Wall Condition Class and the calculated factor of safety. The only relevant Pit Wall Condition Classes would be C (corresponding to a factor of safety of 1.2) and D (corresponding to a factor of safety of 1.5 (see Fig. 26b). Although the lack of reliability of the calculated factors of safety has already been discussed, the post-closure factors of safety (after buttress construction) are closer to 1.2 for Sections TR02E-6, TR02E-9, and TR02E-11 and closer to 1.5 for Sections TR02E-5, TR02E-7, and TR02E-8 (see Fig. 15). Pit Wall Condition C is described as “unvegetated slopes with uncontrolled rockfall risk and undesirable risk of failure” and with “high level of concern,” while Pit Wall Condition D is described as “standard design reliability, slopes with rockfall control” and with “moderate level of concern” (Carter et al., 2022; see Fig. 26b). Pit Wall Condition is assigned a score of 5, while Pit Wall Condition D is assigned a score of 4 (see Fig. 26a).	by GLA’s proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase. The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey (2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines. The current geotechnical report details the location of the Tiehm’s buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12). The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability. Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species Supplemental Environmental Report. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.

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Table 3 **Suggested screening classification table for benchmarking open pit slope wall conditions and probable significance for slope failure risk (modified from Carter & Miller 1995; McCracken & Jones 1986; Kirsten & Moss 1985; Priest & Brown 1983; Pine 1992; Cole 1993)**

Existing pit wall condition class	Existing pit wall likely Probability of Failure %	Existing pit wall likely Factor of Safety*	Assessed existing wall reliability index*, ß)	Existing pit wall likely long-term reliability*	Indicative stakeholder position on closure strategy	Suggested Controls	
						Public Access	Operating Surveillance
A	50 – 100	<1	<0.1	Effectively zero	Totally Unacceptable	Forbidden	Ineffective
B	20 – 50	1.0	0.5	Quasi-stable Slopes	Not acceptable	Forcibly Prevented	Continuous sophisticated monitoring
C	10 – 20	1.2	1.0	Unvegetated slopes with uncontrolled rockfall risk and undesirable risk of failure	High level of concern	Actively prevented	Continuous monitoring with instruments
D	5 – 10	1.5	1.2	Standard design reliability, slopes w/rockfall control	Moderate level of concern	Prevented	Continuous simple monitoring
E	1.5 – 5	1.8	1.5	Good design reliability, unvegetated slopes, but w/rockfall protection	Low to moderate level of concern	Discouraged	Conscious superficial monitoring
F	0.5 – 1.5	2.0	2.5	Design reliability to routine civil design standards, incl. rockfall protection & berm drainage	Of limited concern	Allowed	Incidental superficial monitoring
G	<0.5	>>2	>3	Extremely high reliability, controls far exceed credible hazards (vegetated slope to full highway design standards)	Of no concern	Free	No monitoring required

*For closure loading conditions considering material degradation & longevity events.

Note $\beta = \log_{10}(PoF)$, where $PoF = p(FoS<1.0) + p(SM<0) = 10^{-\beta}$ (after Pine 1992).

Figure 26b. According to the mining industry guidance book Guidelines for Mine Closure (de Graaf et al., 2021, 2024; LOP, 2024), the assumption of a minimum factor of safety against slope failure of 1.2 by Geo-Logic Associates (2022, 2023) would put the pit slopes at the Rhyolite Ridge mine into Pit Wall Condition Class C, corresponding to a score of 5 (see Fig. 26a). Note that Pit Wall Condition Class D (more competent slopes) would require a calculated factor of safety of 1.5. The above table describes Pit Wall Condition Class C as "unvegetated slopes with uncontrolled rockfall risk and undesirable risk of failure," together with "high level of concern" and the need for "continuous monitoring with instruments." Figure from Carter et al. (2022).

In the post-closure period, the slope failure consequence of the cessation of mining activity is no longer relevant, since mining activity will already have ceased. Carter et al. (2022) do not discuss the loss of irreplaceable biological resources in terms of a failure consequence category, so recourse must be sought in other types of mining industry guidance documents. The Global Industry Standard on Tailings Management has a five-level consequence scale (Low, Significant, High, Very High, Extreme) for failure of tailings facilities. Extreme failure consequences include "catastrophic loss of critical habitat or rare and endangered species" (ICMM-UNEP-PRI, 2020), which would be analogous to the irreplaceable loss of Tiehm's buckwheat habitat. The International Commission on Large Dams (ICOLD) also has a five-level scale for consequences of failure for tailings dams. For this scale, Extreme consequences include "catastrophic loss of critical environmental values including rare and endangered species of high significance" (ICOLD, 2022). Finally, the Canadian Dam Association has a five-level scale for consequences of failure of both water-retention and tailings dams. In this case, Extreme consequences include "major loss of critical fish or wildlife habitat" (Canadian Dam Association, 2013). By comparison with the three preceding industry guidance documents, in the terms of the five-level scale of Guidelines for Mine Closure, the loss of Tiehm's buckwheat habitat should have an Adjacent Impact Consequence of Very High, corresponding to a score of 5 (see Fig. 26a).

At this point, the discussion will be temporarily restricted to Sections TR02E-6, TR02E-9, and TR02E-11 (see Figs. 14-15), which have been assigned to Pit Wall Condition Class C with a score of 5 (see Figs. 26a-b). All three sections intersect Tiehm's buckwheat population (see Fig. 14). In this regard, Section TR02E-11 is the most critical since it intersects the Tiehm's buckwheat population that occurs only 15 feet from the proposed quarry (compare Fig. 14 with Figs. 2 and 3a-b). The multiplication of a Wall-Class Condition score of 5 and an Adjacent Impact Consequence score of 5 yields 25, which still needs to be multiplied by the score for Existing Design Confidence to obtain the RSG. The RSG score would need to be less than 20 for a minimum post-closure factor of safety in the range 1.2-1.5 (see Fig. 26c). Note that, according to Fig. 26c, a minimum post-closure factor of safety of 1.2 would not be acceptable under any circumstances, no matter how low the RSG score was. In the case of Sections TR02E-6, TR02E-9, and TR02E-11, an RSG score of 25 would result from an Existing Design Confidence of Very High with a score of 1 (see Fig. 26a). At the present time, the Existing Design Confidence must be quite low, but it could be imagined that it might eventually be brought up to Medium with a score of 3 (see Fig. 26a). Scores for the Wall-Class Condition, Adjacent Impact Consequence, and Existing Design Confidence of 5, 5, and 3, respectively, would yield an RSG score of 75, which would imply a minimum post-closure factor of safety greater than 2.0 (see Fig. 2c). Note that, even an Existing Design Confidence of High (score of 2) would yield an RSG score of 50, which would still imply a minimum post-closure factor of safety greater than 2.0 (see Fig. 26c).

The less critical Sections TR02E-5, TR02E-7, and TR02E-8 with Pit Wall Condition D (score of 4) can now be considered. The Adjacent Impact Consequence should still be Very High with a score of 5 (see Fig. 26a). If the Existing Design Confidence could be raised to Medium (score of 3), then the RSG score would be 60, which would again imply a minimum post-closure factor of safety greater than 2.0 (see Fig. 26c). However, if the Existing Design Confidence could be raised to High (score of 2), then the RSG score would be reduced to 40, which would imply a minimum post-closure factor of safety in the range 1.5-2.0 (see Fig. 26c). In summary, a minimum post-closure factor of safety of 2.0 seems to be reasonable, which is far greater than the minimum post-closure factor of safety of 1.2 that was selected by Geo-Logic Associates (2022, 2023).

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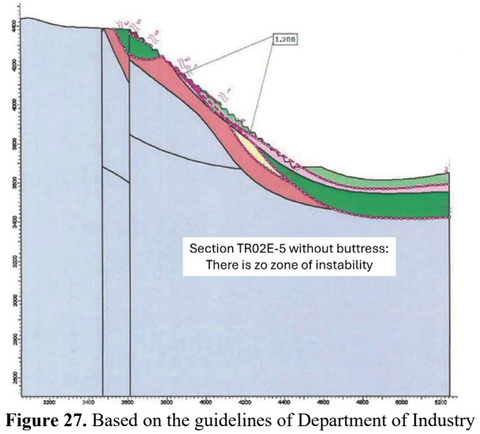
		Table 4 Suggested actions, dependent on RSG score RSG score / RSG level / Appropriate action RSG>100 — Extreme — Comprehensive and extremely rigorous analysis required, based likely on additional data acquisition so that deep understanding of failure mechanisms and behaviour can be gained to allow extremely robust controls to be implemented. Very high design reliability required. **FoS >> 2 needed unless quantitative risk analysis (QRA) undertaken** 50≤RSG≤100 — High — Rigorous analysis necessary, so that thorough understanding of mechanisms is gained, so robust controls can be implemented. High design reliability required. **FoS > 2** 20≤RSG≤50 — Moderate — Standard analysis sufficient, good understanding needed of scenario so that appropriate controls can be implemented. Good design reliability required. **FoS > 1.5** RSG<20 — Low — Apply good practice, guidance and hierarchy of controls. Fair design reliability required **FoS > 1.2** **Figure 26c.** The RSG score for the pit slopes at the Rhyolite Ridge mine can be calculated by multiplying the score of 5 for Pit Wall Condition Class C (see Fig. 26b) by the scores for Existing Design Confidence and Adjacent Impact Consequence (see Fig. 26b). The Guidelines for Mine Closure do not address the irreplaceable loss of biological resources, but other five-level consequence classifications, such as the Global Industry Standard for Tailings Management place accidents with "catastrophic loss of critical habitat or rare and endangered species" (ICMMUNEP-PRI, 2020) into the most severe category of Extreme consequences. Thus, a score of 5 for Adjacent Impact Consequences, corresponding to Very High consequences (see Fig. 26a), would yield an RSG score of 25 multiplied by the score for Existing Design Confidence. On that basis, the minimum post-closure factor of safety of 1.2, which was assumed by Geo-Logic Associates (2022, 2023) would not be appropriate even if the Existing Design Confidence could be raised to the level of Very High (corresponding to a score of 1) (see Fig. 26a). The Existing Design Confidence is certainly not at the level of Very High, based on the low-quality geotechnical data that are currently available (see, for example, Fig. 19). If the Existing Design Confidence could be raised to a level of Medium with a score of 3 (see Fig. 26a), then the RSG score would be 75, which would demand a post-closure factor of safety greater than 2.0. The best that could be hoped for would be to raise the Existing Design Confidence to High (score of 2) or Very High (score of 1), yielding RSG scores of 50 and 25, respectively, both of which would demand minimum post-closure factors of safety greater than 1.5.	
108 and 183	108.52 and 183.51	***The Post-Closure Zone of Instability has not been Taken into Account*** From a superficial standpoint, Geo-Logic Associates (2022, 2023) appears to have calculated some version of a "Zone of Instability" through using the limit equilibrium method to calculate the location of the critical failure surfaces, which are the curved lines labeled with a boxed number indicating the factor of safety in Figs. 27, 28a-b, 29a-b, 30a-b, 31a-b, and 32a-b (compare with list of calculated factors of safety in Fig. 15). For example, the shifting of the critical failure surface inward toward the quarry after construction of a buttress would seem to reduce or eliminate any unstable zone outside of the quarry after closure. The standpoint is superficial for three reasons. First, just as there has been no sensitivity analysis as to how the factor of safety would change in response to reasonably possible alternative values of the geotechnical parameters, there has been no analysis as to how the location of the critical failure surface might change. If the location of the critical failure surface could change significantly, especially if it did not shift in an inward direction after construction of a buttress, then any predictions regarding the elimination of an unstable zone should be viewed with great caution.  **Figure 27.** Based on the guidelines of Department of Industry and Resources (Western Australia) (1997), Section TR02E-5 (see Fig. 14) has no Zone of Instability, so that the region more than 50 feet upslope (in the horizontal direction) from the edge of the quarry could be regarded as a safe zone (see Fig. 18a and Table 3). Since the entire section consists of rock units stratigraphically lower than B5 (see Fig. 13 and Table 1), all of the rocks were assumed to be unweathered (strong), so the line connecting the toe of the pit with the surface should have a 45° angle (see Fig. 18a). The lack of a Zone of Instability results from the slope of the pit being shallower than 45°. Figure is portion of figure from Geo-Logic Associates (2023) with addition of a label.	A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report. The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report. For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report. To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site. .

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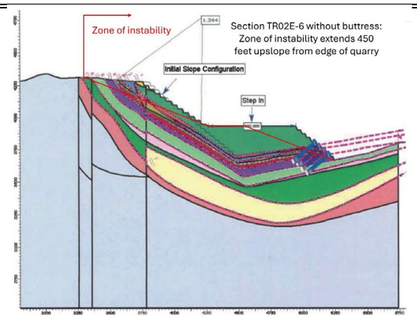
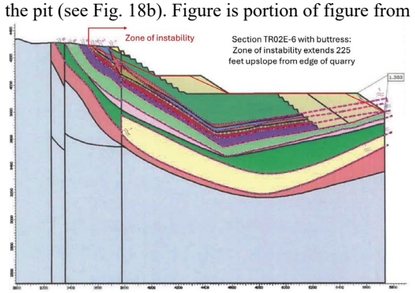
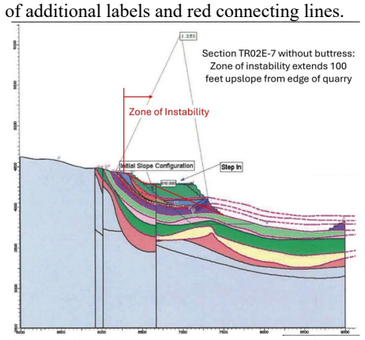
		 **Figure 28a.** Based on the guidelines of Department of Industry and Resources (Western Australia) (1997), the Zone of Instability for Section TR02E-6 (see Fig. 14), without a buttress, extends 450 feet upslope from the edge of the quarry, so that the region more than 500 feet upslope (in the horizontal direction) from the edge of the quarry could be regarded as a safe zone (see Fig. 18a and Table 3). Since all of the rocks above the toe of the pit are at the stratigraphic level of Unit B5 or higher (see Fig. 13 and Table 1), all rocks are regarded as weathered (weak) and the red connecting lines are drawn with slopes of 25° with respect to the horizontal. The above diagram follows the guidelines for complex pit geometries in which the connecting line intersects an interior surface of the pit (see Fig. 18b). Figure is portion of figure from Geo-Logic Associates (2023) with overlay of additional labels and red connecting lines.  **Figure 28b.** Based on the guidelines of Department of Industry and Resources (Western Australia) (1997), the Zone of Instability for Section TR02E-6 (see Fig. 14), with a buttress, extends 225 feet upslope from the edge of the quarry, so that the region more than 275 feet upslope (in the horizontal direction) from the edge of the quarry could be regarded as a safe zone (see Fig. 18a and Table 3). Thus, the addition of a buttress reduced the width of the Zone of Instability from 450 feet (compare with Fig. 28a and Table 3), but did not eliminate the Zone of Instability. Since all of the rocks above the toe of the pit are at the stratigraphic level of Unit B5 or higher (see Fig. 13 and Table 1), all rocks are regarded as weathered (weak) and the red connecting lines are drawn with slopes of 25° with respect to the horizontal. In the absence of any further information, it is assumed that the buttress will be constructed out of weathered or oxidized material. The above diagram follows the guidelines for complex pit geometries in which the connecting line intersects an interior surface of the pit (see Fig. 18b). Figure is portion of figure from Geo-Logic Associates (2023) with overlay of additional labels and red connecting lines.  **Figure 29a.** Based on the guidelines of Department of Industry and Resources (Western Australia) (1997), the Zone of Instability for Section TR02E-7 (see Fig. 14), without a buttress, extends 100 feet upslope from the edge of the quarry, so that the region more than 150 feet upslope (in the horizontal direction) from the edge of the quarry could be regarded as a safe zone (see Fig. 18a and Table 3). Since all of the rocks above the toe of the pit are at the stratigraphic level of Unit B5 or higher (see Fig. 13 and Table 1), all rocks are regarded as weathered (weak) and the red connecting lines are drawn with slopes of 25° with respect to the horizontal. The above diagram follows the guidelines for complex pit geometries in which the connecting line intersects an interior surface of the pit (see Fig. 18b). Figure is portion of figure from Geo-Logic Associates (2023) with overlay of additional labels and red connecting lines.	The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure. GLA did not use Guidelines for Mine Closure published by the LOPP, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of “Guidelines for Open Pit Slope Design” (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA’s proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. 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The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines. The current geotechnical report details the location of the Tiehm’s buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to

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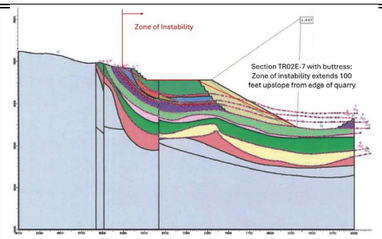
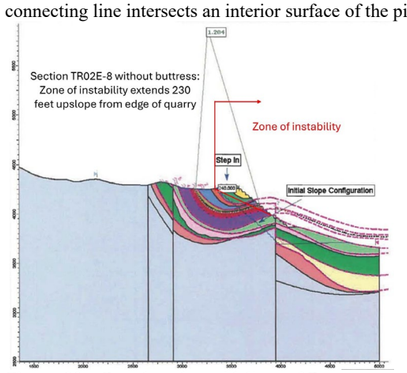
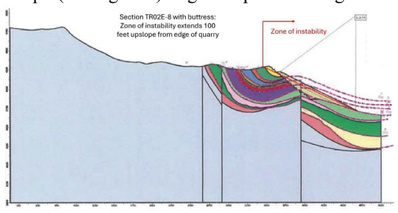
		 **Figure 29b.** Based on the guidelines of Department of Industry and Resources (Western Australia) (1997), the Zone of Instability for Section TR02E-7 (see Fig. 14), with a buttress, extends 100 feet upslope from the edge of the quarry, so that the region more than 150 feet upslope (in the horizontal direction) from the edge of the quarry could be regarded as a safe zone (see Fig. 18a and Table 3). Thus, the addition of a buttress did not change the width of the Zone of Instability (compare with Fig. 28a and Table 3). Since all of the rocks above the toe of the pit are at the stratigraphic level of Unit B5 or higher (see Fig. 13 and Table 1), all rocks are regarded as weathered (weak) and the red connecting lines are drawn with slopes of 25° with respect to the horizontal. In the absence of any further information, it is assumed that the buttress will be constructed out of weathered or oxidized material. The above diagram follows the guidelines for complex pit geometries in which the connecting line intersects an interior surface of the pit (see Fig. 18b). Figure is portion of figure from Geo-Logic Associates (2023) with overlay of additional labels and red connecting lines.  **Figure 30a.** Based on the guidelines of Department of Industry and Resources (Western Australia) (1997), the Zone of Instability for Section TR02E-8 (see Fig. 14), without a buttress, extends 230 feet upslope from the edge of the quarry, so that the region more than 280 feet upslope (in the horizontal direction) from the edge of the quarry could be regarded as a safe zone (see Fig. 18a and Table 3). Since all of the rocks above the toe of the pit are at the stratigraphic level of Unit B5 or higher (see Fig. 13 and Table 1), all rocks are regarded as weathered (weak) and the red connecting lines are drawn with slopes of 25° with respect to the horizontal. The above diagram follows the guidelines for complex pit geometries in which the connecting line intersects an interior surface of the pit (see Fig. 18b). Figure is portion of figure from Geo-Logic Associates (2023) with overlay of additional labels and red connecting lines.  **Figure 30b.** Based on the guidelines of Department of Industry and Resources (Western Australia) (1997), the Zone of Instability for Section TR02E-8 (see Fig. 14), with a buttress, extends 100 feet upslope from the edge of the quarry, so that the region more than 150 feet upslope (in the horizontal direction) from the edge of the quarry could be regarded as a safe zone (see Fig. 18a and Table 3). Thus, the addition of a buttress reduced the width of the Zone of Instability from 230 feet (compare with Fig. 30a and Table 3), but did not eliminate the Zone of Instability. Since all of the rocks above the toe of the pit are at the stratigraphic level of Unit B5 or higher (see Fig. 13 and Table 1), all rocks are regarded as weathered (weak) and the red connecting lines are drawn with slopes of 25° with respect to the horizontal. In the absence of any further information, it is assumed that the buttress will be constructed out of weathered or oxidized material. The above diagram follows the guidelines for complex pit geometries in which the connecting line intersects an interior surface of the pit (see Fig. 18b). Figure is portion of figure from Geo-Logic Associates (2023) with overlay of additional labels and red connecting lines.	be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12). The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability. Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species Supplemental Environmental Report. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.

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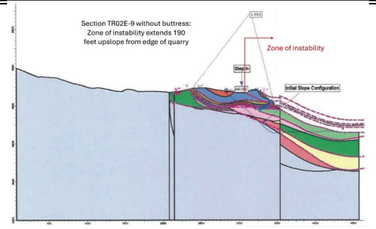
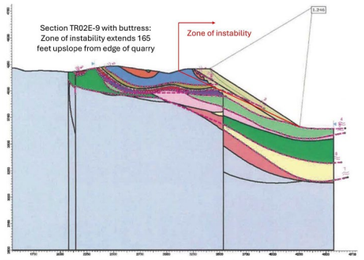
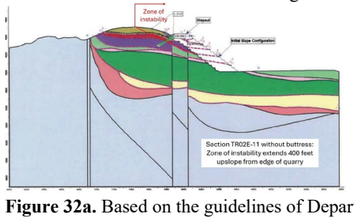
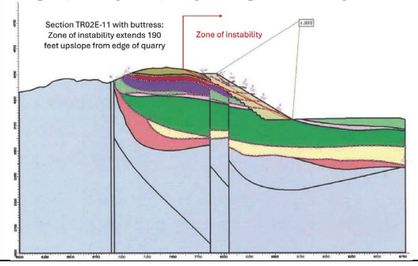
		 **Figure 31a.** Based on the guidelines of Department of Industry and Resources (Western Australia) (1997), the Zone of Instability for Section TR02E-9 (see Fig. 14), without a buttress, extends 190 feet upslope from the edge of the quarry, so that the region more than 240 feet upslope (in the horizontal direction) from the edge of the quarry could be regarded as a safe zone (see Fig. 18a and Table 3). Since all of the rocks above the toe of the pit are at the stratigraphic level of Unit B5 or higher (see Fig. 13 and Table 1), all rocks are regarded as weathered (weak) and the red connecting lines are drawn with slopes of 25° with respect to the horizontal. The above diagram follows the guidelines for complex pit geometries in which the connecting line intersects an interior surface of the pit (see Fig. 18b). Figure is portion of figure from Geo-Logic Associates (2023) with overlay of additional labels and red connecting lines.  **Figure 31b.** Based on the guidelines of Department of Industry and Resources (Western Australia) (1997), the Zone of Instability for Section TR02E-9 (see Fig. 14), with a buttress, extends 165 feet upslope from the edge of the quarry, so that the region more than 215 feet upslope (in the horizontal direction) from the edge of the quarry could be regarded as a safe zone (see Fig. 18a and Table 3). Thus, the addition of a buttress reduced the width of the Zone of Instability from 190 feet (compare with Fig. 31a and Table 3), but did not eliminate the Zone of Instability. Since all of the rocks above the toe of the pit are at the stratigraphic level of Unit B5 or higher (see Fig. 13 and Table 1), all rocks are regarded as weathered (weak) and the red connecting lines are drawn with slopes of 25° with respect to the horizontal. In the absence of any further information, it is assumed that the buttress will be constructed out of weathered or oxidized material. The above diagram follows the guidelines for complex pit geometries in which the connecting line intersects an interior surface of the pit (see Fig. 18b). Figure is portion of figure from Geo-Logic Associates (2023) with overlay of additional labels and red connecting lines.  **Figure 32a.** Based on the guidelines of Department of Industry and Resources (Western Australia) (1997), the Zone of Instability for Section TR02E-11 (see Fig. 14), without a buttress, extends 400 feet upslope from the edge of the quarry, so that the region more than 450 feet upslope (in the horizontal direction) from the edge of the quarry could be regarded as a safe zone (see Fig. 18a and Table 3). Since all of the rocks above the toe of the pit are at the stratigraphic level of Unit B5 or higher (see Fig. 13 and Table 1), all rocks are regarded as weathered (weak) and the red connecting lines are drawn with slopes of 25° with respect to the horizontal. The above diagram follows the guidelines for complex pit geometries in which the connecting line intersects an interior surface of the pit (see Fig. 18b). Figure is portion of figure from Geo-Logic Associates (2023) with overlay of additional labels and red connecting lines. 	

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Figure 32b. Based on the guidelines of Department of Industry and Resources (Western Australia) (1997), the Zone of Instability for Section TR02E-11 (see Fig. 14), with a buttress, extends 190 feet upslope from the edge of the quarry, so that the region more than 240 feet upslope (in the horizontal direction) from the edge of the quarry could be regarded as a safe zone (see Fig. 18a and Table 3). Thus, the addition of a buttress reduced the width of the Zone of Instability from 400 feet (compare with Fig. 32a and Table 3), but did not eliminate the Zone of Instability. Since all of the rocks above the toe of the pit are at the stratigraphic level of Unit B5 or higher (see Fig. 13 and Table 1), all rocks are regarded as weathered (weak) and the red connecting lines are drawn with slopes of 25° with respect to the horizontal. In the absence of any further information, it is assumed that the buttress will be constructed out of weathered or oxidized material. The above diagram follows the guidelines for complex pit geometries in which the connecting line intersects an interior surface of the pit (see Fig. 18b). Figure is portion of figure from Geo-Logic Associates (2023) with overlay of additional labels and red connecting lines.

The second reason as to why Geo-Logic Associates (2022, 2023) has not really calculated the extent of the post-closure unstable zone is that the critical failure surface has been calculated based on the existing geotechnical parameters, and not based on the degraded rock strengths that could exist after pit closure (see Figs. 6-7). Of course, there is always a great deal of uncertainty in the future degraded rock strengths, which again underscores the importance of a complete sensitivity analysis. The third reason is that the application of the limit equilibrium method is the beginning of a stability analysis and not the end. The limit equilibrium method considers only the initiation of failure through one rigid block sliding over another. The method does not consider how failure might progress after initiation. For example, it does not consider how the sliding along one surface could initiate sliding along another surface in the backward direction (away from the center of the quarry). It is most important that the method does not consider rockfall or structurally-controlled failure along joints or faults. The latter could be especially important because of the opening and weathering of joints that occurs during the post-closure period.

The Western Australian guidelines are not foolproof and not the final word in a stability analysis, but they are the culmination of years of experience with the typical widths of unstable zones in arid climates. According to the Western Australian guidelines, "Whilst it is recognized that the controls on the stability of pit walls will be site specific, the design criteria provided represent a generalised, conservative approach for determining the location of long-term abandonment bunds in all open pits. The design information provided in this document is based on field measurements of failures and tension cracks around pit edges in operating and abandoned open pit gold mines in Western Australia … The long-term stability of the open pit edge is dependent on a number of geotechnical factors … This guideline provides generic design criteria that allow for the normal variation of all these factors" (Department of Industry and Resources, 1997). Therefore, the Western Australian guidelines ought to be followed, unless it can be convincingly argued that the guidelines are excessively conservative for a particular mining pit, which is exactly what is stated in the guidelines. According to the Western Australian guidelines, "In cases where the mine owner wishes to locate the abandonment bund closer to the edge of the open pit than specified by this guideline, it must be demonstrated that the stability of the ground mass between the pit edge and the abandonment bund can be ensured for the very long term" (Department of Industry and Resources, 1997).

Out of the six sections for which the stability analyses were updated by Geo-Logic Associates (2023), only Section TR02E-5 has no Zone of Instability outside of the quarry even without a buttress (see Fig. 27). The lack of a Zone of Instability results from all of the exposed geologic units being stratigraphically lower than Unit B5 (compare Fig. 27 with Table 1 and Fig. 13) and from the pit slope being shallower than 45°. For each of the other five sections, either all of the exposed geologic units are at the stratigraphic level of Unit B5 or higher or the Zone of Instability begins at the base of Unit B5 (see Figs. 28a-b, 29a-b, 30a-b, 31a-b, 32a-b). In the absence of a Zone of Instability for Section TR02E-5, the safe region begins 50 feet from the edge of the quarry (see Table 3). It should be noted that Section TR02E-5 is the least critical of the six sections, since it is the only one that does not intersect a population of Tiehm's buckwheat (see Fig. 14).

Table 3. Widths of post-closure zones of instability and safe regions1

Cross-Section2	Width of Zone of Instability (feet)		Safe Region (feet)3	
	Without Buttress	With Buttress	Without Buttress	With Buttress
TR02E-5	0	0	50	50
TR02E-6	450	225	500	275
TR02E-7	100	100	150	150
TR02E-8	230	100	280	150
TR02E-9	190	165	240	215
TR02E-11	400	190	450	240

1Zones of instability and safe regions were calculated using procedures described in Department of Industry and Resources (Western Australia) (1997) (see Figs. 18a-b).
2See Figs. 14, 27, 28a-b, 29a-b, 30a-b, 31a-b, and 32a-b.
3The safe region is the region more than 50 feet upslope (in the horizontal direction) from the outer edge of the Zone of Instability.

For Section TR02E-6, without a buttress, the Zone of Instability encompasses a portion of the "Step In" plus a portion of the region upslope from the "Step In" and the "Initial Slope Configuration" (see Fig. 28a). The width of the Zone of Instability is 450 feet, as measured from the edge of the quarry, so that the safe region begins 500 feet from the edge of the quarry (see Table 3). After the addition of two buttresses, the Zone of Instability encompasses a portion of the inner buttress, a portion of the outer buttress, and a portion of the region upslope from the outer buttress (see Fig. 28b). The width of the Zone of Instability is reduced to 225 feet and the distance of the beginning of the safe region from the edge of the quarry is reduced to 275 feet (see Table 3).

For Section TR02E-7, without a buttress, the Zone of Instability again encompasses a portion of the "Step In" plus a portion of the region upslope from the "Step In" and the "Initial Slope Configuration" (see Fig. 29a). The width of the Zone of Instability is 100 feet, as measured from the edge of the quarry, so that the safe region begins 150 feet from the edge of the quarry (see Table 3). After the addition of a buttress, the Zone of Instability encompasses a portion of the buttress plus a portion of the region upslope from the "Initial Slope Configuration" (see Fig. 29b and compare with Fig. 29a). Since the addition of a buttress does not change the unstable portion of the region upslope from the "Initial Slope Configuration," (see Figs. 29a-b) the width of the Zone of Instability is still 100 feet with the safe region beginning 150 feet from the edge of the quarry (see Table 3).

For Section TR02E-8, without a buttress, the Zone of Instability encompasses a portion of the "Step In" plus a very small portion of the region upslope from the "Initial Slope Configuration" (see Fig. 30a). The width of the Zone of Instability is 230 feet, as measured from the edge of the quarry, with the safe region beginning 280 feet from the edge of the quarry (see Table 3). After the addition of a buttress, the Zone of Instability encompasses a portion of the buttress plus a portion of the region upslope from the "Step In" (see Fig. 30b and compare with Fig. 30a). The width of the Zone of Instability is reduced to 100 feet and the distance of the beginning of the safe region from the edge of the quarry is reduced to 150 feet (see Table 3).

For Section TR02E-9, without a buttress, the Zone of Instability encompasses only a portion of the "Step In" (see Fig. 31a). The width of the Zone of Instability is 190 feet, as measured from the edge of the quarry, with the safe region beginning 240 feet from the edge of the quarry (see Table 3). After the addition of a buttress, the Zone of Instability encompasses most of the buttress plus a portion of the "Step In" (see Fig. 31b and compare with Fig. 31a). The width of the Zone of Instability is reduced to 165 feet and the distance of the beginning of the safe region from the edge of the quarry is reduced to 215 feet (see Table 3).

Section TR02E-11 is the most critical, since it would intersect the population of Tiehm's buckwheat that would be only 15 feet from the edge of the quarry (see Fig. 14 and compare with Figs. 2 and 3a-b). For this section, without a buttress, the Zone of Instability begins at the base of Unit B5 on the side of the quarry and extends to the crest of a hill upslope from both the "Initial

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		Slope Configuration" and the "Stepout" (see Fig. 32a). The width of the Zone of Instability is 400 feet, as measured from the edge of the quarry, with the safe region beginning 450 feet from the edge of the quarry (see Table 3). After the addition of a buttress, the Zone of Instability encompasses about half of the buttress and does not extend all the way to the crest of the hill (see Fig. 32b). The addition of a buttress reduces the width of the Zone of Instability to 190 feet and the distance of the beginning of the safe region from the edge of the quarry to 240 feet (see Table 3). In summary, even with a buttress, the Zone of Instability would extend far into the population of Tiehm's buckwheat.	
108 and 183	108.53 and 183.52	***The Assumption that Slope Materials will remain Unsaturated is Unjustified*** The argument by Geo-Logic Associates (2023) as to why the quarry slope materials could not become re-saturated or re-pressurized even in response to extreme snowmelt or precipitation events was quoted at length in the section "Summary of Stability Analysis for Rhyolite Ridge Open Pit." The argument expresses the opinion that any snowmelt or precipitation would either become surface runoff or would infiltrate to a shallow depth and then evaporate. It should be noted that the argument is only a qualitative opinion and is not accompanied by any empirical data, calculations, or modeling. In the absence of any quantitative reasoning, at the present time, it is impossible to determine whether extreme snowmelt or precipitation events could or could not re-saturate the slope materials and thus, affect the stability of the quarry walls. It is important to consider not only whether the slope materials could become saturated during the operational period when, presumably, quarry dewatering could be an ongoing process, but also during the indefinitely long post-closure period when ongoing quarry dewatering is no longer possible. According to Geo-Logic Associates (2023), "As difficult as it may be to depressurize and remove water from these low permeability clays, it is even more difficult to put it back in." However, there has been no consideration of the meteorological and hydrogeological processes that resulted in the saturation and pressurization of the clay-rich units (M5 and B5) in the first place. Based on the available information, it cannot be said whether the water in Units M5 and B5 is formation water (trapped when the clay was first deposited) or meteoric water (originating in precipitation). Thus, it is not known whether the clay-rich units will recharge over decades or over geologic time, or how the recharge rate could be affected by climate change. In the absence of any of these types of quantitative studies, it should be imperative that the postclosure factors of safety be evaluated not only in light of the reduced rock strengths that develop during the post-closure period, but also for the wide range of water tables and pore pressures that might develop during the post-closure period. An issue that has not been considered in any documents is the possible localized impact on slope stability of watering the haul roads for dust suppression. In this respect, it should be noted that, based on the design in the DEIS, the main haul road that leaves the quarry would come to within 140 feet of the Tiehm's buckwheat population (see Fig. 17b), which would be very close to Section TR02E-11 (see Fig. 14) with a calculated factor of safety of only 1.21 under the assumption that the quarry slope materials will be unsaturated (see Fig. 15). McCarthy (2024) has estimated that, at the control efficiency level of 95%, dust suppression will require the application of 50,000 gallons of water per hour on the haul roads continuously for the lifetime of the mine. Thus, there needs to be a quantitative analysis of the impact of the water application and not simply the expression of an opinion. On the subject of haul roads, the U.S. Fish and Wildlife Service (2022) has expressed concern as to how the vehicular traffic on the roads could affect the stability of the quarry walls in the context of concern as to whether the quarry walls would be stable under any circumstances. According to U.S. Fish and Wildlife Service (2022), "Then there is a statement in here [document not available to author] that says, 'It is not feasible to reclaim the slopes of the Quarry wall due to instability and other geologic factors.' If they are stating this slope is unstable, why is there no concern for Tiehm's sliding off into a hole?" U.S. Fish and Wildlife Service (2022) continued, "The actual stability analyses should also show whether surcharge loads from the heavy trucks are being included. Since there are haul roads along this slope, it is assumed they will have included surcharge loads but that should be verified." However, the slope stability analyses by Geo-Logic Associates (2022, 2023) do not consider the additional weight of vehicular traffic on the haul roads, which could be especially important for Section TR02E-11 (compare Fig. 14 with Fig. 17b). In fact, Geo-Logic Associates emphasized the assumed irrelevance of vehicular weight on slope stability. According to Geo-Logic Associates (2022), "It is recommended that the required minimum static factor of safety of 1.2 be used for slopes with or without haul road access."	A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report. The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report. For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report. To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site. The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure. GLA did not use Guidelines for Mine Closure published by the LOPP, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of "Guidelines for Open Pit Slope Design" (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The

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			"Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA's proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase. The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey (2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines. The current geotechnical report details the location of the Tiehm's buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12). The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability. Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species Supplemental Environmental Report. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.
108 and 183	108.54 and 183.53	***The Adaptive Management Plan is Inadequate*** As discussed in the section "Summary of Stability Analysis for Rhyolite Ridge Open Pit," the set of preplanned actions ready for execution in response to adverse observations of slope stability consists of the single sentence: "Preliminary concepts for adaptive management actions include suspending mining activity, stopping mining activity and implementing mitigation measures in an area if detrimental instability near sensitive habitat is identified, based on monitoring" (Geo-Logic Associates, 2023). The first concern is the lack of detail in the preplanned actions and the lack of connecting specific actions to particular observations. The need for specific preplanned actions in an Adaptive Management plan (also called the Observational Method) cannot be overemphasized. According to the investigation report on the catastrophic failure at the Mount Polley mine in British Columbia in 2014, "The Observational Method is useless without a way to respond to the observations" (Independent Expert Engineering Investigation and Review Panel, 2015). According to Safety First: Guidelines for Responsible Mine Tailings Management, "There must be a system in place to respond to the observations" (Morrill et al., 2022). The SME (Society for Mining, Metallurgy and Exploration) Tailings Management Handbook warned, "The	A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report. The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material

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		observational method, since its inception, has experienced definitional and applicational drift, gradually being misused and redefined in a transition from planned change management to a 'make it up as you go' process. This is the paradox. The observational method is intended to leave nothing to uncertainty" (Hatton and van Zyl, 2022). The same handbook reviewed the original formulation of the Observational Method by Peck (1969) with the critical step: "Selection in advance of a course of action or modification of design for every foreseeable significant deviation of the observational findings from those predicted on the basis of the working hypothesis" (Hatton and van Zyl, 2022). There are implications in Geo-Logic Associates (2023) that specific actions in response to adverse observations will be developed later. Geo-Logic Associates (2023) states, "The majority of the adaptive management plan will be implemented once mining commences to allow for applicable monitoring threshold values and conditions to be established based on the understanding of the quarry stability," which seems to confuse the formulation of the Adaptive Management plan with the implementation of the plan. Geo-Logic Associates (2023) continues, "Responses at Rhyolite Ridge will be developed as experience is gained and a trigger action response plan (TARP) will be developed. This TARP will be developed by the Rhyolite Ridge Technical service group with the support of third-party geotechnical experts (EnviroMine, Dec 2019)." The problem with the later development of the Adaptive Management plan is the lack of a later opportunity for the public to review or to even have knowledge of the contents of the Adaptive Management plan. The lack of an opportunity for public review of the Adaptive Management plan leads to the second concern, which is the apocalyptic nature of the preliminary plan. The plan as expressed above calls for the cessation of mining activity, either temporarily or permanently, if there is indication of slope instability that could affect sensitive habitat, without any consideration of intermediate steps. At this stage, it is difficult for the public to determine whether the threat or the promise to close the Rhyolite Ridge mine to save the Tiehm's buckwheat is supposed to be taken literally. This threat or promise is found only in an attachment to the DEIS that was written by consultants for Ioneer. The mining company has not stated that they will close the mine to save the Tiehm's buckwheat population. The Bureau of Land Management has not stated they will rescind the mining permit to save the Tiehm's buckwheat population. It is not even clear that Ioneer can close the mine, even temporarily, considering the commitments that have been made or will have been made to other companies. Thus, the public is left in the position of needing to evaluate the status of a claim by a consulting company that there will be a cessation of mining activity in response to an indication of slope instability, but without any corresponding commitment on the part of the mining company.	properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report. For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report. To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site. The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure. GLA did not use Guidelines for Mine Closure published by the LOPP, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of "Guidelines for Open Pit Slope Design" (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable

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			approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA's proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase. The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey (2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines. The current geotechnical report details the location of the Tiehm's buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12). The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability. Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species Supplemental Environmental Report. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.
108 and 183	108.55 and 183.54	**SUMMARY CONCLUSIONS** The six questions posed in the "Methodology" section are repeated below, followed by very brief responses. More complete responses can be found in the "Responses" section. ***1) Are the calculated factors of safety reliable?*** No, the calculated factors of safety are not reliable. Although the raw data that were used to develop the geotechnical parameters show considerable scatter, the geotechnical parameters and factors of safety are stated with no uncertainties and there is no sensitivity analysis. No source has been identified for the buttress material, so that the geotechnical parameters for the buttress are purely hypothetical. ***2) Was the choice of 1.2 for the minimum factor of safety appropriate for the operational period?*** No, according to the Guidelines for Open Pit Slope Design (published by the Large Open Pit Project) and the SME Surface Mining Handbook (published by the Society for Mining, Metallurgy and Exploration), based upon the data uncertainty and the consequences of slope failure, the minimum factor of safety should be 1.5 and the maximum probability of failure should be 5% during the operational period (prior to buttress construction). ***3) Was the choice of 1.2 for the minimum factor of safety appropriate for the post-closure period?*** No, according to the Guidelines for Mine Closure (published by the Large Open Pit Project), based upon the data uncertainty, the consequences of slope failure, and the pit wall condition, the minimum factor of safety should be 2.0 during the post-closure period (after buttress construction). ***4) Was the Zone of Instability for open pits as specified in Western Australian guidelines properly taken into account?*** No, the concept of the Zone of Instability was not taken into account at all. Application of the guidelines shows that the minimum separation distance between the quarry and the Tiehm's buckwheat population ought to be 450 feet before buttress construction and 240 feet after buttress construction along the profile where the proposed quarry would be only 15 feet from the Tiehm's buckwheat population ***5) Was the assumption that slope materials will remain unsaturated justified?***	A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report. The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report. For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes

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		No, the assumption is not justified. The stability analysis does not consider the hydrogeological and meteorological processes by which the current state of saturation and over-pressurization was achieved, nor does it consider the time period over which re-saturation and re-pressurization could occur. ***6) Is the proposed Adaptive Management plan adequate?*** No, the Adaptive Management plan lacks any specifics or details. The plan states the mine could be closed in response to an indication of slope instability, although without any apparent commitment on the part of the mining company.	a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report. To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site. The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure. GLA did not use Guidelines for Mine Closure published by the LOPP, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of “Guidelines for Open Pit Slope Design” (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA’s proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase. The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey

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			(2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines. The current geotechnical report details the location of the Tiehm's buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12). The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability. Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species Supplemental Environmental Report. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.
108 and 183	108.56 and 183.55	**RECOMMENDATIONS** The recommendation of this report is that the geotechnical sections of the Draft Environmental Impact Statement be completely rewritten with special attention to the following: 1) A specific source should be identified for the buttress material with estimation of the geotechnical parameters for that particular source. 2) All of the raw geotechnical data should be presented with a complete explanation as to how those data were used to develop the geotechnical parameters. 3) The Draft Environmental Impact Statement should specify which parameters were developed from data and which were based on judgment. Parameters that were based on judgment should be rigorously defended. 4) The discussion of the geotechnical parameters should include the uncertainty in the parameters. 5) The calculated factors of safety should include the uncertainty, such as the standard deviation. 6) A sensitivity analysis should be carried out in which the factor of safety for each section is re-calculated based on the entire range of reasonable values for the geotechnical parameters, such as the lowest reasonable values for cohesion and friction angle. If the factors of safety vary significantly for the reasonable range of input data, the results should be used with great caution. 7) A sensitivity analysis should be carried out in which the critical failure surface for each section is re-calculated based on the entire range of reasonable values for the geotechnical parameters, such as the lowest reasonable values for cohesion and friction angle. If the positions of the critical failure surfaces vary significantly for the reasonable range of input data, the results should be used with great caution. 8) It should not be assumed that all slope materials will be unsaturated. The factors of safety should be re-calculated for a range of possible pore pressures and water tables, including the eventual possibility that pore pressures and the water table will return to pre-mining levels. If the factors of safety are strongly dependent upon the assumption that all slope materials will be unsaturated, then the results for unsaturated materials should be used with great caution. 9) The localized re-saturation of slope materials that could result from the surface application of water for dust suppression on the haul roads should be calculated and the potential impact on slope stability should be assessed. 10) The weight of vehicular traffic on the haul roads should be taken into consideration for analyses of slope stability. 11) The distribution of possible values of the factor of safety should be developed for each section, so that the probability of failure can be calculated. 12) The stability analyses should be carried out in accordance with the most up-to-date map for the intended quarry. 13) The Draft Environmental Impact Statement should adhere to the recommendations of Guidelines for Open Pit Slope Design (published by the Large Open Pit Project) and the SME Surface Mining Handbook (published by the Society for Mining, Metallurgy and Exploration) that the minimum factor of safety should be 1.5 and the maximum probability of failure should be 5% during the operational period (prior to buttress construction). 14) The Draft Environmental Impact Statement should adhere to the recommendations of the Guidelines for Mine Closure (published by the Large Open Pit Project) that the minimum factor of safety should be 2.0 during the post-closure period (after buttress construction). 15) The factors of safety and the critical failure surfaces for the post-closure period should be calculated based on reasonable expectations for the rock mass degradation that will occur during the post-closure period. 16) For each section, the Zone of Instability should be calculated according to the guidelines of the Western Australian Department of Industry and Resources. The connecting lines for the geologic units that are at the stratigraphic level of Unit B5 of the Cave Spring Formation or higher should have an angle of 25° with respect to the horizontal. Local and regional outcrops should be investigated to determine whether some geologic units show breakback angles less than 25°, in which case, the connecting lines should be assigned the lower angle for those units. 17) Unless it can be convincingly argued to the contrary, the quarry should be designed so that the Tiehm's buckwheat population is at least 50 feet beyond the Zone of Instability, as specified in Western Australian regulations.	A conservative approach was used for estimation of geotechnical parameters based on the materials encountered on site. Material properties are listed on Figure 3-5 of the GLA report. The material properties utilized in the analyses were derived from the EnviroMine (2019) report. The material parameters incorporated are conservative values based on the results of various laboratory tests. These conservative values provide a reliable foundation for the stability analyses, reducing the need for additional sensitivity analyses regarding the material properties. Materials Properties are listed on Figure 3-5 (GLA 2022). This conservative approach ensures that the safety factors used are robust and account for any potential variability in the material properties. Material properties are listed on Figure 3-5 of the GLA report. For the report completed by GLA, no new drilling and geotechnical tests were conducted. Instead, the geotechnical data were sourced from previous investigations and other available resources. Specifically, they relied on the geotechnical report prepared by EnviroMine in 2019 to obtain the necessary geotechnical parameters and details of the cross sections required for stability analyses. This existing report provided a set of data, eliminating the need for additional fieldwork or testing by GLA. The GLA report from 2022 incorporates the test results from the EnviroMine (2019) report, which includes a variety of tests such as direct shear tests, uniaxial compressive strength tests, triaxial tests, and Brazilian tensile strength tests, among others. These tests provide a thorough characterization of the material properties, ensuring that there is no uncertainty regarding the material properties used in the stability analyses. The availability of these detailed test results and laboratory reports means that the data used are robust and reliable, thus supporting the conclusions drawn in the GLA report. To address the uncertainty in material properties, GLA utilized the values provided in the previous report by EnviroMine for their initial analyses. These values offer a baseline for understanding the geotechnical characteristics of the site.

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		18) The Adaptive Management plan for the response to indications of slope instability should be specific and detailed with intermediate steps that would occur prior to a cessation of mining activity. Any claims that the mine will be closed in response to evidence of slope instability should be supported by a binding commitment from the mining company.	The effect of watering the surface for dust control purposes is not significant and does not warrant analysis in the slope stability assessments for mine closure. This means that the water used to control dust on the mine surface does not appreciably affect the stability of the mine slopes. Therefore, including this factor in the slope stability analysis is unnecessary. The primary concern of dust control is to minimize airborne particulates for environmental and health reasons, which has minimal impact on the geotechnical stability of the slopes. GLA undertook a full assessment by examining various cross-sections throughout the mine site. They conducted multiple stability analyses on different walls to ensure a thorough evaluation of the mine's stability. These analyses are detailed in the geotechnical report by GLA (2022). The report includes stability assessments for 19 distinct sections of the mine walls, the results are documented in the report. Also, the details and outcomes of these analyses are presented in Appendix G of the report. This extensive examination of multiple cross-sections ensures that all critical areas of the mine are evaluated, providing an understanding of the overall stability and safety of the mine site during and after closure. GLA did not use Guidelines for Mine Closure published by the LOPP, which is mentioned here in the comments as the reference. Geo-Logic Associate used Chapter 9 of “Guidelines for Open Pit Slope Design” (Read & Stacey, 2009) for design criteria, which is one of the sources typically used in US. The "Guidelines for Open Pit Slope Design" by Read and Stacey (2009) does not explicitly provide a fixed minimum Factor of Safety for mine closure and post-closure periods. Instead, it emphasizes that the acceptable Factor of Safety should be determined based on specific site conditions, the nature of the materials, and the risk associated with potential slope failures. Typically, the guidelines suggest a more conservative Factor of Safety for the post-closure period compared to the operational period, acknowledging the long-term stability requirements and potential consequences of failure. This level of safety is deemed sufficient based on geological assessments and historical data, making it a practical and economically viable choice for mine closure operations. It allows for the allocation of resources towards other critical areas of the closure plan, ensuring a comprehensive and financially sustainable approach. Furthermore, the effectiveness of a 1.2 Factor of Safety is reinforced by GLA’s proposed methodologies for slope monitoring. Continuous and advanced monitoring techniques are integral to detecting any potential instabilities in real-time, thereby preventing slope failures during and after the mine closure process. These monitoring strategies include the use of instruments like inclinometers, piezometers, and radar systems, which provide precise and timely data on slope movements and groundwater conditions. With proactive monitoring in place, a Factor of Safety of 1.2 can ensure the long-term stability of mine slopes, as any signs of potential failure can be addressed promptly, thereby maintaining safety and structural integrity throughout the closure phase. The geotechnical report from GLA adhered to the methodologies and standards outlined in the "Guidelines for Open Pit Slope Design" by Read & Stacey (2009). These guidelines are internationally recognized and provide comprehensive criteria for assessing the stability of open pit slopes. Consequently, the report did not incorporate the Zone of Instability guidelines specified by the Western Australian Department of Industry and Resources, as it focuses primarily on ensuring compliance with the Factor of Safety requirements specified in the Read & Stacey guidelines. The stability of the slopes, as shown in the GLA report, is fundamentally dependent on the thorough slope stability analyses conducted in accordance with these established guidelines. The current geotechnical report details the location of the Tiehm’s buckwheat plants on Figure 12. The report did not account for the presence or location of these plants in their stability analysis as an external load as it was determined to be lightweight and not be a significant load factor. Of the 19 cross-sections used

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			in the analysis, the general location of the plants and their habitat were captured in the study (GLA 2023 Figure 12). The buckwheat protection plan provides more detail regarding the location of the plants and the habitat and discusses the monitoring required for slope stability. Monitoring and management measures are detailed in the GLA report as well as the Buckwheat Protection Plan that was made available to the public within the Threatened and Endangered Species Supplemental Environmental Report. Section 7 consultation is ongoing, and a Biological Opinion will be issued by the USFWS. The Biological Opinion will, in part, assess impacts from pit stability.
108 and 183	108.57 and 183.56	**ABOUT THE AUTHOR** Dr. Steven H. Emerman has a B.S. in Mathematics from The Ohio State University, M.A in Geophysics from Princeton University, and Ph.D. in Geophysics from Cornell University. Dr. Emerman has 31 years of experience teaching hydrology and geophysics, including teaching as a Fulbright Professor in Ecuador and Nepal, and has over 70 peer-reviewed publications in these areas. Since 2018 Dr. Emerman has been the owner of Malach Consulting, which specializes in evaluating the environmental impacts of mining for mining companies, as well as governmental and nongovernmental organizations. Dr. Emerman has evaluated proposed and existing mining projects in North America, South America, Europe, Africa, Asia and Oceania, and has testified on issues of mining and water before the U.S. House of Representatives Subcommittee on Indigenous Peoples of the United States, the European Parliament, the United Nations Permanent Forum on Indigenous Issues, the United Nations Environment Assembly, the Permanent Commission on Human Rights of the Chamber of Deputies of the Dominican Republic, and the Minnesota Senate Environment, Climate and Legacy Committee. Dr. Emerman is the former Chair of the Body of Knowledge Subcommittee of the U.S. Society on Dams and one of the authors of Safety First: Guidelines for Responsible Mine Tailings Management.	Comment noted.
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108 and 183	108.59 and 183.58	**Appendix C** Michael C. McCarthy, PhD, Review of Dust Deposition and Suppression Impacts on Tiehm's Buckwheat from the Rhyolite Ridge Lithium-Boron Project (May 31, 2024). Review of Dust Deposition and Suppression Impacts on Tiehm's Buckwheat from the Rhyolite Ridge Lithium-Boron Project Technical Memorandum prepared for Center for Biological Diversity Michael C. McCarthy, PhD – Radical Research LLC – Riverside, CA 92508 – mikem@radicalresearch.llc - http://radicalresearch.llc/ May 31, 2024 Background and Executive Summary The Rhyolite Ridge Lithium-Boron Project ('Project') would involve the construction and operation of an open-pit mine to extract lithium and boron ore in the Rhyolite Ridge area of Esmeralda County, NV. The proposed quarry, overburden storage, haul road, and service road intersects existing critical habitat for Tiehm's Buckwheat *Eriogonum tiehmii* (F.R., 2022). Operation of the quarry, haul road, overburden storage, service roads, and general mine operations will create significant and unavoidable dust impacts. Dust suppression methods include water trucks, in-place watering, and potential chemical dust suppressants (if approved).	An air quality impact analysis was prepared for the Project, which was reviewed by the BLM and cooperating agencies, and was approved for use in the NEPA. The air quality impacts analysis demonstrates compliance with both secondary and primary NAAQS, including for particulate matter. The Clean Air Act identifies two types of NAAQS, which are primary standards and secondary standards. Primary standards, which are what is assessed in the Air Quality Impact Analysis, provides public health protection, including sensitive human populations. Primary standards are more stringent than the secondary standards. The secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Under the North and South OSF Alternative, a substantial portion of the haul road was moved further away from the Tiehm's buckwheat subpopulations to reduce dust impacts to the buckwheat. The comments provided on dust impacts are based on an earlier configuration of the haul road. A particulate matter impact analysis was prepared as part of the Buckwheat Protection Plan for the

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		This technical memorandum evaluates the Draft Environmental Impact Statement (DEIS) – DOI-BLM-NVB020-2021-0020-EIS and associated environmental documentation and appendices for dust deposition direct and indirect impacts on the critical habitat areas – specifically focused on domain specific air quality emissions, modeling, and deposition impacts for the 'Proposed Action' and the 'North and South OSF Alternative'. Executive Summary **Fugitive dust emissions are underestimated.** Fugitive dust emissions from quarry blasting, quarry excavation operations, overburden loading/unloading, service roads, watering trucks, and overburden wind erosion are not included in the fugitive dust dispersion modeling impacts on critical habitat. **Model inputs are systematically biased low.** Multiple dispersion model or emission inputs systematically bias the results to lower fugitive dust emissions. Silt fraction, meteorology, and water truck emissions activity are inadequate. Minor and major sources of fugitive dust are not included in critical habitat deposition modeling. **Resuspended herbicide and/or chemical suppressants will affect critical habitat**. Indirect effects of dust deposition and dust suppression on critical habitat are not considered at all. Resuspension of particles and dust deposition of mine dust with adsorbed/absorbed herbicides or chemical dust suppressants is not considered. **Water truck emissions and water requirements are inadequate.** Dust suppression activities from Water Trucks are inadequately modeled for emissions activity and water management. **Model documentation is insufficient.** DEIS documents, supplemental reports, appendices, and attachments are insufficient for evaluation of model domain and model results for critical habitat dust deposition. Dispersion modeling was not performed for the North and South OSF alternative.	North and South OSF Alternative. This particulate matter impact analysis was used to assess particulate matter deposition from haul trucks in proximity to designated critical habitat and Tiehm's buckwheat subpopulations and was used in the Buckwheat Protection Plan for the North and South OSF Alternative in assessing Project particulate matter deposition impacts relative to the particulate matter threshold that was established using the best available science. The results showed the Project is below the established threshold, and the Buckwheat Protection Plan includes measures to monitor particulate matter deposition within designated critical habitat and provides protocols and procedures to assess the established threshold during the life of the Project. This will allow for appropriate management implementation if data from monitoring shows the need to modify the threshold or implement other management requirements to meet the intent of the conservation measure detailed in the Buckwheat Protection Plan for the North and South OSF Alternative. Impacts to Tiehm's buckwheat from dust are disclosed in EIS Section 4.12 and additional clarification was added to Section 3.3.3 of the Threatened and Endangered Species SER. This additional clarification was added to the SER but was available to the public during the comment period as Appendix B of the Threatened and Endangered Species SER.

108 and 183	108.60 and 183.59	Detailed Discussion
		Documents Reviewed and DEIS Description of Impacts and Mitigation Measures
		This technical memorandum evaluates the Draft Environmental Impact Statement (DEIS) – DOI-BLM-NVB020-2021-0020-EIS and associated environmental documentation and appendices for dust deposition direct and indirect impacts on the critical habitat areas. My comments reflect documents available publicly or through public records requests which are the most recent available. These documents reviewed include:
		
		• Rhyolite Ridge Lithium-Boron Project DEIS – Project DOI-BLM-NV-B020-2021-0020-EIS; (BLM, 2024)
		  ○ Air Quality Including Climate Change Supplemental Environmental Report
		  ○ Transportation and Access Supplemental Environmental Report
		  ○ Vegetation Resources, Including Noxious Weeds, and Special Status Plant Species Supplemental Environmental Report
		  ○ Threatened and Endangered Species Supplemental Environmental Report
		• Air Quality Impact Analysis – Trinity Consultants (September 2022, and revised October 2023 v5.6)
		• Work Plan for Air Quality Impact Analysis (August 2023)
		• Attachment H – Particulate Matter Impact Analysis on Tiehm's Buckwheat – Trinity Consultants June 2023 and September 2023
		• Geospatial files on critical habitat, Tiehm's buckwheat populations, haul road location, and quarry/overburden storage locations.
		
		The DEIS acknowledges that project activities will generate dust that can deposit on the critical habitat and adversely impact Tiehm's Buckwheat populations. Adverse impacts are described In Section 4.12.1.3 of the DEIS. The Proposed Action would disturb approximately 354 acres of designated critical habitat. Surface disturbance will reduce the habitat available for pollinator species, will lead to establishment and spread of non-native species (both plant and animal), and increase dust deposition on critical habitat areas. The Proposed Action includes mitigation measures for dust suppression on some portions of the mining operation (watering trucks, chemical dust suppressants), noxious species herbicide application, and a dust monitoring plan. In my review of the DEIS and accompanying documentation, there were multiple critical areas of concern that should be addressed. These areas must meet NEPA requirements that decision-makers and the public are fully informed of the environmental, social, and economic effects of the Proposed Action and the North-South OSF Alternate.
		
		Section 2.1.13.2 describes Applicant-Committed Environmental Protection Measures, including protections for Tiehm's Buckwheat, Air Quality, and Noxious Weeds. Key measures reviewed for this report include the disturbance buffers around subpopulations, a Buckwheat Exclusion Area, fugitive dust controls including in-place water sprays, water trucks or chemical dust suppressants, and physical weeding or herbicide application.
		
		Section 2.2.2 identifies additional plans for Tiehm's Buckwheat in the North and South OSF Alternative Action.
		
		Table 2-6 Compares effects by actions. For Fugitive Particulate Emissions, the Proposed Action and North and South OSF Alternative are 'Similar.' The surface disturbance differential is 35 acres fewer for the alternative action out of 2,306 – or less than 2%. Critical Habit disturbance is 354 acres in the proposed action and 197 acres in the Alternate; 559 acres of critical habitat would be fenced in the Proposed Action and 714 Acres would be fenced in the Alternative. The 'Dust' category asserts that Fugitive Dust would impact the critical habitat in the Proposed Action and is the 'Same as the Proposed Action, but less impacts from less disturbance in designated critical habitat.' It is not at all clear how Fugitive Dust can be **the same** but also less impact, as this claim is based on no dispersion modeling or emissions dust modeling. There is no air quality document that supports this assertion.
		
		The DEIS reports on emissions and dispersion modeling of air quality impacts and dust deposition of the proposed Project Action. Dispersion modeling was not conducted for the North and South OSF Alternative (DEIS, p. 4-2). Total fugitive dust emissions from the Proposed Action are presented as 2,625 tons per year of particulate matter (PM), non-fugitive emissions are 76 tons per year, and mobile emissions are 199 tons per year, for a total of 2,900 tons per year. Fugitive emissions are the bulk of emissions in the DEIS.
		
		The DEIS describes mitigation measures which include implementing a dust deposition monitoring program and verifying the effectiveness of dust suppressant measures on unpaved roads, construction areas, and stockpiles. The adaptive management program sets a limit of 4 g/m2/day based on a trailing 12-month average. Based on this approach, they claim the 'impacts to Tiehm's buckwheat from fugitive dust would be minor, long-term, and localized.' This assertion is unsupported and relies on multiple untested assumptions and modeling underestimates.
			An air quality impact analysis was prepared for the Project, which was reviewed by the BLM and cooperating agencies, and was approved for use in the NEPA. The air quality impacts analysis demonstrates compliance with both secondary and primary NAAQS, including for particulate matter. The Clean Air Act identifies two types of NAAQS which are primary standards and secondary standards.
			
			Primary standards, which are what is assessed in the Air Quality Impact Analysis, provides public health protection, including sensitive human populations. Primary standards are more stringent than the secondary standards. The secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.
			
			A particulate matter impact analysis was prepared as part of the Buckwheat Protection Plan for the North and South OSF Alternative. This particulate matter impact analysis was used to assess particulate matter deposition from haul trucks in proximity to designated critical habitat and Tiehm's buckwheat subpopulations and was used in the Buckwheat Protection Plan for the North and South OSF Alternative in assessing Project particulate matter deposition impacts relative to the particulate matter threshold that was established using the best available science. The results showed the Project is below the established threshold, and the Buckwheat Protection Plan includes measures to monitor particulate matter deposition within designated critical habitat and provides protocols and procedures to assess the established threshold during the life of the Project. This will allow for appropriate management implementation if data from monitoring shows the need to modify the threshold or implement other management requirements to meet the intent of the conservation measure detailed in the Buckwheat Protection Plan for the North and South OSF Alternative.
			
			Impacts to Tiehm's buckwheat from dust are disclosed in EIS Section 4.12 and additional clarification was added to Section 3.3.3 of the Threatened and Endangered Species SER. This additional clarification was added to the SER but was available to the public during the comment period as Appendix B of the Threatened and Endangered Species SER.

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108 and 183	108.61 and 183.60	Fugitive dust emissions are underestimated Critical sources of fugitive dust are identified and documented outside of the DEIS and Supplemental Environmental Reports in the Trinity Consultants Air Quality Impacts Analysis (AQIA 2023, v5.6). There are multiple iterations of these reports, but we believe this is the most recent available. A single modeling simulation was used to assess all facility impacts based on 'mining throughputs, VMT, source locations, and reasonably foreseeable maximum emissions year.' In Attachment H – Trinity Consultants (September 2023) provided a determination of potential deposition of PM from a haul road proximate to the Tiehm's Buckwheat populations 3 and 6. In it, they explicitly note that they only model haul truck traffic trips. This is not a credible cumulative assessment of fugitive dust deposition as it omits dozens of sources large and small that will contribute to fugitive dust emissions in the operational project area. As noted in the Air Quality Impacts Analysis based on the broader emissions analysis, total emissions from Haul Trucks are not the only sources of fugitive dust emissions. Other significant sources include the overburden stockpiles in Table 13a which emit 2,906 lbs/day for the North stockpile, 4,690 lbs/day for the West overburden stockpile, and 3,650 lbs/day for the Infill stockpile of fugitive dust emissions. Total on-site road emissions are 3,333 lbs/day, with most of that being in haul road segment 1, 22, or in-pit, so it is unclear how the determination was made to exclude wind erosion from overburden storage from a dust deposition analysis. It is also unclear how the water truck dust emissions were allocated based on Table 16b – since all the emissions were allocated identically to the mine-pit and to Segment 1, with zero dust suppression on road Segments 2-22. Water trucks contribute at least 470 lbs/day of PM and the allocation does not appear to be included in the Attachment H dust deposition modeling of haul road impacts. Additionally, the 100+ ton water trucks (CAT 777) are too large to go on service roads and no other water trucks are specified for dust suppression on those roads. Those appear to have not been modeled or to have been omitted from the analysis. Cumulatively, there are more fugitive dust emissions that have not been modeled for critical habitat dust deposition impacts than have been modeled. Given the variable location of overburden storage across the alternate scenarios – a transparent and reproducible dust deposition modeling simulation with multiple mine layout scenarios needs to be performed to assess maximum dust deposition impacts. The existing work is neither reproducible nor inclusive enough to be credible for estimating maximum dust deposition impacts based on the limited haul road modeling performed. Lastly, silt content is parameterized at 6.4% for haul road and service road emissions calculations based on Arizona Department of Environmental Quality, State Implementation Plan Revision: Regional Haze Program (2018-2028) – (2022). In that report, it describes its silt content assumptions for achieving 6.4%. *Application and maintenance of surface gravel on the unpaved non-haul roads is technically feasible. However, the rubber tire rigs would still degrade the gravel over time at a rate faster than normal vehicle traffic, due to the weight of the rubber tire rigs. This would necessitate periodic replacement of the gravel. Per AP-42 Section 13.2.2 Equation 1(a), surface material silt content (%) is one of the key variables for estimating PM10 emission factor. Asarco currently utilizes a silt content of 6.9% in its emission inventories for the unpaved roads. A silt content of 6.4% could be achieved by adding more gravel to the unpaved roads. A decrease in the silt content from 6.9% to 6.4% would reduce the PM10 emission by 5.1 tpy. (ADEQ, 2022)* The description characterizes how a single facility can lower its silt content by regularly applying gravel to its non-haul road. First, I note that this is for non-haul roads and is not a reasonable assumption for a haul road which has far heavier vehicles mechanically grinding down material into silt and dust that is resuspended. Secondly, it requires period application of a gravel layer which would also create dust through application – this has not been modeled or included in any documentation in the DEIS or appendices. Finally, this silt content value is far lower than observed silt content on site, which ranges from 12% to 32%. Moreover, it is lower than the 13% silt content of the ore stockpile ore in Table 13a of appendix B (AQIA 2023, v5.6). The assumption that the silt content of the mining overburden and ore will be more than twice as high as the road is based entirely on the combination of water treatment or chemical dust suppressant applications and gravel applications. The haul road is continuously utilized by 200+ ton trucks which will pulverize the haul road into silt at a rapid rate. It is not a conservative or realistic estimate to assume silt content levels less than half of the silt content of the ore and surrounding overburden material based on a non-haul road application.	The 2024 AQIA for the North and South OSF Alternative was completed after the publication of the DEIS. Data from the 2024 AQIA has been incorporated into the Final EIS. The 2024 AQIA for the North and South OSF Alternative, and the assessment in the EIS, considers all dust emitting sources including truck emissions, quarry activities, storage wind erosion emissions, etc. The modeled concentrations from these emissions are below primary and secondary NAAQS. As noted in Appendix H, "Worst Case Year Memorandum" of the 2023 AQIA for the Proposed Action, these emissions were generated for the operation year that is expected to generate the highest level of emissions, and consequently, the highest potential impacts. Furthermore, because of the short-term emissions associated with the dust models, the water truck activity emissions were placed on the road segments closest to the critical habitat and the off-site receptors to maximize dust impacts at these locations. Pursuant to the requirements of 40 CFR Part 51 Appendix W, the AQIA considers locations of "Ambient air". Pursuant to 40 CFR 50.1(e), "Ambient air" means that portion of the atmosphere, external to buildings, to which the general public has access. The critical habitat area is not available for general public access, not considered "ambient air", and was thus excluded from the AQIA analysis, consistent with the requirements of 40 CFR Part 51 Appendix W. Because of these considerations, a separate modeling evaluation was completed to evaluate dust impacts to critical habitat and specifically potential impacts to subpopulations Tiehm's buckwheat. This analysis is summarized in the BPP & APCM and provided as in Attachment H in the BPP & APCM, and has been included in the Section 7 consultation process and the applicable NEPA documents. The Attachment H evaluations only included the haul trucks and haul road traffic, based on the AQIA evaluation, which demonstrates that the haul trucks contribute to 96% of the maximum dust impacts and because the haul road was the single source of dust with the greatest potential to impact Tiehm's buckwheat. This consideration mirrored FWS concerns with the potential for dust deposition from the haul road and their request to move the haul road 300 feet, 91 meters, away from Tiehm's buckwheat subpopulations. This analysis considered particulate matter equal to or less than PM30 to better understand the potential risks from dust deposition. With respect to Attachment H, the years and truck traffic modeled were Year 3 with 2 haul truck round trips per day, and Year 11 with 525 haul truck round trips per day. These years were selected to evaluate the lowest mining activity year (Year 3) and the highest mining activity year (Year 11). As summarized in Table 5 of Attachment H, the model impacts for Year 11 (i.e., highest mining activity year) are several orders of magnitude higher than the model impacts for Year 3 (i.e., lowest mining activity year) and are still protective of the critical habitat. To further understand potential risks from dust, Figure 17 of Rev 4 of the BPP & APCM included dust impacts from sources other than the haul roads and these effects for the worst-case emissions year. This analysis demonstrates that the location and magnitude of the dust impacts from all sources are not anticipated to cause any detrimental effects on the critical habitat. This analysis has been included in the Section 7 consultation process and Section 4.12.2.3 of the Final EIS. Since publication of the DEIS, Ioneer has agreed to move the haul road from over 300 meters up to 870 meters east of the haul road location in the Proposed Action and the North and South OSF Alternative considered in the DEIS. Modeled 24-Hour average PM10 dust impacts for the North and South OSF to Tiehm's buckwheat subpopulations after movement of the haul road range from 7 to 26 percent of NAAQS primary and secondary standards. Haul trucks and traffic on the haul road are modeled to be substantially lower than the threshold identified in the BPP & APCM. The risk of larger dust particles impacting Tiehm's buckwheat has been substantially reduced by relocation of the haul road. This

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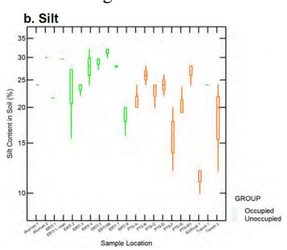
			data has been included in the Section 7 consultation process and the applicable NEPA documents. CAT-777 water truck is too large for smaller service roads. In addition to the CAT-777, the project will utilize two smaller water trucks to maintain adequate water on all project roads for dust control. Note that the 2024 model demonstrations are based on the utilization of three water trucks with greater assumed dust emissions than a CAT 777. This maximized dust emissions and dust impacts from this source. The haul roads will be constructed from mined competent overburden, not from surficial alluvial materials. Therefore, the use of a silt content value of 6.4% is an appropriate assumed value based on the type of material used. The commentors cited silt content values of 12% to 32%, but these materials do not represent the materials that will be used for the haul road construction. In addition, the reference to the 13% silt content value for the ore stockpiles is also not applicable. Ore will not be used to construct the haul roads and the ore is a geologically different material than the competent overburden that will be used for the haul road construction.
108 and 183	108.62 and 183.61	Model inputs are systematically biased low. Multiple key dispersion model and emission inputs systematically bias the results to lower fugitive dust emissions. Silt fraction, meteorology, and water truck emissions activity are inadequate. As discussed in the previous section, silt fraction values for the haul road ranged from 1.7% to 6.4% which is at least a factor of 3 lower than observed silt values within the critical habitat (~12% to ~32%, with an average silt content of 25.7%) (Threatened and Endangered Species SER, 2024 – see Figure 5b below), and a factor of 2 lower than the content of the ore stockpile in Table 13 of Appendix B (AQIA 2023, v5.6). Silt content is a key factor in dust deposition. Moreover, the silt fraction of 6.4% requires routine gravel application which has not been described as part of the DEIS or mitigation measures for dust suppression.  **Figure 5b** - Threatened and Endangered Species SER (2024) Silt Content in Critical Habitat Occupied and Unoccupied areas. Meteorological observations used by the Project Applicant from the Tonopah Airport site are unlikely to be representative of the topographically complex Rhyolite Ridge project area. While the Tonopah Airport site is the closest ASOS site with processed AERMET data, it is more than 40 miles to the northeast of the project site in a flat basin; multiple mountain peaks are barriers to air movement between the project site and the Tonopah Airport. Additionally, the project site area is topographically complex due to the surrounding mountains within the Rhyolite Ridge project area. The Tonopah Airport Wind Rose is shown in **Figure 1.** Winds are predominantly on a north-south axis, originating from the north most of the time. Winds from the northwest are slightly higher wind speeds. This wind rose is extremely unlikely to represent the winds at Rhyolite Ridge along the haul road, which is in a canyon at approximately 6,000 foot elevation with ridges rising well over 1,000 feet above the canyon floor to the north and south of Cave Springs Rd.	The modelled concentrations from these emissions are below primary and secondary NAAQS standards. As noted in Appendix H, "Worst Case Year Memorandum" of the 2023 AQIA for the Proposed Action, these emissions were generated for the operation year that is expected to generate the highest level of emissions, and consequently, the highest potential impacts. Furthermore, because of the short-term emissions associated with the dust models, the water truck activity emissions were placed on the road segments closest to the critical habitat and the off-site receptors to maximize dust impacts at these locations. Pursuant to the requirements of 40 CFR Part 51 Appendix W, the AQIA considers locations of "Ambient air". Pursuant to 40 CFR 50.1(e), "Ambient air" means that portion of the atmosphere, external to buildings, to which the general public has access. The critical habitat area is not available for general public access, not considered "ambient air", and was thus excluded from the AQIA analysis, consistent with the requirements of 40 CFR Part 51 Appendix W. Because of these considerations, a separate modeling evaluation was completed to evaluate dust impacts to critical habitat and specifically potential impacts to subpopulations Tiehm's buckwheat. This analysis is summarized in the BPP & APCM and provided as in Attachment H in the BPP & APCM, and has been included in the Section 7 consultation process and the applicable NEPA documents. The Attachment H evaluations only included the haul trucks and haul road traffic, based on the AQIA evaluation, which demonstrates that the haul trucks contribute to 96% of the maximum dust impacts and because the haul road was the single source of dust with the greatest potential to impact Tiehm's buckwheat. This consideration mirrored FWS concerns with the potential for dust deposition from the haul road and their request to move the haul road 300 feet, 91 meters, away from Tiehm's buckwheat subpopulations. This analysis considered particulate matter equal to or less than PM30 to better understand the potential risks from dust deposition. With respect to Attachment H, the years and truck traffic modeled were Year 3 with 2 haul truck round trips per day, and Year 11 with 525 haul truck round trips per day. These years were selected to evaluate the lowest mining activity year (Year 3) and the highest mining activity year (Year 11). As summarized in Table 5 of Attachment H, the model impacts for Year 11 (i.e., highest mining activity year) are several orders of magnitude higher than the model impacts for Year 3 (i.e., lowest mining activity year) and are still protective of the critical habitat. To further understand potential risks from dust Figure 17 of Rev 4 of the BPP & APCM included dust impacts from sources other than the haul roads and these effects for the worst-case emissions year. This analysis demonstrates that the

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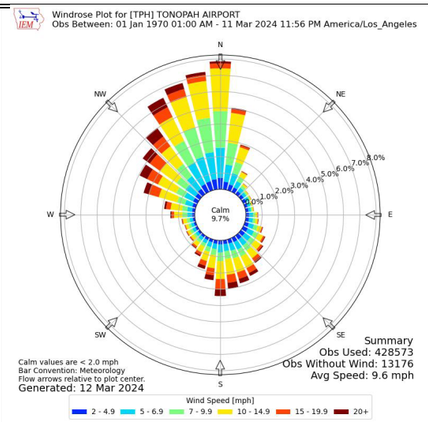

Figure 1. Tonopah Airport Wind Rose from Iowa Environmental Mesonet ASOS network1 – based on hourly wind observations from 1970 through 2024.

In an area with multiple high ridges, it is likely that the topography channels the wind along Cave Springs Rd on a path of least resistance through the mountainous terrain. Therefore, it is unlikely that the Tonopah airport meteorology will be the same directionally (due to mountainous terrain to the north of the project area).

In addition, areas with high ridges can experience upslope and downslope flow. Upslope flow is orographic lifting and is often associated with precipitation although that is unlikely in this area due to the rain shadow from the Sierras to the west of the project. Downslope flow is associated with strong warm winds. While the ridges may not be tall enough to generate strong topographical flows, it is important for deposition measurements to have accurate meteorological measurements as inputs. Higher wind speeds will cause greater turbulence, greater wind erosion, and additional dust deposition on disturbed silty habitat. Ioneer or BLM should collect onsite meteorology for at least three months to validate if the Tonopah airport meteorology is representative and a portable wind sensor can be acquired for these measurements for a nominal cost.

Lastly, the model emissions calculations for dust critically depend on the number of days with greater than 0.1 inches of precipitation for wind erosion and haul road dust deposition estimates. AQIA used a value of 60 in their calculations, based on the isopleths of rainfall days with greater than 0.1 inches of precipitation in AP-42 Section 13.2.2, Figure 13.2.2-1 (US EPA, 2006). This is inadequate for three reasons.

First, the number of days with greater than 0.1 inches of precipitation is not 60 as inferred from Figure 13.2.2-1 isopleths. Tonopah airport precipitation statistics for the last decade are shown in **Table 1**. There are typically 34 days with greater than 0.1 inches of precipitation, as expected for an area with 4.95 inches of average rainfall and a distribution of rain event magnitudes. A more accurate estimate of precipitation events is 34 days, rather than the 60 days used in dust emissions calculations calculating haul road emissions in Appendix B and Attachment H for haul road emissions, wind erosion emissions, and water truck requirements.

Table 1 - Tonopah ASOS Airport Precipitation statistics from 2012-2023[2]

Year	Days with >=0.1 inches of precipitation	Valid days	Percentage of days >=0.1 inches of precipitation
2012	36	347	10.4
2013	32	363	8.8
2014	30	362	8.3
2015	36	346	10.4
2016	41	366	11.2
2017	38	364	10.4
2018	39	365	10.7
2019	45	336	13.4
2020	24	363	6.6
2021	24	357	6.7
2022	27	350	7.7
2023	31	323	9.6
Median	**34**	**360**	**10.0**
Mean	**33.6**	**354**	**9.5**

2 Data acquired from https://mesonet.agron.iastate.edu/request/download.phtml?network=NV_ASOS May 15, 2024

location and magnitude of the dust impacts from all sources are not anticipated to cause any detrimental effects on the critical habitat. This analysis has been included in the Section 7 consultation process and the applicable NEPA documents.

Since publication of the DEIS, Ioneer has agreed to move the haul road from over 300 meters up to 870 meters east of the haul road location in the Proposed Action and the North and South OSF Alternative considered in the DEIS. Modeled 24-Hour average PM10 dust impacts for the North and South OSF to Tiehm's buckwheat subpopulations after movement of the haul road range from 7 to 26 percent of NAAQS primary and secondary standards. Haul trucks and traffic on the haul road are modeled to be substantially lower than the threshold identified in the BPP & APCM. The risk of larger dust particles impacting Tiehm's buckwheat has been substantially reduced by relocation of the haul road. This data has been included in the Section 7 consultation process and the applicable NEPA documents.

The haul roads will be constructed from mined competent overburden, not from surficial alluvial materials. Therefore, the use of a silt content value of 6.4% is an appropriate assumed value based on the type of material used. The commentors cited silt content values of 12% to 32%, but these materials do not represent the materials that will be used for the haul road construction. In addition, the reference to the 13% silt content value for the ore stockpiles is also not applicable. Ore will not be used to construct the haul roads and the ore is a geologically different material than the competent overburden that will be used for the haul road construction.

The meteorological data selection for the dispersion modeling evaluations was based on the requirements of 40 CFR 51, Appendix W which states the following:

Pursuant to Section 8.4.2(b): "Where surface conditions vary significantly over the analysis domain, the emphasis in assessing representativeness should be given to adequate characterization of transport and dispersion between the source(s) of concern and areas where maximum design concentrations are anticipated to occur."

Pursuant to Section 8.4.2(e): "The model user should ... ensure that worst-case meteorological conditions are adequately represented in the model results."

Based on the considerations below, the project is expected to generally experience a bimodal wind frequency distribution similar to that observed at the Tonopah airport:

- The northwesterly through northerly components of the expected wind distribution at the project site would be similar to those observed at the Tonopah airport given the similar gentle terrain relief in several upwind sectors in those directions. Sectors with more elevated terrain in the northern upstream quadrant have similar terrain relief at the project site and Tonopah airport. There is little intervening terrain north and upstream of the project site that could potentially interfere with the north-northwesterly through northerly flow component of the wind distribution.

- Despite the proximity of Rhyolite Ridge immediately to the east and Piper Peak and adjacent elevated terrain to the south, in the absence of larger scale synoptic forcing during specific weather events (that would also be experienced at Tonopah airport at the same time), the project site is likely to experience southerly winds during the nocturnal hours associated with drainage flows from these near-field terrain features. All portions of the proposed project site would experience a range of southeasterly through southerly winds depending on proximity to the above-mentioned specific terrain features. These southeasterly through

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		Secondly, the value of 0.1 inches of precipitation is not a good rule of thumb for this dust suppression application where evaporation rates are extremely high due to the elevation and low humidity. Watering requirements for 90% control efficiency require 0.8 L/m2 to be applied every 70 minutes on an annual basis in year 11 based on Attachment H. Each application is 800 cm3/10,000 cm2 = 0.08 cm application of water. Cumulatively, that results in 1.65 cm of water applied over the 20.6 daily water truck applications for the haul road (90% control efficiency – see **Table 2**). There are 2.54 cm in an inch – so that 1.65 cm is 0.65 inches of water applied daily to the haul road and minepit. In fact, even the 75% control efficiency application is 0.66 cm daily – or 0.26 inches. A 0.1 inch precipitation event is only sufficient to suppress dust on the haul roads for the equivalent of 3.175 applications of water truck activity – less than four hours at 90% control efficiency and about 2 hours at 95% control efficiency. Thirdly, the dust deposition model excludes all service road dust deposition, quarry activities (blasting, excavating, loading, unloading) and process plant activities. A proper accounting of the cumulative impacts is required informed decision-making. To evaluate dust deposition, a cumulative dust dispersion modeling of **all significant** proposed action PM emissions is necessary, with local meteorology input variables.	southerly winds would display a similar distribution from this quadrant as observed at the Tonopah airport. Based on the considerations above, the Tonopah meteorological data selected for use in the dispersion modeling evaluations is conservative and meets the requirements of "worst/case conditions" as required by 40 CFR 51, Appendix W, and is the best available data. Furthermore, as noted in the 2023 AQIA, the Tonopah meteorological data set has been used by the Nevada Division of Environmental Protection (NDEP) to complete various air dispersion modeling demonstrations in the local airshed and its use for the proposed project maintains consistency with other NDEP actions. Note that the webpage from which the Tonopah ASOS Airport Precipitation statistics are presented states that "This archive simply provides the as-is collection of historical observations, very little quality control is done." To avoid any concern of data reliability, Ioneer elected to base the calculations directly on information provided by the USEPA in the AP-42 compilation of air emissions factors. It is important to note that the threshold reference in Section 13.2.2 of AP-42 is 0.01 inches of precipitation for natural mitigation, not the 0.1 inches suggested by the reviewer. The value included in AP-42 for natural mitigation from precipitation events is an order of magnitude less than the 0.1 inches of precipitation suggested by the commenter. We relied on AP-42 and the proximity of the site to the 60-day isopleth for the 0.01-inch rainfall days for this analysis. The 2023 AQIA was developed in accordance with the workplan approved by the BLM. The 2023 AQIA considered all emissions sources and assumed ambient precipitation during 24-hour and 1-hour worst-case assessment. This resulted in an approximately 15 to 20 percent reduction in particulate impacts under those two scenarios as compared to no ambient precipitation. Considering the impact results obtained based on the approved work plan, an increase of 15 to 20 percent, using no ambient precipitation, would not be a material change in the overall conclusions of the analysis, since the margin between the impacts for the North and South OSF Alternative and the NAAQS standards is so great. Nevertheless, an updated analysis was developed to reflect no ambient precipitation during the 24-hour or one-hour averaging periods. This data was added to the applicable SERs. Standard practice is to use the closest isopleth in Figure 13.2.2.1 for annual emission estimation purposes. As an alternative approach, Figure 13.2.2.1 can be imported into a GIS system and number of precipitation days with 0.01 inches or more of precipitation interpolated based the “steepest gradient” between the two nearest isopleths that includes the point of interest. Using this alterative GIS-method, it results in an estimate of 43 days with precipitation of 0.01 inches or more at the site. As discussed above, the use of either method does not change the “dry” short emission estimates done in accordance with AP-42, which does not consider precipitation. The updated analysis was completed using the 43 days with precipitation of 0.01 inches or more at the site for the longer term (annual) analysis. This approach would not be a material change in the overall conclusions of the analysis, because of the margin between the impacts for the North and South OSF Alternative and the NAAQS standards. As noted in Appendix H, "Worst Case Year Memorandum" of the 2023 AQIA, emissions were generated for the operation year that is expected to generate the highest level of emissions, and consequently, the highest impacts. Pursuant to the requirements of 40 CFR Part 51 Appendix W the AQIA considers locations of "Ambient air". Pursuant to 40 CFR 50.1(e), "Ambient air" means that portion of the atmosphere, external to buildings, to which the general public has access. The critical habitat area is not available for general public access, not considered "ambient air", and was thus excluded from the 2023 AQIA analysis, consistent with the requirements of 40 CFR Part 51 Appendix W.

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			Because the 2023 AQIA properly did not consider the Tiehm's buckwheat subpopulations and other portions of critical habitat, which are areas that the general public does not have access (not "ambient air"), a separate modeling evaluation was completed for the subpopulations of Tiehm's buckwheat in critical habitat for the BPP & APCM. This data was included in the Section 7 consultation process and the applicable NEPA documents. This modeling evaluation is summarized in the BPP & APCM and provided as Attachment H in that document. The Attachment H evaluation only included the haul trucks and haul road traffic, based on the AQIA evaluation that demonstrated that the haul trucks and haul road traffic contributed approximately 96% of the maximum dust impacts. This modeling evaluation showed that the expected total maximum dust flux for all populations in the peak year of operation, including assumed maximum background levels are expected to range from 0.1670 to 0.3370 g/m2/d at 95 percent control efficiency using a 1.7 and 6.4 percent silt deposition, respectively. These values are 3.6 to 12.0 times smaller than the lowest daily flux rate reported in Lewis et al. (2017) and Wijayratne et al. (2009) [Citations and further discussion in BPP & APCM]. These values are significantly below the threshold level selected to trigger management strategies provided in APCM-9 in the BPP & APCM. In response to stakeholders concerns with the dust impacts from sources other than the haul roads could pose a risk or add to the effects of the action, Figure 17 of Revision 4 of the BPP & APCM was developed to demonstrate that the location and magnitude of PM10 impacts from all sources. This analysis shows that PM10 impacts are not expected to cause any detrimental effects to vegetation, including Tiehm's buckwheat within critical habitat. Discussion was added to the applicable NEPA documents. This analysis was updated in Revision 5.1 of the BPP & APCM to reflect all of the constituents considered in a NAAQS evaluation. In addition, the relocation of the haul road further reduces potential dust impacts to subpopulations of Tiehm's buckwheat and the more than 700 acres of unoccupied critical habitat that will not be directly impacted by Project development.
108 and 183	108.63 and 183.62	Resuspended herbicide and/or chemical suppressants will affect critical habitat Resuspension of particles and dust deposition of haul road, overburden storage, service road, and quarry dust with adsorbed/absorbed herbicides or chemical dust suppressants was not identified as a potential issue. In both the herbicide application and chemical suppressant cases, it is critically important to model the expected maximum loading of the herbicide and/or dust suppressant and then model the transport of these contaminants onto the critical habitat via multiple cycles of resuspended road dust activity over the course of the active lifetime of the chemical, rather than simply assume they will not migrate onto the critical habitat via fugitive dust resuspension.	As detailed in the Tiehm's Buckwheat Protection Plan for the North and South OSF Alternative, herbicide use will not occur within 50 feet of delineated Tiehm's buckwheat subpopulations. When weed removal within subpopulations is required, it will be accomplished mechanically and in a manner that minimizes disturbance to soils and plants. Dust monitoring is also an Applicant Proposed Conservation Measure in the Buckwheat Protection Plan for the North and South OSF Alternative. Ioneer selected herbicides without long-term residual toxicities and without toxic nitroguanidine neonicotinoids. Thus, chlorsulfuron (trade name: Telar® XP) herbicide or an equivalent approved substitute will be applied. More details can be found in the Tiehm's Buckwheat Protection Plan for the North and South OSF Alternative
108 and 183	108.64 and 183.63	*Herbicide particulate drift* Herbicide drift could kill or damage Tiehm's Buckwheat (Threatened and Endangered Species SER, 2024). The three main forms of herbicide drift are droplet drift, vapor drift, and particulate drift (Bish et al., 2021). Droplet drift is straight dispersion from the application source with larger droplets falling closer and smaller droplets having a wider area of impact. Vapor drift occurs when herbicide evaporates upon spraying – it can widely disperse until forced back to the ground via precipitation or dry deposition through dust particles. Last, particle drift can occur when droplets or vapors adsorb onto particle surfaces – particles can be resuspended especially in high silt conditions with frequent mechanical disturbance. APCM-7 in Appendix B of the Threatened and Endangered Species SER (2024) describes the Control of Nonnative, Invasive, and Noxious Species. Herbicide treatments will be applied in May and June using DuPont Telar XP herbicide or an equivalent substitute using Methylate Seed Oil (MSO) as a surfactant. The active ingredient in Telar XP is Chlorsulfuron, which has a DT50 of weeks to months in alkaline soils (Sarmah et al., 1999) and is essentially stable at pH 9. Measures will be taken to avoid droplet drift and vapor drift including low wind speed application, spray nozzles with low pressure, and wicking techniques, but no measures will be taken to avoid particle drift or resuspension beyond being 50 feet from critical habitat. Given the sticky and waxy nature of MSO and the stability of Telar, it is highly likely that mechanical disturbance of any herbicide treated areas will resuspend the herbicide via particle drift. It is unclear from this plan whether there will be any intention to apply herbicide to active disturbance areas – haul roads, surface roads, quarry, or overburden storage areas. If there is, and there is active disturbance, it is foreseeable that herbicide drift onto critical habitat areas will occur.	As detailed in the Tiehm's Buckwheat Protection Plan for the North and South OSF Alternative, herbicide use will not occur within 50 feet of delineated Tiehm's buckwheat subpopulations. When weed removal within subpopulations is required, it will be accomplished mechanically and in a manner that minimizes disturbance to soils and plants. Dust monitoring is also an Applicant Proposed Conservation Measure in the Buckwheat Protection Plan for the North and South OSF Alternative. Ioneer selected herbicides without long-term residual toxicities and without toxic nitroguanidine neonicotinoids. Thus, chlorsulfuron (trade name: Telar® XP) herbicide or an equivalent approved substitute will be applied. More details can be found in the Tiehm's Buckwheat Protection Plan for the North and South OSF Alternative. An air quality impact analysis was prepared for the Project, which was reviewed by the BLM and cooperating agencies, and was approved for use in the NEPA. The air quality impacts analysis demonstrates compliance with both secondary and primary NAAQS, including for particulate matter. The Clean Air Act

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			identifies two types of NAAQS which are primary standards and secondary standards. Primary standards, which are what is assessed in the Air Quality Impact Analysis, provides public health protection, including sensitive human populations. Primary standards are more stringent than the secondary standards. The secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. A particulate matter impact analysis was prepared as part of the Buckwheat Protection Plan for the North and South OSF Alternative. This particulate matter impact analysis was used to assess particulate matter deposition from haul trucks in proximity to designated critical habitat and Tiehm's buckwheat subpopulations and was used in the Buckwheat Protection Plan for the North and South OSF Alternative in assessing Project particulate matter deposition impacts relative to the particulate matter threshold that was established using the best available science. The results showed the Project is below the established threshold, and the Buckwheat Protection Plan includes measures to monitor particulate matter deposition within designated critical habitat and provides protocols and procedures to assess the established threshold during the life of the Project. This will allow for appropriate management implementation if data from monitoring shows the need to modify the threshold or implement other management requirements to meet the intent of the conservation measure detailed in the Buckwheat Protection Plan for the North and South OSF Alternative. Impacts to Tiehm's buckwheat from dust are disclosed in EIS Section 4.12 and additional clarification was added to Section 3.3.3 of the Threatened and Endangered Species SER for the Rhyolite-Ridge Lithium-Boron Project. This additional clarification was added to the SER but was available to the public during the comment period as Appendix B of the Threatened and Endangered Species SER for the Rhyolite-Ridge Lithium-Boron Project. Alternative is Appendix B of that SER. Dust control measures would be implemented for the Project, compliance with the Class II Air Permit issued by the State of Nevada would be required, and compliance with the conservation measures set forth in the Tiehm's Buckwheat Protection Plan, including dust monitoring, would be required.
108 and 183	108.65 and 183.64	*Chemical dust suppressants* Similarly, chemical dust suppressants are briefly discussed in various sections of the DEIS as a means of controlling dust deposition. Potential dust suppression chemical would need to be approved by Nevada Department of Transportation (NDOT) and Bureau of Land Management (BLM) prior to use. Page 4-2 of the DEIS states that polymer, and/or dust suppression reagents could be used to control dust. Page 4-22 states that '…chemical binding agents for dust suppression may impact Tiehm's buckwheat and designated critical habitat…' without explicitly stating which salts the DEIS identifies as potentially harmful to critical habitat. Two common salts used for dust suppression are calcium chloride and magnesium chloride, both of which function as hygroscopic materials to retain moisture for dust suppression. AP-42 Section 13.2.2 describes the impact of chemical dust suppression on unpaved haul roads. (US EPA, 2006) > *As opposed to watering, chemical dust suppressants have much less frequent reapplication requirements. These materials suppress emissions by changing the physical characteristics of the existing road surface material. Many chemical unpaved road dust suppressants form a hardened surface that binds particles together. After several applications, a treated road often resembles a paved road except that the surface is not uniformly flat. Because the improved surface results in* ***more grinding*** *of small particles, the* ***silt content*** *of loose material on a highly controlled surface may be substantially higher than when the surface was uncontrolled.* (AP-42 13.2.2-11) Chemical dust suppressants used in operational areas will be resuspended as fugitive dust – some of which will be deposited into critical habitat areas. It is critical to model these impacts if chemical dust suppressants are likely to be used on haul roads, service roads, or other uncontrolled mine surfaces for dust suppression. While this may be acceptable at significant distances of kilometers from critical habitat, it is much more likely to be detrimental to critical habitat and vegetation if used within a few km of critical habitat areas, given the possibility for mechanical disturbance, dust resuspension, and ensuing dust deposition.	As detailed in the Tiehm's Buckwheat Protection Plan for the North and South OSF Alternative, herbicide use will not occur within 50 feet of delineated Tiehm's buckwheat subpopulations. When weed removal within subpopulations is required, it will be accomplished mechanically and in a manner that minimizes disturbance to soils and plants. Dust monitoring is also an Applicant Proposed Conservation Measure in the Buckwheat Protection Plan for the North and South OSF Alternative. Ioneer selected herbicides without long-term residual toxicities and without toxic nitroguanidine neonicotinoids. Thus, chlorsulfuron (trade name: Telar® XP) herbicide or an equivalent approved substitute will be applied. More details can be found in the Tiehm's Buckwheat Protection Plan for the North and South OSF Alternative. An air quality impact analysis was prepared for the Project, which was reviewed by the BLM and cooperating agencies, and was approved for use in the NEPA. The air quality impacts analysis demonstrates compliance with both secondary and primary NAAQS, including for particulate matter. The Clean Air Act identifies two types of NAAQS which are primary standards and secondary standards. Primary standards, which are what is assessed in the Air Quality Impact Analysis, provides public health protection, including sensitive human populations. Primary standards are more stringent than the secondary standards. The secondary standards provide public welfare protection, including protection

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<tr><td></td><td></td><td></td><td>against decreased visibility and damage to animals, crops, vegetation, and buildings.

A particulate matter impact analysis was prepared as part of the Buckwheat Protection Plan for the North and South OSF Alternative. This particulate matter impact analysis was used to assess particulate matter deposition from haul trucks in proximity to designated critical habitat and Tiehm’s buckwheat subpopulations and was used in the Buckwheat Protection Plan for the North and South OSF Alternative in assessing Project particulate matter deposition impacts relative to the particulate matter threshold that was established using the best available science. The results showed the Project is below the established threshold, and the Buckwheat Protection Plan includes measures to monitor particulate matter deposition within designated critical habitat and provides protocols and procedures to assess the established threshold during the life of the Project. This will allow for appropriate management implementation if data from monitoring shows the need to modify the threshold or implement other management requirements to meet the intent of the conservation measure detailed in the Buckwheat Protection Plan for the North and South OSF Alternative.

Impacts to Tiehm’s buckwheat from dust are disclosed in EIS Section 4.12 and additional clarification was added to Section 3.3.3 of the Threatened and Endangered Species SER. This additional clarification was added to the SER but was available to the public during the comment period as Appendix B of the Threatened and Endangered Species SER. Alternative is Appendix B of that SER.

Dust control measures would be implemented for the Project, compliance with the Class II Air Permit issued by the State of Nevada would be required, and compliance with the conservation measures set forth in the Tiehm’s Buckwheat Protection Plan, including dust monitoring, would be required.</td></tr>
<tr><td>108 and 183</td><td>108.66 and 183.65</td><td>Water truck requirements are inaccurately modeled.
Dust suppression activities from Water Trucks are inadequately modeled for emissions activity and water management.

Haul road and operational mine areas will require multiple water trucks under high control efficiency scenarios when the mine is fully operational, but the emissions modeling assumes only one truck will be required to operate 16 hours a day (e.g., Table 16b and Table 18a of Appendix B of AQIA 2023 v5.6).

Under the 95% control efficiency scenario, haul roads will need to be watered every 35 minutes, 24 hours a day, 330 days a year, which is ~41 applications per day, over an inch of water daily, and about 473 inches per year. It will require ~2.5 trips for a 77,000 L (20,000 gallon) water truck to apply 0.8 L/m2 to the ~238,000 m2 area of haul road (4.7 km long, 51 m wide based on Attachment H). That will require 50,000 gallons of water per hour for dust suppression for the haul road. It is not clear how quickly water trucks can refill a 20,000 gallon tank – although a 1,000 gallon per minute pump would take 20 minutes. While being refilled, the water truck is not actively watering, and so additional water trucks will be needed. Moreover, this includes no watering requirements for service roads – which are multiple miles long and cannot accommodate the 100+ ton weight of the CAT 777 watering trucks. It also excludes water truck activity in the quarry. Table 2 provides a table of estimated watering rates and requirements
for the dust control efficiencies described in Attachment H.

Table 2. Water truck haul road dust suppression control efficiency calculations for (1) volume of water required daily and annually and (2) water depth applied to dust suppression surfaces daily and annually.

<table>
<tr><th>Control Efficiency (%)</th><th>Minutes between application (annual)</th><th>Applications per day</th><th>Depth of water per application (cm)</th><th>Water depth per day (cm)</th><th>Water depth per year - 330 days (inches)</th><th>Haul road Water volume per day (L)</th><th>Haul road water volume per day (gallons)</th></tr>
<tr><td>75</td><td>175</td><td>8.2</td><td>0.08</td><td>0.66</td><td>86</td><td>1,566,832</td><td>413,913</td></tr>
<tr><td>80</td><td>140</td><td>10.3</td><td>0.08</td><td>0.82</td><td>107</td><td>1,958,540</td><td>517,391</td></tr>
<tr><td>85</td><td>105</td><td>13.7</td><td>0.08</td><td>1.10</td><td>143</td><td>2,611,387</td><td>689,855</td></tr>
<tr><td>90</td><td>70</td><td>20.6</td><td>0.08</td><td>1.65</td><td>214</td><td>3,917,080</td><td>1,034,783</td></tr>
<tr><td>95</td><td>35</td><td>41.1</td><td>0.08</td><td>3.29</td><td>428</td><td>7,834,160</td><td>2,069,566</td></tr>
</table>
Applications will be 0.8 L/m2 based on Attachment H Table 1 Application intensity.
Water depth assumes 330 days of watering per year based on 35 precipitation days with >= 0.1 inches of precipitation</td><td>A CAT-777 water truck is too large for smaller service roads. In addition to the CAT-777, the project will utilize two smaller water trucks to maintain adequate water on all project roads for dust control. The model demonstrations are based on the utilization of three water trucks with greater assumed dust emissions than a CAT 777. This maximized dust emissions and dust impacts from this source.

As outlined in the BPP & APCM fugitive dust will be controlled on roadways and other areas of disturbance within the Project in accordance with the Project’s Air Quality Operating permit. Along the Haul Road, where it is proximate to critical habitat, control efforts will be implemented to achieve necessary efficiency using water applications and NDEP/BLM approved dust suppressants. It is reasonable to anticipate that NDEP/BLM approved dust suppressants would generally be needed from May through September when evaporation rates are highest and during years when haul truck activity is higher. Their use will provide the needed logistical flexibility to maintain required control efficiencies with the water truck fleet planned for the Project. The use of NDEP/BLM approved dust suppressants can significantly decrease the amount/frequency of watering and required control efficiency can be achieved with the equipment proposed.
Using competent overburden material to construct the road is not expected to be adversely impacted by the use of a combination of water and NDEP/BLM dust suppressants. Should noxious or invasive species become established along the margins of the haul roads and other areas subject to watering for dust control, those areas will be treated with herbicides in accordance with APCM-7 in the BPP & APCM.</td></tr>
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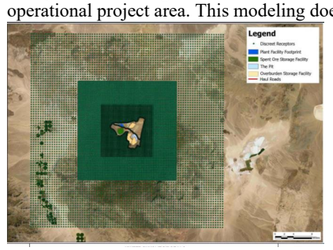
		• Haul road area of 238,000 m2 based on 4.696 km length and 51 m width (46 m + 5 m shoulder) based on Attachment H. Haul road area in geospatial shape files was 225,000 m2, about a 6% difference. Given the enormous volumes of water required for haul road dust suppression, the water tank and water truck filling pumps will also need to be quite large to efficiently transfer the 20,000 gallons per tank to keep the water trucks on the haul road and minepit watering. Additionally, there is no discussion of the structural impacts to the haul road of constant watering (in and out of the mine-pit), the noxious weeds impacts from having a tropical rain forest level of watering, and pollinator impacts of watering the haul road 86 to 400+ inches of water per year. It is also unclear if the mine operations have sufficient water for dust suppression under high control efficiency scenarios since the watering requirements indicate between 17,000 and 86,000 gallons per hour estimates is solely for the haul road. I have not included the watering and misting required for the quarry excavation, overburden storage, ore crushing, or service roads. Given a water budget of ~2,500 gallons per minute (150,000 gallons per hour) – it is not clear if the dust suppression plan is practical or implementable. It is foreseeable that the water management for dust suppression will be a critical part of the Project environmental impacts and it does not appear to have been considered holistically in the DEIS and supplemental environmental reports. Moreover, it is likely that critical habitat area adjacent to haul roads will be impacted by haul road mud, haul road water evaporation and deposition via dust, and indirectly impacted by the persistent misting of the sprayed water on adjacent haul roads and operational quarry surfaces and overburden storage areas. A full accounting of water management is necessary to characterize the dust suppression plan in detail.	
108 and 183	108.67 and 183.66	Model documentation is insufficient. DEIS documents, supplemental reports, appendices, and attachments are insufficient for evaluation of model domain and model results for critical habitat dust deposition. Air Quality modeling is described in the DEIS and AQIA 2023 v5.6. The Modeled Receptor Grid is displayed in Figure 3-1 as reproduced below. All receptors are outside of the boundaries of the operational project area. This modeling does not address the internal dust deposition in the critical habitat area.  **Figure 3-1** reproduced from the DEIS showing the model receptor grid used for Air Quality modeling – offsite only. As seen in the figure, there is no internal receptor modeling of critical habitat. Critical habitat modeling was done separately and only included emissions from the haul trucks on the haul roads. Receptor grids for the critical habitat were not provided for evaluation, and no spatial information was provided on the maximum impacted receptor. It is not clear to what extent the critical habitat was modeled, nor is it possible to evaluate why only two haul trucks were expected to pass by Buckwheat population 3 in year 3 of the mine operations, given that the DEIS definitively states that 'Approximately 2.8 Mt per year of ore is anticipated to be processed…' on p2-3. If ore processing is occurring at capacity in year 3, that is 7,000+ tons of ore a day, or 51 haul truck trips each way past population 3. Moreover, there would still be much more extensive haul truck activity within the mine pit quarry and overburden storage that would create fugitive dust emissions to the south of population 6 in removal and moving of overburden – on the order of 7 times as much haul truck activity as required for ore hauling. That is ~350 haul truck trips that were not modeled in Attachment H, for unknown reasons. Water truck emissions were not modeled, and neither were quarry activities or overburden storage wind erosion emissions. Model documentation is insufficient to evaluate the true impacts of the mine activities on critical habitat areas. It is highly likely that this is due to the insufficiency of the analysis in evaluating the cumulative impacts of mine operations on dust deposition due to arbitrary exclusion of emissions sources and insufficiently spatial characterization of mine impacts on the critical habitat areas.	In Revisions 4 of the BPP & APCM a contour map of PM10 impacts was generated using the receptor grid depicted in the comment which included receptors located along Cave Spring Road, including within critical habitat. For Revision 5.1 of the BPP & APCM, completed in response to comments and additional conservation commitments made during the consultation process, analysis of air emissions within the subpopulations of Tiehm's buckwheat that are dispersed throughout critical habitat was completed. This analysis concludes that air quality impacts within the subpopulations are well below the primary and secondary NAAQS standards. Emissions considered in this analysis did include Quarry activities, all haul truck trips, and water truck emissions, and other sources of fugitive dust, including dust from wind. The relocation of the haul road also substantially reduced the potential for larger dust particles (PM30) to impact the critical habitat, including the subpopulations of Tiehm's buckwheat. Data was added to the Section 7 consultation process and the applicable NEPA documents. As illustrated in Figure 17 of Revision 4 of the BPP & APCM, PM10 impacts are below the primary and secondary NAAQS standards. Secondary standards are established to protect wildlife and vegetation. Also as stated earlier, under the North and South OSF Alternative with the relocated haul road the PM10 impacts within the subpopulations are well below the NAAQS. [See Table 8 and Figure 18b of Revision 5.1 of the BPP & APCM.] Attachment H is focused on vehicle trips going past subpopulations 3 and 6 -- this was the area that in Ioneer's opinion that posed the greatest risk for larger dust fractions (PM30) to impact Tiehm's buckwheat and other vegetation within critical habitat. This assessment was affirmed by FWS requests to relocate the haul road at least 300 feet (91 meters) away from these populations. Notably, Ioneer has relocated the haul road under the North and South OSF Alternative from over 300 meters to 870 meters east of the original location. To bracket the likely impact of dust onto Tiehm's buckwheat, prior to relocation of the haul road to east of critical habitat, Ioneer's mine planners identified the number of times haul trucks would drive past subpopulations 3 and 6 to transport ore to the processing plant or to the North OSF to determine the peak year and year with the fewest vehicle trips. The potential dust deposition, using a 1.7 and 6.4 percent silt content and 75, 85, and 95 percent control efficiencies, was then determined to reasonably bracket the range of project impacts. Model receptors were located within all of the subpopulations. In the early years of the project, most haul truck trips will be south, transporting overburden to the South OSF. PM30 does not behave as a suspended airborne pollutant and is deposited relatively quickly after it becomes airborne. This analysis showed that the expected total maximum dust flux for all populations in the peak year of operation, including assumed maximum background levels are expected to range from 0.1670 to 0.3370 g/m2/d using a 95 percent control efficiency and 1.7 to 6.4 percent silt deposition, respectively. These values are 3.6 to 12.0 times smaller than the lowest daily flux rate reported in Lewis et al. (2017) and Wijayratne et al. (2009) [Citations and further

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			discussion in BPP & APCM]. These values are significantly below the threshold level selected to trigger management strategies provided in APCM-9 in the BPP & APCM. With the relocation of the haul road to the east side of the quarry these effects are expected to be less.
108 and 183	108.68 and 183.67	Conclusions The Draft Environmental Impact Statement is required to include sufficient information for decisionmakers and the public to evaluate the environmental impacts of a proposed action and its alternatives. The Rhyolite Ridge Lithium-Boron Project DEIS fails to adequately consider and address the environmental impacts of its project's dust deposition impacts on the critical habitat of Tiehm's Buckwheat within the Project operating area. The impacts of the dust deposition can cause damage directly or indirectly; the DEIS only evaluates the direct impacts of dust deposition and it does that only for one of the Project's emissions sources; this is piecemealing and the entirety of the Project impacts need to be considered. Moreover, the suppression of the dust impacts and the planned noxious weed management will also have environmental impacts and need to also be evaluated for their impacts when they are resuspended into dust by routine project operations. Finally, dust suppression will require extreme quantities of water that will alter the local ecosystem and require adequate water management evaluation and ecosystem impact evaluation.	Section 4.12.1.3 of the EIS discusses potential impacts from dust deposition on Tiehm's buckwheat subpopulations. Ioneer has committed to monitoring dust-related impacts and measures to control fugitive dust. An air quality impact analysis was prepared for the Project, which was reviewed by the BLM and cooperating agencies, and was approved for use in the NEPA. The air quality impacts analysis demonstrates compliance with both secondary and primary NAAQS, including for particulate matter. The Clean Air Act identifies two types of NAAQS, which are primary standards and secondary standards. Primary standards, which are what is assessed in the Air Quality Impact Analysis, provides public health protection, including sensitive human populations. Primary standards are more stringent than the secondary standards. The secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. A particulate matter impact analysis was prepared as part of the Buckwheat Protection Plan for the North and South OSF Alternative. This particulate matter impact analysis was used to assess particulate matter deposition from haul trucks in proximity to designated critical habitat and Tiehm's buckwheat subpopulations and was used in the Buckwheat Protection Plan for the North and South OSF Alternative in assessing Project particulate matter deposition impacts relative to the particulate matter threshold that was established using the best available science. The results showed the Project is below the established threshold, and the Buckwheat Protection Plan includes measures to monitor particulate matter deposition within designated critical habitat and provides protocols and procedures to assess the established threshold during the life of the Project. This will allow for appropriate management implementation if data from monitoring shows the need to modify the threshold or implement other management requirements to meet the intent of the conservation measure detailed in the Buckwheat Protection Plan for the North and South OSF Alternative. Impacts to Tiehm's buckwheat from dust are disclosed in EIS Section 4.12 and additional clarification was added to Section 3.3.3 of the Threatened and Endangered Species SER. This additional clarification was added to the SER but was available to the public during the comment period as Appendix B of the Threatened and Endangered Species SER. Alternative is Appendix B of that SER.
108 and 183	108.69 and 183.68	References ADEQ (2022) *State Implementation Plan Revision: Regional Haze Program (2018-2028)*. 3 June. Available at: https://static.azdeq.gov/aqd/haze/az_regional_haze_proposed_sip_20220603.pdf (accessed 30 May 2024). Bish M, Oseland E and Bradley K (2021) Off-target pesticide movement: a review of our current understanding of drift due to inversions and secondary movement. *Weed Technology* 35(3): 345–356. BLM (2024) *Rhyolite Ridge Lithium-Boron Project, Environmental Impact Statement*. Available at: https://eplanning.blm.gov/eplanning-ui/project/2012309/510. F.R. (2022) Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Tiehm's Buckwheat. Available at: https://www.federalregister.gov/documents/2022/02/03/2022-02298/endangered-and-threatened-wildlife-and-plants-designation-of-critical-habitat-fortiehms-buckwheat (accessed 28 May 2024). Sarmah, Konkana, and Alston (1999) Degradation of chlorsulfuron and triasulfuron in alkaline soils under laboratory conditions. *Weed Research* 39(2): 83–94. US EPA (2006) *AP-42: Compilation of Air Emissions Factors from Stationary Sources;* Fifth Edition, Volume 1. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/13._miscellaneous_sources.pdf (accessed 31 May 2024).	References noted.
108 and 183	108.70 and 183.69	**Appendix D** Tom Myers, PhD, Technical Memorandum: Review of Rhyolite Ridge Draft Environmental Impact Statement (June 1, 2024).	Comment noted.

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108 and 183	108.71 and 183.70	Tom Myers, Ph.D. Hydrologic Consultant P.O. Box 177 Laporte, PA 18626 775-530-1483 tommyers1872@gmail.com **Technical Memorandum** **June 1, 2024** **Re: Review of Rhyolite Ridge Draft Environmental Impact Statement Prepared for: Center for Biological Diversity and Great Basin Resource Watch** This technical memorandum provides a review of impacts expected from the proposed Rhyolite Ridge project on the water resources, including hydrogeology, springs, wetlands, water rights, and surface water, in the project area. The draft environmental impact statement (BLM 2024a) (DEIS) generally provides just cursory information with very little actual information regarding the project site or impacts. There is also a supplemental report regarding water resources and water quality which only slightly expands on the information in the actual DEIS (BLM 2024b). Both documents rely on references to various technical supporting documents, including Piteau (2023 and 2024) and HGL (2020a and b), although the former replaced the latter except for reliance on some of the baseline hydrogeology. The DEIS considers three alternatives including no action. The water resources impacts of the quarry operation are the same for each action alternative because the differences are where the operator places waste. The DEIS summarizes very briefly water resources impacts estimated using a groundwater model developed by Piteau (2023). Piteau (2023) considered three water impact scenarios. A scenario 0 is the no action alternative which is current business continuing as usual for the proposed life of the project and recovery (200 years). The groundwater model developed for the valley to analyze the project simulates continuing Fish Lake Valley (FLV) pumping since 1940 into the future. Piteau simulates a future 200 years based on the observed average pumping between 2018 to 2022. The simulation predicts that by year 2240 pumping causes a drawdown compared to 1940 of up to 500 feet, which is clearly not sustainable. The baseline to which the project is compared is not realistic. Piteau (2023) simulates using its groundwater model a scenario 1 and 2 which analyze the effects of dewatering the quarry and pumping the water supply from FLV. Mining alternatives 1 and 2 cause similar drawdowns in the quarry area because the differences in the proposals are limited to the location of waste and tailings; there is no consideration of different quarry configurations or quarrying strategies. Piteau (2023) runs scenarios 1 and 2 to analyze different situations in FLV for obtaining water supply. Scenario 1 is that the water rights are transferred existing agricultural rights from a ranch in the valley; scenario 2 is that water supply water is simply new pumping from the valley. Scenario 2 adds significant drawdown to FLV by the end of quarrying, but the DEIS does not present this as an alternative, so I do not further consider it. This memorandum considers the magnitude of impacts and considers the baseline hydrology and assumptions used to make those predictions. I cursorily review the groundwater model below, focusing only on aspects of it that could make a difference in the predictions. HGL (2020a) provides baseline hydrology, although the model developed therein was expanded substantially to include all of FLV. It shows the project would affect up to 32 springs near the pit, contaminate groundwater because it will have at-least occasionally a flow-through lake, that the dewatering and quarry lake formation will intercept groundwater that the FLV wetlands depend on, and that additional drawdown in FLV could lower shallow groundwater affecting endangered plants.	Comment noted.
108 and 183	108.72 and 183.71	**Obtaining the water supply would increase drawdown in FLV potentially harming surrounding groundwater dependent vegetation.** The project would require approximately 2500 gallons/minute (gpm) (4000 acre-feet/year (afa)) for a water supply (BLM 2024, p 2-8). BLM claims Ioneer would use dewatering water supplemented with a water supply developed in FLV by acquiring agricultural rights. Piteau (2023) analyzes this plan as scenario 1 (noted above) using two wells each pumping 2000 afa each while shutting down pumping at 12 agricultural wells. Piteau (2023) notes that the model considers pumping the full 4000 afa whereas the simulated agricultural pumping accounts for return flow to the system. Piteau (2023) simulated a drawdown cone around the new wells. The drawdown was up a 20-foot increase over the baseline (Piteau 2023, p iv). Piteau may also have underestimated the effects of project pumping by assumptions made in the model, which apparently does not consider: 1. The difference between year-round pumping and seasonal pumping by simulating agricultural pumping on an annual time step (based on Piteau Figure 3.5) which ignores the seasonal drawdown. 2. The exact location of return flow 3. Variations in agricultural pumping due to the use of surface water or rainfall Piteau simulated agricultural pumping on an annual basis, using annual time steps. Annual time steps prevent them from adequately analyzing seasonality in the system, including pumping, recharge and evapotranspiration (ET). Simulating on an annual basis does not consider the increased ET and pumping during summer or the recharge occurring primarily during spring. The maximum drawdown caused by agriculture which the water supply pumping adds to is not appropriately simulated by Piteau (2023).	In-depth analysis of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with NEPA. EIS Section 4.16 contains the water resources and geochemistry analysis. Impacts to groundwater-dependent ecosystems are discussed in Section 4.17. Additional information is in the Water and Geochemistry SER and Wetland and Riparian Resources SER. A numerical groundwater flow model was used for assessing potential impacts which was reviewed by the BLM and cooperating agencies and approved for use in NEPA analysis. Annual estimates for recharge, evapotranspiration, and pumping are utilized in the model over its 200-year simulation based on information for these parameters that is primarily reported as annual data (e.g., annual NDWR pumping records. The sensitivity of model predictions to these parameters was evaluated for the groundwater flow model. Assessment of potential impacts to seeps and springs is not limited to the groundwater flow model but would rely more on required monitoring of surface water flow and groundwater water levels with mitigation requirements should dewatering pumping affect surface waters. Drawdown monitoring would inform the actual extent of impacts from dewatering on surface water sites that are dependent on upon the extent of hydraulic connectivity between surface waters and the groundwater targeted by the dewatering.

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108 and 183	108.73 and 183.72	**The quarry lake could be a flow-through lake.** A flow-through quarry lake would allow quarry lake water to flow from the quarry into the groundwater on the downstream side of the quarry. Although the DEIS claims it will be terminal (BLM 2024a, p 2-29, 4-5, 4-33) which means the DEIS also predicts there will no groundwater quality impacts, the analysis relies on assumptions that make the prediction of a terminal lake more likely. The DEIS provides information regarding the quarry lake that does not reflect the analysis in Piteau (2024a). The DEIS (BLM 2024a, p 4-33) claims the steady state quarry lake will be 100 feet below the surrounding groundwater, but the Piteau (2024a, p 58) indicates that the 5650-groundwater level contour will encircle the quarry lake at a level of 5646 ft amsl. That is only a four-foot difference. Clearly, seasonal variations or even a high quarry wall runoff could raise the water level and cause quarry lake water to flow into the surrounding groundwater. The pre-mining water table was not flat but sloped across the quarry. A lake would be a flat surface. The question not considered in the DEIS or supporting documents is whether that flat surface exceeds the recovered groundwater level at any point along its perimeter or provides sufficient pressure into a confined aquifer intersected by the lake to cause flow. The analysis fails for two reasons:(1) a failure to consider seasonal flows or annual dry periods and, (2) assuming the evaporation rate from the lake is too high. The predictive modeling uses an annual time step for 200 years (HGL 2020b, p 25). Therefore, the modeling does not account for seasonal variability or long-term dry conditions. Groundwater levels that respond to recharge by rising tens of feet could cause significant fluctuations in the quarry lake. Due to differing geologic formations intersecting the quarry, the groundwater level may recover at different rates around the quarry. It is possible that quarry water could enter formations either seasonally or after the rapid recovery from a long-term drought. Due to the steep groundwater gradient to the northwest, groundwater could reach the pathway down the drainage and discharge into Fish Lake Valley. The quarry lake level could fluctuate, possibly wetting and drying reactive rock or (2) even allowing the quarry lake to occasionally flow through. A fluctuating quarry lake level could fluctuate above the surrounding groundwater table and cause the lake to be flow through. This is quite possible because the groundwater divide is just 4 feet above the quarry lake level; it is easy to imagine fluctuations around that during high flow periods. Several things could be done to more accurately model this. For one, Piteau could specify recharge by month to reflect seasonality. To reflect drought, they could change the rates by year. This would require consideration of stochasticity in the annual precipitation, but there is plenty of research about that, including how recharge actually occurs maybe once a decade rather than being spread evenly among years. They also need to be more careful about where the recharge actually occurs because this affects the calibrated hydrologic parameters and the beginning of the flow paths. Piteau applies an ET rate for the quarry lake that is too high. It uses a 90.7 in/yr pan evaporation rate which yields a 63.5 in/y quarry lake evaporation rate. Because the quarry lake will be below quarry walls and sheltered from the wind, 0.7 may be an inappropriate pan coefficient which causes Piteau to overestimate the evaporation. Too much evaporation would simulate the quarry lake lower than would otherwise be accurate. A higher quarry lake level resulting from lower evaporation could cause the quarry lake to be flow-through. The evidence therefore is that the quarry lake will likely have periods during which it will be flow-through and discharge into surrounding groundwater.	A numerical groundwater flow model was used for assessing potential impacts which was reviewed by the BLM and cooperating agencies and approved for use in NEPA analysis. The model was calibrated based on available data and predicts that the quarry lake will be terminal. The numerical groundwater flow modeling was used to assess whether the quarry lake would be terminal or outflow to local groundwater. In the model simulation and all the sensitivity runs, the quarry lake was a terminal pit lake that did not outflow to groundwater. The recovered pit lake level is more than 100 feet below local groundwater levels indicating that groundwater flow gradients will be from the local groundwater into the quarry lake. Effects on varying recharge on groundwater levels and quarry lake recovery were evaluated through the sensitivity analysis applied to the groundwater flow model. Pan evaporation rates and quarry lake evaporation rates are consistent with meteorological monitory data at the methodology for estimating evaporation from a pit lake surface. Sensitivity analyses on evaporation rates indicated that the quarry lake will remain terminal under the range of likely evaporation rates. Based on the groundwater flow model results and model sensitivity analyses, a flow-through condition at the quarry pit lake is not anticipated.
108 and 183	108.74 and 183.73	**The DEIS shows that predicted drawdown will affect many springs in the quarry area. It provides no mitigation to protect those springs. It hypothesizes about the springs being perched that are not supported with evidence.** DEIS Figure 4-7 shows the surveyed springs that will be affected by the predicted maximum extent of the 10-foot drawdown along with a one-mile buffer beyond that prediction to account for uncertainty. The proposed action would cause a drawdown such that the groundwater table would drop more than 10 feet at their location. There are 12 springs, including Cave Spring (SP-01) within the projected maximum 10-foot drawdown area and 20 springs within the one-mile buffer around the 10-foot drawdown (BLM 2024a, p 4-32). These springs within the buffer will be just as affected by drawdown as those within the 10-foot drawdown because springs occur wherever groundwater intersects the surface and any decrease in the groundwater table will affect the flow. Wetland plants depending on those springs will also be affected by decreased water in the vadose zone, as discussed below regarding the Fish Lake Valley Wetlands. This assumption that drawdown must be 10 feet to affect springs has no scientific basis – any reduction in the groundwater level beneath a spring will cause the flow to lessen or cease. Spring discharge depends on the groundwater gradient at the spring; simply decreasing that gradient by lowering the groundwater table upgradient will decrease the discharge even though there has been no reduction in the groundwater table at the spring. Also, wetland plants often survive on water in the vadose zone above a shallow groundwater table. Vadose zone water results from two factors. First, water percolating downward from recent precipitation replenishes the moisture. However, this is independent of shallow groundwater and its drawdown. Second, and importantly, wetland plants can survive on water above the water table being drawn by capillarity. Lowering the shallow water table will increase the distance that water must move upward through the capillaries and decrease the water available to wetland vegetation. BLM has often justified using a 10-foot drawdown to separate the predicted drawdown from natural variability. This is fallacious reasoning. Modeled drawdown occurs in addition to natural groundwater level changes. BLM has considered less than 10 feet for other projects. The groundwater modeling completed for the Copper Flat project in New Mexico (BLM 2019) is one example. JSAI (2013) Figure 3.9 presented the one-foot drawdown around the downstream end of the stream that would be affected by water supply pumping. JSAI (2013, p 2) summarized: “The figures indicates that peak groundwater-level drawdown along Animas Creek and most of Percha Creek will be less than 1 ft. Drawdown in a small area along lower Percha Creek is projected to be greater than 1 ft and less than 2 ft. The projected effects on evapotranspiration and surface discharge from the shallow aquifers are correspondingly small.” JSAI (2013) Table 3.5 also tabulated drawdown as low as 0.01 feet expected at springs affected by the project. The US Geological Survey provided another example of considering drawdown to less than 1 foot in their model of water resources development in Snake Valley NV (Halford et al 2011). The authors presented drawdown contours to 1 foot and even showed areas expected to have drawdown of 0.3 feet. USGS did this because of an interest in determining the decrease in ET in natural wetlands away from the water supply pumping. The BLM should consider a much smaller drawdown when considering whether a project could affect a spring. A one-mile buffer is not sufficient because the drawdown could far exceed critical levels for springs or groundwater vegetation for much longer than a mile.	Detailed analysis of groundwater drawdown impacts to springs and wetlands is presented in EIS Sections 4.16 and 4.17 and the Water Resources SER and Wetland and Riparian Resources SER. Mitigation measures are included in Section 4.21 to address surface water impacts. The EIS assesses the predicted 10-foot drawdown contour and a one-mile buffer. A change in groundwater elevations of 10 feet or more was selected by the BLM for identifying areas of potential drawdown impacts. This threshold was established by the BLM based on the fact that natural fluctuations in water levels, particularly in fractured rock aquifers, commonly exceed 10 feet. Drawdowns of less than 10 feet are not considered since these changes probably would not be measurable or distinguishable from natural seasonal and annual variations in groundwater levels. In addition, it is important to note that the 10-foot drawdown contour has been used as the threshold for defining the potential drawdown impact area for numerous other BLM EISs for mining projects in central Nevada over the past 30 years. The BLM acknowledges that numerical models could be used to provide predictions of drawdown of less than 10 feet, and drawdown of less than 10 feet could significantly impact flow in some perennial springs and streams. However, considering the broad regional extent of the numerical modeling domain, and lack of hydrogeologic data outside of the mine exploration and mining area, it is not reasonable to use numerical modeling to predict areas with drawdown of less than 10 feet. Monitoring and mitigation are included in Section 4.21 to address potential for drawdown effects. The one-mile buffer was added to account for additional areas where impacts from less than a 10-foot drawdown contour may take place.

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		The DEIS does not propose mitigation to protect these springs. Rather, it suggests monitoring the surface water flows at the springs and suggests that the project proponent will find a new source of water (BLM 2024a, p 4-77). I discuss additional problems with monitoring and the use of make-up water below. The DEIS states that the springs in the project area likely will not be affected by drawdown because it assumes the springs are perched. Neither the DEIS nor supporting documentation provide conclusive evidence the springs are perched. The DEIS notes that "Cave Spring and SP-02 through SP-05 are likely related to a fault zone at the base of the exposed Rhyolite Ridge Tuff formation" (BLM 2024b, p ES-4). Neither the DEIS nor supporting documents presents evidence this fault compartmentalizes the groundwater. Drawdown lowering the groundwater table on one side of the fault will increase the flow through the fault by increasing the gradient to the detriment of the spring flow. A similar argument applies to SP-06 and SP-07 which "are likely related to a fault zone along the southern edge of the OPA" (Id.). SP-08 is located in the Cave Spring drainage so pulling water from the drainage will lower the head controlling flow from the spring. In summary, the proposed action will likely negatively impact up to 32 springs in the nearby vicinity of the proposed quarry if it is allowed to be excavated and dewatered. The following paragraphs provide additional discussion regarding Cave Springs based on data presented by HGL (2020a). A negative effect on Cave Spring would include a reduction in flow due to the mining operations, primarily the quarry dewatering. HGL (2020a) provided one flow measurement – 0.31 cfs (HGL (2020a) Table 6-1) – taken on June 26, 2019. Pictures and data in HGL (2020a) Attachment A show a substantial riparian vegetation cover, so there is probably more groundwater reaching the surface than reflected by the measurement. In late June, the flow is likely higher than it would be in the fall after a hot summer, but the vegetation indicates that moisture reaching the surface is perennial. This is much more than would be expected from the limited aquifer supporting a perched spring. Cave Springs chemistry shows low concentrations of most ions, with TDS at 270 mg/l; SO4 and Na are much of the TDS (HGL 2020a, Table B-3). Arsenic is at 0.067 mg/l and the only constituent that exceeds state standards at the spring. This chemistry suggests a short flow path to the spring. Based on TDS and individual ions, wells MW-1, MW-2a and MW-2B also have similar chemistry, but TW-1 and TW-2 have twice the TDS concentration and exceedances of aluminum and antimony. The monitoring wells and the spring are near the fracture zone down the middle of Cave Spring drainage northwest of the spring. Chemistry suggests the flow path for the pumping wells, with double the TDS concentration, is longer. This simply reflects that the wells are screened deeper in the aquifer. Quarry dewatering that lowers the pressure at depth would significantly change groundwater flow gradients so that groundwater would be pulled deeper into the aquifer. The hydrogeologic data is insufficient to adequately protect Cave Springs or to design a decent monitoring/mitigation plan. To assess the seasonal flow rates, a time series of monthly flow observations is necessary. Knowing when or if the spring goes dry, it would confirm that the flowpath is short and add evidence that it is perched or only poorly connected to deeper groundwater. Second, there should be a vibrating wire piezometer (VWP) installation within a couple hundred feet of the spring in the direction of the quarry. Simply developing the VWP would provide information on nearby geology and water levels. It should monitor four VWP levels and be monitored for a year prior to quarry development and be used for monitoring and mitigating impacts to the spring.	
108 and 183	108.75 and 183.74	**Drawdown in FLV could affect the Fish Lake Valley Wetlands, which include wetlands in northeastern portion of FLV including numerous springs around the playa, wetlands associated with Fish Lake Valley Hot Well, and McNett Springs. BLM (2024a and b) fail to disclose potential impacts in this area.** The quarry area dewatering and quarry lake refilling will divert substantial amounts of water from northeast Fish Lake Valley. The piezometric surface maps of the quarry area shows groundwater flows down Cave Springs drainage to enter Fish Lake Valley not far from McNett Ranch. Modeling predicts dewatering will average 280 gpm (450 afa) and peak at 650 gpm (BLM 2024b). Modeling also predicts a quarry lake will develop over about 60 years after which it will evaporate 347 afa when full. Thus, dewatering and quarry lake evaporation will intercept approximately 10% of the predicted recharge in the Silver Peak Range in perpetuity. Modeling does not predict the 10-foot drawdown will reach the McNett Ranch, but as explained below, any change in the groundwater level controlling flow to the springs at McNett Ranch could be detrimental. Because the flow path from the quarry area is directly towards the McNett Ranch, it is likely there will be some significant impact. The DEIS notes that quarry evaporation will have a "minor, permanent" effect on Fish Lake Valley. It is minor only when considering the valley as a whole, but not minor as a localized impact. Fish Lake Valley has been developed for agriculture since the first half of the 20th century because of the water that enters the valley from the surrounding mountains. Rhyolite Ridge is in the Silver Peak Range which is the range bounding the east side of Fish Lake Valley. To the west is the White Mountains. Total recharge to the basin, as estimated by Piteau (2023) is 30,000 afa under both natural and current conditions. About ten percent emanates from the Silver Peak Range to the east. Piteau estimates natural ET in FLV to be 27,000 afa with 3000 afa of interbasin flow to surrounding basins; this interbasin flow has been speculated on since at least the early 1970s (Rush and Katzer 1973). Because much of the groundwater development supporting agriculture lies in the southern parts of FLV, the pumping has not captured much of the natural ET and the basin is severely overappropriated. Recent agricultural pumping as estimated by Piteau (2023) is 29,700 afa, based on the last five years of pumping records obtained from the Nevada Division of Water Resources. Total discharge, pumping and ET, exceeds natural recharge which causes the groundwater table to lower. Piteau Figures 2.14, .15, and .16 show that northern, central, and southern Fish Lake Valley wells have declined 0.47, 1.1, and 2.2 ft/y, respectively, since 1970. Because agricultural pumpage and ET continues to exceed natural recharge, the decline will continue. Even with all of the existing drawdown, much of the northeastern portion of the basin including the area referred to as the Fish Lake Valley Wetlands has been little affected by drawdown. Wells near McNett Spring, like 117 So1 E35 24DB1, have declined only 5 feet; levels further northeast have probably declined even less (Piteau 2023, Figure 2.13). Figure 1 is a screen capture of a Google Earth image showing Fish Lake Valley Hot Well and McNett Springs area. The satellite image is recent and the wetlands are apparent.	The referenced wetlands are not within the one-mile buffer of the predicted maximum extent of the 10-foot drawdown contour and therefore, no impacts are expected.

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		 *Figure 1: Google earth image of northeastern Fish Lake Valley showing Fish Valley Hot Well and McNett Ranch wetlands in the lower left corner.* According to Piteau (2023), Fish Lake Valley Hot Well and Lower McNett Ranch well are artesian and discharge warm water; Piteau (2023, p 6) describes their construction. It also describes the waters as being a "mixture of surface recharge and deep geothermal water" (Id.). This is probably correct, but the authors have failed to disclose important information in that it has not estimated the proportions of each. That failure renders it difficult to predict the effects of this project or to assign damaged if monitoring reveals them in the future. Historically, the discharge from McNett Springs was 700 afa (Eakin 1950). GeoLogic (2024) estimated 77 gpm from the well alone (124 afa). There has not been substantial drawdown caused by current pumping at this area. Water supply pumping, which will be ten miles southwest of McNett according to DEIS Figure 4-7, drawdown will primarily be limited to areas that are currently affected by substantial agricultural drawdown. Although the patterns of pumping and return flow will change, the effects would occur in existing agricultural areas far from McNett Springs GeoLogic (2024) prepared a geologic and geochemical analysis and concluded the McNett Ranch waters are not from the project area. That may be true for existing groundwater conditions, but drawdown on the east side of the fault would affect flow at the ranch in two ways. First, drawdown would change the gradient which would draw groundwater from the west through the fault. This would also decrease the gradient at the spring and the flow rate. Second, drawdown east of the fault would remove shallow groundwater from the mix of flow at the well (the "surface recharge" referenced above). Piteau's currently postulated groundwater compartments cannot be assumed to protect McNett Springs, or any spring in the northeastern FLV, from future impacts. Impacts are not limited to those resulting from pumping the project water supply. The proposed quarry could intercept flows that would reach the northeastern FLV, including the McNett Ranch area, and cause drawdown in the shallow groundwater that affects the surface recharge and discharge. BLM should require substantial monitoring of groundwater flows downgradient from the quarry site and future lake to determine whether changes in the flow to Fish Lake Valley wetlands could be occurring. The groundwater model for the No Action alternative (Piteau Scenario 0) shows that agricultural pumping without the proposed mine would cause up to 500 feet of drawdown in the southern portion of the valley; in other words, existing pumping for the next 200 years would cause 500 total feet of drawdown from 1940 to 2240 (Piteau 2023, Figure 4.8). At the location proposed for pumping the water supply, existing pumping would cause more than 100 feet of drawdown. Areas in the northeast portion of Fish Lake Valley, like McNett Ranch, are outside of the 10-foot drawdown as predicted by Piteau Scenario 0 for no action alternative. There has been little drawdown at McNett Spring. Any changes to baseline caused by the project would be a negative effect. As described above, dewatering and quarry lake formation could substantially affect the McNett Spring and other springs in the northeast FLV. BLM should require substantial monitoring of groundwater flows downgradient from the quarry site and future lake to determine whether changes in the flow to Fish Lake Valley wetlands could be occurring.	
108 and 183	108.76 and 183.75	**Groundwater modeling relies on compartmentalization in the groundwater to limit impacts, but the reports do not present sufficient evidence to support the assumptions.** The modeler assumed that various faults and lineaments will be flow barriers and simulated them as hydraulic flow barriers (HFBs) in the numerical model. Some of the hydrogeologic units are compartmentalized as a result. However, neither Piteau (2023) nor HGL (2020a) presents adequate hydrologic evidence to support the assumption. HGL (2020a) reports on an eight-day pump test at well TW-02 that did not significantly affect VWP-11, which is located just east of Cave Spring, although it can only be an analogue for the spring. Pumpage averaged near 350 gpm. VWP-11 levels dropped about 1.5 feet from September through December, including through the period of the pump test. This water level decline probably reflects decreased recharge into the Cave Springs flow paths through the end of summer. Apparent cyclic variations at the well could be barometric because of their low magnitude. Water level behavior through the TW-02 pump test differs from the long period in that the larger cyclic variations have been virtually eliminated and the water level was relatively flat. The VWP-11 response simply reflects the distance and different aquifer levels being pumped and monitored reflecting a longer period for the effects to manifest. The assessment of the TW-02 pumping test described by HGL (2020a, p 33) makes no sense. HGL Figure 6-4 shows the response for the pumping test. It provides the water level for TW-02 and TW-03. However, the description makes a claim, "the drawdown response indicates an initial, near-liner, early- to mid-time trend" (Id.), that is wrong – the figure shows a parabolic trend in TW-02 for five days; after the fifth day following a minor jump in the water level, the drawdown remains constant. This indicates that drawdown has reached a steady state with flow into the drawdown cone being constant. That is not what would be expected from a compartmentalized well. Drawdown in TW-03 just increased linearly several feet over 8 days also indicating a constant inflow rather than being indicative of a compartment.	All faults and fracture zones in the model are based on mapped faults or modeled geologic contacts or by faults mapped by Ioneer geologists. However, not every fault shown on published geologic maps are depicted in the model. Only faults that Piteau Associates deemed to be hydrologically significant based on observed water levels, aquifer tests, and significant offset of geologic units were included. Faults and fracture zones are represented in the model at hydraulic flow barriers (HFBs) or as hydraulic zones. HFBs are barriers to flow and vertical whereas hydraulic zones are either barriers or conduits and are either vertical or dipping. In some cases, faults are represented as both HFB (to limit horizontal flow perpendicular to the fault) and as a zone (to allow vertical and horizontal conduit flow parallel to the fault). Hydraulic properties of faults and fracture zones (HFBs and hydraulic zones) were adjusted during calibration until the fit to field observations was deemed acceptable. Faults (as HFB or as zones) were only added to the model if there was corroborating evidence to support the existence of the fault. Typically, faults were only added during calibration when deemed necessary to improve the model fit in a particular area.

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		The TW-02 pump test lasted eight days and pumped up to 355 gpm. TW-02 is in the western portion of the proposed quarry, so it should be representative of the rock that will require dewatering. Groundwater levels reached about 40 ft bgs and leveled out after the pumping rate was reduced to 340 gpm due to drawdown. Recovery occurred almost immediately. HGL (2020a, p 33) suggests the initial response of the test reflects a near-linear trend at the beginning of the test, which indicates an isolated compartment, and the leveling off after several days reflects leakage into the compartment. The test is not long enough to provide information regarding how long the additional leakage would continue but the drawdown is sufficient to draw water from other aquifers or compartments. The model predicted that dewatering rates would vary from 345 to 63 gpm, averaging 144 gpm, over the five-year life of the quarry (HGL 2020a, p 68). Presumably, the dewatering rate decreases over the period. HGL's numerical model simulated the pump test for transient calibration. The model simulated several nearby monitoring wells reasonably well, but HGL notes that the lack of simulated recovery at TW-03 suggests the model may simulate the system as being too segmented (HGL 2020a, p 64). There is apparently more connection to surrounding aquifers than simulated in the model. This is based both on the rapid recovery from the TW-02 pump test and the lack of simulated recovery. Dewatering rates may stay high longer than predicted and the lake may recover more quickly than predicted. Both would increase the amount of water captured from the Cave Springs drainage. The model used horizontal flow barriers to simulate the segmentation, but with very little data for transient modeling it is very difficult to calibrate an HFB. The assumption that the area has segmented hydrogeology is based on little supporting data and may be a poor conceptual model of the area. The conductivity is highly variable among hydrogeologic units. There are also conductive faults in the area. There is a long fracture zone along the Cave Spring drainage north of the quarry. Any connection has been only poorly examined by HGL (2020a). HGL (2020a, p 33) indicates that responses from the pump test at TW-01 shows an "absence of a strong hydraulic flow barrier at depth along the Cave Springs drainage". HGL (2020a, p 13) indicated: "The 2019 pumping test for TW-01 (sustaining ~35 gpm for 7 days) generated a hydrologic response in vibrating wire piezometers (VWPs) across the Cave Springs Fracture Zone (VWP-01, MW-01, VWP-03, VWP-05). Residual drawdown on the order of <1 ft to 10 ft was observed in some piezometers 7 days after the test was completed, which suggests compartmentalization with a leaky bounded hydrogeologic block." That the pump test caused drawdown indicates a connection rather than compartmentalization. Residual drawdown may imply a slow connection over the contact between formations. Piteau (2023) Figure 2.9 shows a piezometric surface that does not contain any sharp groundwater table drops that could be linked to faults or HGBs. The contours appear sharper near the fracture zone near and northeast of the quarry simply due to their being more observations probably from different strata. Note that plotting a groundwater table based on all observations without consideration of their level in the strata implicitly assumes there is no vertical gradient in the groundwater pressures. Neither pump test provides evidence of complete compartmentalization. The hydrologic baseline data reports do not support the assumption of compartmentalization. Neither does the groundwater table map. The analysis of groundwater for this project should not depend on compartmentalization of portions of the groundwater aquifer.	
108 and 183	108.77 and 183.76	**Quarry Lake Modeling Errors** The quarry lake model simulates the chemistry of water accumulating in the pit. This review considers just the hydrogeologic aspects of the modeling effort. There are two primary errors in the hydrology input that can affect the predicted quarry lake chemistry. First, the modeling appears to use an annual time step for 200 years, as discussed above. Therefore, the predicted chemistry misses the fluctuations that would occur seasonally. The report (Piteau 2024) notes that quarry lake runoff flushes chemical constituents from the quarry walls that have accumulated there due to precipitation wetting the walls but not causing runoff into the pit. Runoff across each slice of the quarry wall flushes these contaminants but once the lake rises to a given level, the modelers assume oxidation and the contribution of contaminants will cease. Reality for a semiarid quarry lake is that the water level will rise and fall seasonally and probably annually due to drought periods, as noted above regarding the flow-through quarry lake question. Oxidation will not be shut off permanently once the lake reaches a given elevation because it will not remain inundated. As the quarry lake level falls, a wetted perimeter will remain within which much additional oxidation will occur. Fluctuating lake water levels will cause a much higher contaminant load to reach the quarry lake. The model should be rerun to include monthly time steps and variable precipitation and evaporation. Droughts should be considered by using actual annual precipitation rates. Second, groundwater inflow enters by flowing through various quarry wall lithologies. The model ignores this variable chemistry by setting inflow chemistry based on observed groundwater chemistry data without considering the leaching that would occur from the groundwater leaching through the damage zone in the skin of the quarry lake. The groundwater level may be higher than the quarry lake level so that groundwater inflow would reach the damaged layers above the lake level and therefore flow through multiple feet of damaged quarry wall before entering the lake. The model apparently neglects a substantial input of contaminants that could leach from the quarry wall. The lake model may also simulate a much too high evaporation rate from the quarry lake, as explained above. Based on standard pan evaporation, the model assumes evaporation will equal 63.5 in/y. Standard pan coefficients do not apply in a quarry or quarry lake situation because the water surface is usually protected from the wind by the quarry walls. Therefore, the simulation could be withdrawing too much water from the quarry lake and preventing the simulation from allowing it to rise as far as it otherwise would.	The groundwater model considered in the EIS was prepared by Piteau Associates in 2023. The document stated in this comment (HGL 2000a) is an older version of groundwater modeling. The updated groundwater model domain was expanded from the 2000 water model and went through BLM review and approval. The numerical groundwater flow model was used for assessing potential impacts which was reviewed by the BLM and cooperating agencies and approved for use in NEPA analysis. In-depth analysis of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with NEPA. EIS Section 4.16 contains the water resources and geochemistry analysis. Impacts to groundwater-dependent ecosystems are discussed in Section 4.17. Additional information is in the Water and Geochemistry SER and Wetland and Riparian Resources SER. Annual estimates for recharge, evapotranspiration, and pumping are utilized in the model over its 200-year simulation based on information for these parameters that is primarily reported as annual data (e.g., annual NDWR pumping records. The sensitivity of model predictions to these parameters was evaluated for the groundwater flow model. Assessment of potential impacts to seeps and springs is not limited to the groundwater flow model but would rely more on required monitoring of surface water flow and groundwater water levels with mitigation requirements should dewatering pumping affect surface waters. The presence of several geologic structures is supported by the drillhole, and surface geology data collected during exploration for the Project. However, only

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			three fault structures were incorporated in the groundwater flow model based on water level observations. While limited in duration, the available pump test data does not contradict the fault interpretations. In addition, the sensitivity analysis evaluated the simulation of the three fault zones included in the model. Predicted drawdown changed little when the conductivity of the fault zones and other lithologic units were increased. Mitigation measures for seeps and springs focus on maintaining the current use of those surface water features. Effects of groundwater pumping on seeps and spring would indicate that they were sourced from local groundwater. As such, flow supplementation would also be sourced from local groundwater for consistent water chemistry with the existing conditions.
108 and 183	108.78 and 183.77	**Groundwater Modeling Comments** The groundwater modeling effort uses spring levels as calibration targets, meaning it attempts to match the water level to the spring elevation (Piteau 2023, Table 3-5). This is appropriate only for springs connected to the intermediate level aquifer being simulated (not the regional aquifer or perched aquifers). Calibration involves minimizing residuals which could be negative or positive meaning there is as much chance for the simulated potentiometric surface being above the ground level as below, which is clearly not appropriate. A spring is better simulated as a DRAIN boundary with a targeted discharge rate than as a groundwater surface target. The boundary would prevent the potentiometric surface rising above the ground surface. Seeps should also not be used for calibration. Doing so causes the steady state water table to be higher than it in reality is. The calibration statistics for springs shows an average residual of about 105 (Piteau 2023, Table 3.9) which means the springs are about 105 feet above the simulated groundwater table, but they have still had the effect of raising it. Mapped calibration residuals show a significant areal bias with residuals tending to be positive or negative in different areas (Piteau 2023, Figure 3.20). For example, springs were underpredicted by up to hundreds of feet especially in the high elevations (Id.). Springs are effectively bounded and make poor targets as discussed above. Residuals are clustered throughout the model domain, including on the valley floor. Area bias in the residuals render the estimated conductivity throughout much of the model domain very inaccurate.	The model calibration results in acceptable calibration statistics. There is no spatial bias in the simulation of spring elevations. Instead, calibration to spring locations is biased by the assumption that the regional groundwater elevation is at the ground surface at the spring locations. This assumption overestimates groundwater levels at the locations of seeps and springs that are sourced from perched water zones rather than regional groundwater. The Draft EIS does not draw conclusions regarding whether seeps and springs are connected to regional groundwater or perched water. Instead, it notes that predicted effects associated with groundwater drawdown would not occur "if these springs are perched features." Mitigation measures for seeps and springs focus on maintaining the current use of those surface water features. Effects of groundwater pumping on seeps and spring would indicate that they were sourced from local groundwater. As such, flow supplementation would also be sourced from local groundwater for consistent water chemistry with the existing conditions.
108 and 183	108.79 and 183.78	**The proposed monitoring and mitigation will not detect impacts before they happen nor provide a viable means of mitigating them.** BLM (2024a) suggests two water resources mitigation measures. The first, WR-01 (BLM 2024a, p4-77) proposes monitoring the flow rates at any surface water resources (springs) within the predicted ten-foot drawdown and one-mile buffer. "If monitoring indicates that flow reductions in surface waters are occurring, and that these reductions are likely the result of Proposed Action drawdown, Ioneer would be responsible for implementing mitigation at the affected surface water resource to enhance or replace the impacted surface water resource." (Id). There is no plan to monitor groundwater levels between the quarry and the spring, therefore the DEIS does not provide a means for showing that any observed reductions are the result of the proposed action. BLM should require the installation and monitoring of monitoring wells between the springs and the quarry. Mitigation WR-92 does require Ioneer to monitor groundwater levels between "the quarry and existing groundwater or surface water rights". Thus, a monitoring well would be required only if the source has a water right. Mitigation for surface water rights or springs for either WR-01 or WR-02 would require make-up water. If the water is sourced nearby, it will add to the deficit causing the problem. For example, if a nearby well replaces a spring that goes dry, then pumping that well will draw from the very resource that dewatering has already depleted, adding to the problem. Make-up water also may not be appropriate for the resource because it could have different chemistry. Springs and wetland seeps have water with chemistry based on the source. The local ecosystem would have evolved with and could depend on that chemistry. Using water from other sources could harm the local balance. Monitoring wells are not a sufficient for avoiding impacts. Once drawdown has reached intermediate monitoring, a certain momentum has become established which will continue the expansion of the drawdown even if the cause of the drawdown is removed.	The BLM's analysis of the mitigation measures for surface water impacts is within the requirements of NEPA and FLPMA. The CEQ definition of "mitigation" for purposes of NEPA includes "rectifying the impact by repairing, rehabilitating, or restoring the affected environment," and "compensating for the impact by replacing or providing substitute resources or environments" (40 CFR 1508.20). BLM's 3809 regulations adopt the same definition (43 CFR 3809.5).
108 and 183	108.80 and 183.79	**SUMMARY** The proposed Rhyolite Ridge project would have substantial impacts on the hydrogeology of the area near the proposed quarry and in Fish Lake Valley, potentially harming the water resource dependent species. The analysis provided in support of the DEIS is insufficient. The following are some of the worst aspects of the proposal and analysis. Quarry dewatering and quarry lake evaporation will intercept water needed to support the Fish Lake Valley wetlands. These include wetlands near McNett and dependent on Fish Lake Valley Hot Well. Quarry development will lower the water table and potentially harm up to 32 springs near the proposed quarry. BLM does not require adequate monitoring or mitigation for these springs. Pumping the project water supply in FLV will add to existing drawdown and harm wetland plants dependent on shallow groundwater.	The EIS and SERs present detailed analysis of impacts from groundwater drawdown within the one-mile buffer of the predicted maximum extent of the 10-foot drawdown contour in Sections 4.16 and 4.17.

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		The quarry lake will occasionally be high enough relative to surrounding groundwater to cause lake water to enter surrounding groundwater. Groundwater modeling in support of the project relies on compartmentalization to prevent impacts from affecting valuable features, but the reports do not justify the simulations of barriers and compartments.	
108 and 183	108.81 and 183.80	**LITERATURE CITED** BLM (Bureau of Land Management) 2024a. Rhyolite Ridge Lithium-Boron Project, Draft Environmental Impact Statement, DOI-BLM-NV-B020-2021-0020-EIS. BLM (Bureau of Land Management) 2024b. Water Resources and Geochemistry Supplemental Environmental Report for the Rhyolite Ridge Lithium-Boron Project. April 2024. BLM (Bureau of Land Management) 2024c. Wetland and Riparian Resources Supplemental Environmental Report for the Rhyolite Ridge Lithium-Boron Project. April 2024. BLM (Bureau of Land Management) 2019. Copper Flat Copper Mine Final EIS. Vol. 1. April 2019. Available at: https://eplanning.blm.gov/public_projects/nepa/75353/169629/206199/Copper_Flat_Final_EIS.pdf, pp. 3-100, 3-101, 3-103. Geo-Logic (Geo-Logic Associates) 2024. Letter Report to Ms Rebecca Sawyer, Ioneer USA, Evaluation of the Hydrogeology of the McNett Ranch Well/Spring, Fish Lake Valley. Halford KJ, RW Plume (2011) Potential effects of groundwater pumping on water levels, phreatophytes, and spring discharges in Spring and Snake Valleys, White Pine County, Nevada, and adjacent areas in Nevada and Utah: U.S. Geological Survey Scientific Investigations Report 2011-5032, 52 p HGL (HydroGeoLogica, Inc.) 2020a. Rhyolite Ridge Baseline Hydrogeology Report, May 2020, Document number RR20-009-0000-EN-MEM-00006. Prepared for Ioneer USA Corporation, Reno NV HGL (HydroGeoLogica, Inc.) 2020b. Rhyolite Ridge Quarry Lake Evaluation Report, May 5, 2020. Document number RR20-009-0000-EN-MEM-00007. Prepared for Ioneer USA Corporation, Reno NV JSAI (John Shomaker & Associated, Inc.) 2013. Probable Hydrologic Consequences of the Copper Flat Project, Sierra County New Mexico. THEMAC Resources New Mexico Copper Corporation. Piteau (Piteau Associates) Piteau 2024. Technical Memorandum, Rhyolite Ridge Quarry Lake Water Quality Modeling. Final 2/12/2024 Piteau (Piteau Associates) 2023. Rhyolite Ridge Project Groundwater Quantity Impacts Report. December 2023. Document number RR30-0900-00-EN-REP-00037. Prepared for Ioneer Rhyolite Ridge LLC Rush FE, Katzer TL 1973. Water-Resource Appraisal of Fish Lake Valley, Nevada and California. State of Nevada Department of Conservation and Natural Resources, Division of Water Resources, Water Resources Reconnaissance Series, Report 58. 71 pp.	Literature cited noted.
108 and 183	108.82 and 183.81	**Appendix E** Tom Myers, PhD, Technical Memorandum: Review of Rhyolite Ridge Hydrogeology and Quarry Lake (April 23, 2021). Tom Myers, Ph.D. Hydrologic Consultant P.O. Box 177 Laporte, PA 18626 775-530-1483 tommyers1872@gmail.com **Technical Memorandum** **April 23, 2021** **Re: Review of Rhyolite Ridge Hydrogeology and Quarry Lake Prepared for: Center for Biological Diversity and Great Basin Resource Watch** **Prepared for: Center for Biological Diversity and Great Basin Resource Watch** This technical memorandum provides review of two technical documents with respect to the proposed Rhyolite Ridge Project, the baseline hydrogeology including groundwater modeling and the quarry lake development and chemistry report titled as follows: HydroGeoLogica Inc (HGL) (2020a) Rhyolite Ridge Baseline Hydrogeology Report, May 2020. Prepared for Ioneer USA Corporation. HydroGeoLogica Inc (HGL) (2020b) Rhyolite Ridge Quarry Lake Evaluation Report, May 5, 2020. Prepared for Ioneer USA Corporation. This memorandum provides specific comments regarding the question whether Cave Spring will be affected by quarry dewatering and whether the quarry lake will have flow through conditions at any point during its development. It also discusses production water, recharge, the groundwater model, and makes general comments. Additionally, this memorandum considers the water pollution control permit (WPCP) application submitted to the Nevada Division of Environmental Protection (NDEP). The specific focus is on the monitoring plan presented in appendix P. NDEP should require at least two more monitoring wells, one between the quarry and Cave Spring drainage and one upgradient of the tailings, and additional vibrating wire piezometers to track the development of the quarry as described below. NDEP should also require monitoring of three springs also described below.	The groundwater model considered in the EIS was prepared by Piteau Associates in 2023. The document stated in this comment (HGL 2000a) is an older version of groundwater modeling. The updated groundwater model domain was expanded from the 2000 water model and went through BLM review and approval. Analysis of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with NEPA. EIS Section 4.16 contains the water resources and geochemistry analysis. Impacts to groundwater-dependent ecosystems are discussed in Section 4.17. Additional information is in the Water and Geochemistry SER and Wetland and Riparian Resources SER. While implementation of the Proposed Action would require a WPCP from NDEP, the WPCP application is beyond the scope of the EIS. The EIS analyzes impacts from groundwater drawdown and quarry water quality and includes mitigation and monitoring for surface water and groundwater
108 and 183	108.83 and 183.82	**Will dewatering affect Cave Spring?** A negative effect on Cave Spring would include a reduction in flow due to the mining operations, primarily the quarry dewatering. HGL (2020a) states the spring is outside the project boundaries, but this is simply due to them drawing the project boundary with a small semicircle excluding the spring. HGL (2020a) provides just one flow measurement – 0.31 cfs (HGL (2020a) Table 6-1) – taken on June 26, 2019. The pictures and data in HGL (2020a) Attachment A show a substantial riparian vegetation cover, so there is probably more groundwater reaching the surface than reflected by the measurement. In late June, the flow is likely higher than it would be in the fall after a hot summer, but the vegetation indicates that moisture reaching the surface is perennial. Cave Spring is at elevation 6208 amsl. The groundwater model predicts less than ten feet of drawdown at the spring, but it only requires that the water level drop a foot to cause substantial changes in the flow. The spring will only be affected if there is a connection between the aquifers being dewatered and the aquifer feeding the spring. HGL (2000a) essentially assumes the dewatering will not	Cave Spring is within the modeled 10-foot drawdown contour. Impacts to Cave Spring from groundwater drawdown are discussed in EIS Section 4.16. Mitigation is included in Section 4.21 to monitor and address drawdown related impacts at Cave Springs and other surface water locations.

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		affect the spring. Evidence can be gleaned from water chemistry, geology maps, and pump tests; the model should not be considered evidence because its conceptualization depends on the modeler's interpretation of the evidence. Cave Springs chemistry shows low concentrations of most ions, with TDS at 270 mg/l; SO4 and Na are much of the TDS (Table B-3). Arsenic is at 0.067 mg/l and the only constituent that exceeds state standards at the spring. This chemistry suggests a short flow path. Based on TDS and individual ions, wells MW-1, MW-2a and MW-2B also have similar chemistry, but TW-1 and TW-2 have twice the TDS concentration and exceedences of aluminum and antimony. The monitoring wells and the spring are near the fracture zone down the middle of Cave Spring drainage northwest of the spring. Chemistry suggests there is a different source of water for the monitoring wells and spring than for the pumping wells in the proposed quarry. Chemistry does not indicate there is a connection between the quarry and Cave Spring. However, quarry dewatering could significantly change groundwater flow gradients so that flow directions could be affected. HGL reports on an eight-day pump test at well TW-02 (reviewed more below) that did not significantly affect vibrating wire piezometer (VWP) VWP-11, which is located just east of Cave Spring, although it can only be an analogue for the spring. Pumpage averaged near 350 gallons per minute (gpm). VWP-11 levels dropped about 1.5 feet from September through December, including through the period of the pump test. This water level decline probably reflects decreased recharge through the end of summer. Apparent cyclic variations at the well could be barometric because they are a low magnitude. Water level behavior through the TW-02 pump test differs from the long period in that the larger cyclic variations have been virtually eliminated and the water level was relatively flat. Nothing in the VWP-11 response suggests a connection to the level being pumped. Newfields installed both VWP-11 and TW-02 in tu3 brecia (Tbx) with TW-02 to 600 feet and VWP-11 to 300 feet with two VWPs at 190 and 300 B below ground surface (bgs) in tuff brecia (Tbx). The Tbx in TW-02 is below 350 B bgs. Geology map Figure 3-2 indicates Rhyolite Ridge Tu3 outcrops near both locations. VWP-06 is adjacent to TW-02 and is constructed in Tbx, confirming that the tuff is widespread at depth on the west side of the proposed quarry. Airlift tests produced over 50 gpm at depths greater than 160 B bgs. Compared to most other VWP installations, VWP-11 produces substantial flow during the tests (VWP-08 produces flow similar to VWP-11 and is installed in tuff) indicating its completion in a relatively conductive zone. Because VWP-11 does not show much response to an eight-day pump test, it is likely there is a disconnect between the pumping well and VWP-11. The disconnect could be the deep basin between the ridge where the proposed quarry would be located and the Rhyolite Ridge massif. The quarry would excavate Cave Spring formation. Wells constructed between TW-02 and Cave Spring support the hypothesis of there being a disconnect. VWP-05, although constructed at an angle, does not reach Tbx until it reaches 900 B bgs. VWP-2, TW-03 and TW-01 do not reach Tbx at greater than 800, 700 and 655 B bgs, respectively. It is possible that dewatering could transmit at depth through the tuff beneath the basin or through lower conductivity material between the quarry and spring, but the pump test does not reflect it, although it could be because the test was not long enough. Evidence is not conclusive regarding Cave Spring being affected by dewatering. Cave Spring may be perched, based on the short flow path as documented by TDS. Also, the elevation of the spring is 300 to 400 feet above the groundwater levels in the quarry area. The spring elevation is close to that of VWP-11 which HGL suggests is due to the step in the potentiometric surface across the Cave Springs fault. That the predicted drawdown in the groundwater model (HGL (2000a) Figure 7-13) does not extend very far to the east, including to the spring, reflects the natural gradient, step in the potentiometric surface, and fault. The natural gradient and the barriers between the quarry and spring indicate that effects on the spring are unlikely. Dewatering deep groundwater may not affect it (and other springs) it is indeed perched. Due to the importance of Cave Spring, Ioneer should complete two additional tasks to provide a better estimate regarding the affect on the spring. One, to assess the seasonal flow rates, Ioneer should measure the flow monthly to determine whether there are seasonal effects. If the spring goes dry, it would suggest that the flowpath is short and would suggest it is perched. Second, Ioneer should establish a VWP installation within a couple hundred feet of the spring in the direction of the quarry. Simply developing the VWP would provide information on nearby geology and water levels. It should monitor four VWP levels and be monitored for a year prior to quarry development and be used for monitoring and mitigating impacts to the spring. Both should be done prior to developing the quarry.	
108 and 183	108.84 and 183.83	**Will the lake that forms in the quarry after dewatering ceases be terminal? In other words, could water accumulating in the quarry flow from the quarry into surrounding groundwater potentially causing degradation?** The pre-mining water table was not flat but sloped across the quarry. A lake would be a flat surface. The question is whether that flat surface exceeds the recovered groundwater level at any point along its perimeter or provides sufficient pressure into a confined aquifer intersected by the lake to cause flow. As part of the modeling, HGL concluded the pit will be a terminal sink meaning that no water leaves the quarry lake to enter the groundwater. The lake would be mostly full within 40 years and reach a steady state after 60 years (HGL 2020b, p v), although steady state is a misnomer in this area. This would be 66 feet below the pre-quarry groundwater level (Id.), although this does no account for the sloping groundwater level across the quarry. The modeled potentiometric surface at the end of five years (HGL (2020a) Figure 7-13) shows several areas with very steep gradients, including just west and east of the quarry. This reflects the different lithology in various blocks and the segmented groundwater expected by HGL. A steep gradient is required for flow across blocks of significantly different conductivity. The long-term pump test held in TW-2 lasted eight days and pumped up to 355 gpm. TW-02 is located in the western portion of the proposed quarry, so it should be representative of the rock that will require dewatering. Groundwater levels reached about 40 B bgs and leveled out after the pumping rate was reduced to 340 gpm due to drawdown (Figure 1). Recovery occurred almost immediately. HGL (2020a, p 33) suggests the initial response of the test reflects a near-linear trend at the beginning of the test, which indicates an isolated compartment, and the leveling off after several days reflects leakage into the compartment. The test is not long enough to provide information regarding how long the additional leakage would continue but the drawdown is sufficient to draw water from other aquifers or compartments. The model predicted that dewatering rates would vary from 345 to 63 gpm, averaging 144 gpm, over the five-year life of the quarry (HGL 2020a, p 68). Presumably, the dewatering rate decreases over the period. The numerical model simulated the pump test for transient calibration. The model simulated several nearby monitoring wells reasonably well, but HGL notes that the lack of simulated recovery at TW-03 suggests the model may simulate the system as being too segmented (HGL 2020a, p 64).	A numerical groundwater flow model was used for assessing potential impacts which was reviewed by the BLM and cooperating agencies and approved for use in NEPA analysis. The model was calibrated based on available data and predicts that the quarry lake will be terminal.

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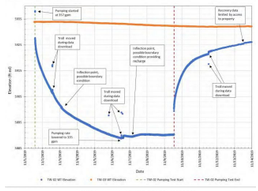
		There is apparently more connection to surrounding aquifers than simulated in the model. This is based both on the rapid recovery from the TW-02 pump test and the lack of simulated recovery. Dewatering rates may stay high longer than predicted and the lake may recover more quickly than predicted. The model used horizontal flow barriers to simulate the segmentation, but with very little data for transient modeling it is very difficult to calibrate an HFB. The assumption that the area has segmented hydrogeology is based on little supporting data and may be a poor conceptual model of the area. The conductivity is highly variable among hydrogeologic units. There are also conductive faults in the area. There is a long fracture zone along the Cave Spring drainage north of the quarry. Any connection has been only poorly examined by HGL (2020a). The predictive modeling uses an annual time step for 200 years (HGL 2020b, p 25). Therefore, the modeling does not account for seasonal variability or long-term dry conditions. Groundwater levels that respond to recharge by rising tens of feet could cause significant fluctuations in the pit lake. Due to differing geologic formations intersecting the quarry, the groundwater level may recover at different rates around the quarry. It is possible that quarry water could enter formations either seasonally or after the rapid recovery from a long-term drought. Due to the steep groundwater gradient to the northwest, groundwater could reach the pathway down the drainage and discharge Fish Lake Valley. The modeling does not preclude such an outcome. The evidence therefore is that the quarry lake will likely be terminal some of the time but that it is also possible that quarry lake water will discharge into surrounding groundwater during some periods.  Figure 6-4 TW-02 pumping test response Figure 1: Groundwater level response in well TW-02 during the TW-02 pump test.	
108 and 183	108.85 and 183.84	**Errors Simulating Recharge** The report describes conceptual recharge accurately with respect to runoff reaching drainages where it sinks into alluvium and then into underlying fractured bedrock with some recharge occurring at elevations due to melting snow and rainfall (HGL2000a, p 27). However, the report in many places overestimates the amount that would recharge at high elevations because it does not adequately account for geology. The report uses the Maxey-Eakin method for estimating recharge but commits two errors in its use. Conceptually, the method relates recharge simply to the amount of rainfall that occurs in varying bands of precipitation estimated to occur throughout a basin. The bands of precipitation are 8 to 12, 12 to 15, 15 to 20 and greater than 20 inches with coefficients equal to 3, 7, 15, and 25%, respectively. This means that, for example, 15% of the total volume of water falling within the area having between 15 and 20 inches of precipitation becomes recharge. The method was developed by assuming that recharge to a basin would equal discharge from that basin, accounting for interbasin inflow. Discharge is spring flow and groundwater evapotranspiration from the regional aquifer within the basin. It does not include perched aquifers and springs although perched springs that discharge to a flow that eventually recharges the regional aquifer would be recharge. The recharge coefficients were derived through a trial-and-error process using an annual precipitation map of Nevada dated 1936, applied to natural discharge by phreatophytes in 13 unidentified valleys in Nevada. Details of the derivation have not been published and have not been reproduced by anyone. The coefficients, and overall method, required use of the 1936 precipitation map or it will provide estimates not consistent with the original method. The method has been updated to different precipitation maps, including the recent PRISM mapping, and it is therefore essential that any use be limited to coefficients derived using the same precipitation estimation mapping. The second error with its use by HGL (2000a) is the tendency to assume that precipitation enters the ground where it falls. Although the report mentions the geologic control, it does not adequately apply it; there will be no recharge into granitic outcrops and no runoff from highly porous carbonate outcrops. The report must provide adequate reasoning for applying recharge as it does. Based on HGL (2000a) Figures 6-10 and 7-4, it appears that the groundwater model applies the precipitation where it falls and does not account for the fact it actually occurs along the washes, probably including into the fracture zone along the Cave Springs wash downstream from the spring. This affects the modeling because it forces groundwater to flow through portions of the model domain where geology would limit the flow. To not have simulated water levels that are too high, it is likely the calibrated conductivity values are too high, primarily in high elevation areas.	The groundwater model considered in the EIS was prepared by Piteau Associates in 2023. The document stated in this comment (HGL 2000a) is an older version of groundwater modeling. The Piteau 2023 updated groundwater model domain was expanded from the HGL 2000 water model and went through BLM review and approval. Annual estimates for recharge, evapotranspiration, and pumping are utilized in the Piteau 2023 model over its 200-year simulation based on information for these parameters that is primarily reported as annual data (e.g., annual NDWR pumping records). The sensitivity of model predictions to these parameters was evaluated for the groundwater flow model. Assessment of potential impacts to seeps and springs is not limited to the groundwater flow model but would rely more on required monitoring of surface water flow and groundwater water levels with mitigation requirements should dewatering pumping affect surface waters. Mitigation and monitoring are described in Section 4.21 of the Final EIS.
108 and 183	108.86 and 183.85	**Pit Lake Modeling Errors** The pit lake model simulates the chemistry of water accumulating in the pit. This review considers just the hydrogeologic aspects of the modeling effort. There are two primary errors in the hydrology input that can affect the predicted pit lake chemistry. First, the modeling appears to use an annual time step for 200 years (HGL 2020b, p 25). Therefore, the predicted chemistry misses the fluctuations that would occur seasonally. The report notes that pit lake runoff flushes chemical constituents from the pit walls that have accumulated there due to precipitation wetting the walls but not causing runoff into the pit. Runoff through each slice of the pit wall flushes these contaminants but once the lake rises to a given level, oxidation and contribution of contaminants will be assumed to cease (HGL 2000b, p 6). The reality in a semiarid pit lake is that the water level will rise and fall seasonally and probably annually during drought periods, as noted above regarding the flow-through quarry lake question. Oxidation will not be shut off permanently once the lake reaches a given elevation because it will not remain inundated. As the pit lake level falls, a wetted perimeter will remain within which much additional oxidation will occur. Fluctuating lake water levels will cause a much higher contaminant load to reach the pit lake. The model should be rerun to include monthly time steps and variable precipitation and evaporation. Droughts should be considered by using actual annual precipitation rates. Second, groundwater inflow enters by flowing through various pit wall lithologies. The model ignores this variable chemistry by setting inflow chemistry based on observed groundwater chemistry data without considering the leaching that would occur from the groundwater leaching through the damage zone in the skin of the pit lake. The groundwater level may be higher than the pit lake level	The groundwater model considered in the EIS was prepared by Piteau Associates in 2023. The document stated in this comment (HGL 2000a) is an older version of groundwater modeling. The Piteau 2023 updated groundwater model domain was expanded from the HGL 2000 water model and went through BLM review and approval. In addition, a sensitivity analysis was conducted with the modeling effort. In-depth analysis of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with NEPA. The Final EIS Section 4.16 describes the water resources and geochemistry analysis. Impacts to groundwater-dependent ecosystems are discussed in the Final EIS Section 4.17. Additional information is included in the Water and Geochemistry SER and Wetland and Riparian Resources SER.

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		so that groundwater inflow would reach the damaged layers above the lake level and therefore flow through multiple feet of damaged pit wall before entering the lake. The model apparently neglects a substantial input of contaminants that could leach from the pit wall. The lake model may also simulate a much too high evaporation rate from the quarry lake. Based on standard pan evaporation, the model assumes evaporation will equal 63.5 in/y. Standard pan coefficients do not apply in a quarry or pit lake situation because the water surface is usually protected from the wind by the quarry walls. Therefore, the simulation could be withdrawing too much water from the quarry lake and preventing the simulation from allowing it to rise as far as it otherwise would.	
108 and 183	108.87 and 183.86	**Production Water** The project would use about 2150 gpm for processing. HGL (2020a) models this water as withdrawn from the fracture zone along the drainage. The simulated drawdown does not extend far because of the high conductivity of the fracture zone. However, HGL does not analyze the potential impacts to the water balance of Fish Lake Valley. Assuming this flow enters the basin fill of that valley, it could have a substantial impact on the water rights in that valley. This would be especially true if the project extends longer than expected.	The BLM assessed drawdown impacts using a numerical groundwater model (Piteau 2023). Water right impacts are described in Section 4.16 of the EIS for the predicted 10-foot drawdown contour and a one-mile buffer.
108 and 183	108.88 and 183.87	**Groundwater Modeling Comments** The groundwater modeling effort uses spring levels as calibration targets, meaning it attempts to match the water level to the spring elevation. This is appropriate only for springs connected to the intermediate level aquifer being simulated (not the regional aquifer or perched aquifers). Calibration involves minimizing residuals which could be negative or positive meaning there is as much chance for the simulated potentiometric surface being above the ground level as below, which is clearly not appropriate. A spring is be6er simulated as a DRAIN boundary with a targeted discharge rate than as a groundwater surface target. The boundary would prevent the potentiometric surface rising above the ground surface. Seeps should also not be used for calibration. The model has a “constant head” boundary at its connection to Fish Lake Valley (HGL 2000a, p 49). However, the report also indicates there is a 3-foot drawdown at the boundary, which is impossible because the boundary head is constant. A constant head boundary will allow whatever flux is necessary to prevent the head from dropping. This is why a general head boundary is preferable – it can limit the inflow from the boundary. The constant head boundary can provide unreasonable changes in the water budget. HGL changed recharge rates as part of calibration (HGL 2000a, p 52). This indicates the model is nonunique. Calibration usually matches measured outflow or inflows to a model domain. for example, HGL should have measured outflows to Fish Lake Valley (based on pump test determined transmissivity and measured gradient) to which it sets the recharge rate (note this means that using Maxey-Eakin recharge values would be inappropriate, as discussed above). Using an established recharge rate as equal to the outflow rate, the calibration would attempt to match the observed groundwater levels by adjusting conductivity. Adjusting also the inflow leads to a nonunique solution. This means that any combination of recharge and conductivity could result in the observed groundwater levels on which the modeler based the calibration. Because the modeler reduced M-E recharge values, it seems likely that the model simulated too little water flowing through the system. **Underpredicting recharge could have resulted in a prediction of too little dewatering and a lower pit lake level than will actually occur.** HGL (2000a, p 54) makes assumptions about the conductance of faults that are not supported by data. There are no pump test results showing significant reductions over the fault, so HGL has no evidence for these assumptions. The response of the model is based on the assumptions input to the model, which may have no basis in reality. The steady state calibration shows a significant areal bias with residual tending to be positive or negative in different areas (HGL 2000a, p 55). For example, springs were underpredicted by up to hundreds of feet especially in the high elevations (Id.). Springs are effectively bounded and make poor targets as discussed above. The estimated conductivity throughout much of the model domain is therefore very inaccurate. The calibration statistics (HGL 2000a, p 56) are very poor. That the mean residual is -65.7 feet means the potentiometric surface is simulated as way too low under steady state conditions. Mean residual should equal zero. HGL uses the steady state groundwater level as the initial level for project simulation. **This would result in the model underpredicting drawdown, flow to the lake, and quarry lake recovery.** The supposed improvement in calibration statistics due to considering only project wells and VWPs means that removing targets leaves those that are easier to hit with the simulation. The mean residual is still substantially negative meaning the steady state groundwater even at the quarry site is too low. The graph showing observed and simulated water tables (HGL 2000a, Figure 7-6) is very misleading due to the scale; observations that appear close to the 1:1 line could still represent residuals of an order of 200 or more. HGL acknowledges the poor portrayal of an upward gradient within the pit due to the inability to match different VWP levels (HGL 2000a, p 58). The report acknowledges many errors due to the model’s inability to simulate small-scale features (Id.). It is therefore questionable how useful the model predictions are. Most of the observations in these comments suggest the model underpredicts flow into the quarry for both dewatering and quarry lake formation.	The groundwater model considered in the EIS was prepared by Piteau Associates in 2023. The document stated in this comment (HGL 2000a) is an older version of groundwater modeling. The Piteau 2023 updated groundwater model domain was expanded from the HGL 2000 water model and went through BLM review and approval. In addition, a sensitivity analysis was conducted with the modeling effort. The Piteau 2023 model used spring levels for calibration targets and applied weighting factors to account for uncertainty with these features. Annual estimates for recharge, evapotranspiration, and pumping are utilized in the model over its 200-year simulation based on information for these parameters that is primarily reported as annual data (e.g., annual NDWR pumping records. The sensitivity of model predictions to these parameters was evaluated for the Piteau 2023 groundwater flow model. Assessment of potential impacts to seeps and springs is not limited to the groundwater flow model but would rely more on required monitoring of surface water flow and groundwater water levels with mitigation requirements should dewatering pumping affect surface waters. Mitigation and monitoring are described in Section 4.21 of the Final EIS. In-depth analysis of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with NEPA. The Final EIS Section 4.16 contains the water resources and geochemistry analysis. Impacts to groundwater-dependent ecosystems are discussed in Section 4.17 of the Final EIS. Additional information is in the Water and Geochemistry SER and Wetland and Riparian Resources SER.
108 and 183	108.89 and 183.88	**General Comments** The spring survey does not indicate other springs near the quarry, but the perched aquifers could flow toward the fracture zone defining the Cave Spring drainage. Quarry construction could intercept groundwater that supports resources along the drainage. In summary, quarry construction could intercept shallow groundwater and have two significant effects: • Dewatering requirements, especially at the beginning of construction, could be substantially higher than predicted. • Dewatering of shallow groundwater could intercept flow down the Cave Springs drainage. There does not appear to have been investigations of shallow groundwater at the pit. HGL (2020a, p 30) notes that the groundwater monitoring data shows an upward gradient within the quarry area. The numerical model does not simulate this upward gradient or the probably flow upward into the quarry. This could result in an underestimate of the quarry dewatering rate and the potential for water leaving the quarry lake. A pump test completed in TW-01 failed due to the water being geothermal with temperature between 80 and 90°F. HGL does not explore the meaning or consequences of there being geothermal water in the area. It could reflect the tendency for upward flow into the quarry.	The numerical groundwater model prepared in 2023 was used for assessing potential impacts and included all available data to represent the groundwater systems and was reviewed by the BLM and cooperating agencies and approved for use in NEPA analysis. The document stated in this comment (HGL 2000a) is an older version of groundwater modeling. The Piteau 2023 updated groundwater model domain was expanded from the HGL 2000 water model and went through BLM review and approval. In addition, a sensitivity analysis was conducted with the Piteau 2023 modeling effort. In-depth analysis of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with NEPA. The Final EIS Section 4.16 contains the water resources and geochemistry analysis. Impacts to groundwater-dependent ecosystems are discussed in Section 4.17. Additional information is in the Water and Geochemistry SER and Wetland and Riparian Resources SER.

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			The presence of several geologic structures is supported by the drillhole, and surface geology data collected during exploration for the Project. However, only three fault structures were incorporated in the Piteau 2023 groundwater flow model based on water level observations. While limited in duration, the available pump test data does not contradict the fault interpretations. In addition, the sensitivity analysis evaluated the simulation of the three fault zones included in the model. Predicted drawdown changed little when the conductivity of the fault zones and other lithologic units were increased. The model calibration results in acceptable calibration statistics. There is no spatial bias in the simulation of spring elevations. Instead, calibration to spring locations is biased by the assumption that the regional groundwater elevation is at the ground surface at the spring locations. This assumption overestimates groundwater levels at the locations of seeps and springs that are sourced from perched water zones rather than regional groundwater. Impacts detailed as a result of groundwater drawdown are considered predicted impacts based on the groundwater model developed for the Project, which details a predicted maximum extent of 10-foot drawdown. The EIS assesses the predicted 10-foot drawdown contour and a one-mile buffer. A change in groundwater elevations of 10 feet or more was selected by the BLM for identifying areas of potential drawdown impacts. This threshold was established by the BLM based on the fact that natural fluctuations in water levels, particularly in fractured rock aquifers, commonly exceed 10 feet. Drawdowns of less than 10 feet are not considered since these changes probably would not be measurable or distinguishable from natural seasonal and annual variations in groundwater levels. In addition, it is important to note that the 10-foot drawdown contour has been used as the threshold for defining the potential drawdown impact area for numerous other BLM EISs for mining projects in northcentral Nevada over the past 30 years. The BLM acknowledges that numerical models could be used to provide predictions of drawdown of less than 10 feet, and drawdown of less than 10 feet could significantly impact flow in some perennial springs and streams. However, considering the broad regional extent of the numerical modeling domain, and lack of hydrogeologic data outside of the mine exploration and mining area, it is not reasonable to use numerical modeling to predict areas with drawdown of less than 10 feet. The potential for drawdown effects is therefore addressed via monitoring requirements that can be expanded based on monitoring results. The one-mile buffer was added to account for additional areas where impacts from less than a 10-foot drawdown contour may take place. Due to uncertainty in the modeling, BLM Battle Mountain District required a one-mile buffer to be placed on the predicted maximum extent of 10-foot drawdown to address this potential modeling uncertainty and establish the locations for monitoring drawdown effects on surface water resources. The hydraulic connectivity of surface water resources with the deep groundwater aquifer in the area of analysis is currently unknown, therefore the potential for impacts at present seeps, springs, and streams throughout the area of analysis is acknowledged but subject to monitoring for verification. Drawdown monitoring would inform the actual extent of impacts from dewatering on surface water sites that are dependent on upon the extent of hydraulic connectivity between surface waters and the groundwater targeted by the dewatering. The Draft EIS does not draw conclusions regarding whether seeps and springs are connected to regional groundwater or perched water. Instead, it notes that predicted effects associated with groundwater drawdown would not occur “if these springs are perched features.”

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108 and 183	108.90 and 183.89	**Monitoring Plan** Appendix P to the WPCP application contains the proposed monitoring plan. Primary concerns for monitoring are whether contaminants from quarrying or from the tailings deposits could reach the Cave Spring drainage. Also, the groundwater level in the area of the tailings appears to be close to the ground surface based on the level of springs 6 and 7, which appear to be connected to the intermediate aquifer based on their high TDS values; there is concern whether contaminants from the tailings could reach groundwater. In addition the requested additional monitoring well for the quarry lake discussed below, there is a need for another baseline monitoring well upgradient of the tailings pile; MW-1 is insufficient because it is near the main drainage whereas the bedrock underlying the tailings is outside of the drainage. MW SOSF, downgradient of the tails, is probably sufficient for monitoring leaks from the tails if it is placed properly in the most permeable bedrock below the tails and if there is leak detection under the tails. The monitoring plan does not discuss the screened or open interval for the wells. Because monitoring wells should not screen more than about 20 feet, the monitoring wells should be sampled with low flow pumps to draw from specific levels if the open interval exceeds 20 feet. To establish a vertical profile of chemistry within the aquifer, the monitoring wells should be sampled using low flow sampling at various levels prior to the commencement of quarrying. The monitoring plan relies on the assumption that the quarry lake will be terminal. This review has disputed the certainty of that assumption as discussed above. The monitoring does not but should include monitoring to verify whether the lake is terminal. Prior to closure, an additional monitoring well should be added between the quarry and the Cave Springs drainage north of the quarry. It should be established to both monitor the recovering groundwater table and the changing groundwater chemistry. Because it would be in an area of varying groundwater levels, it should be screened either in multiple development or sampled using low flow pumps to draw from various levels to ascertain a vertical profile in the aquifer. Additionally, to verify whether the evolving groundwater table near the quarry will flow toward the forming pit lake, the VWPs near the quarry should be retained; this is especially critical for VWP-3 which appears to be just north of the quarry. If it will not survive quarry construction, a replacement VWP should be installed to its north as close to the quarry as possible. This should be completed prior to quarry construction so that natural water levels as well as evolving water levels due to construction can be determined. Additionally, another VWP should be installed between VWP-3 (or its replacement) and VWP-8, which is within the Cave Spring drainage. VWP-3 (or its replacement), -8, and a new VWP between the two would allow a water surface pro2le to be monitored between the quarry, the forming quarry lake, and the drainage to verify whether the quarry is terminal. These VWPs should each have four monitoring levels as were used in VWP-3. Three additional VWP monitoring levels should be added to VWP-8 and the new VWP between -3 and -8 should also have four levels. Four levels are essential to monitor the vertical gradient of 4ow to and from the quarry and quarry lake and to provide monitoring data that would allow groundwater surface profile modeling to predict the future status of the forming quarry lake (a vertical two-dimension groundwater flow model could be used for this). The monitoring plan recommends quarterly sampling for the monitoring wells. That would be sufficient only after a year of monthly sampling to establish seasonal trends. As noted above, the groundwater level probably varies substantially due to seasonal changing recharge and it could lead to seasonal wetting and drying which could also lead to seasonal flushes of contaminants. Understanding natural seasonal variability is essential for understanding whether observed changes are natural or due to the quarry. The monitoring plan fails to include any spring monitoring which it should. As described above a VWP should be installed near Cave Spring to provide warning of impacts to Cave Spring. It is understandable that Cave Spring will not be sampled for chemistry because that would not show anything regarding the spring going dry, but it its flow rate should be monitored at least quarterly, after monthly monitoring for a year prior to quarrying to establish a baseline. Chemistry at the springs just west of the tailings, SP-06 and -07, should also be monitored quarterly to verify whether the tails affect those springs.	While implementation of the Proposed Action would require a WPCP from NDEP, the WPCP application is beyond the scope of the EIS. The EIS analyzes impacts from groundwater drawdown and quarry water quality and includes mitigation and monitoring for surface water and groundwater.
108 and 183	108.91 and 183.90	**Conclusion** HGL has prepared two reports in support of the proposed Rhyolite Ridge lithium quarry project. The reports depend on too little field data to support the conclusions. The lack of evidence is most apparent in the groundwater modeling effort for which there is too little data outside of the immediate pit area. This is obvious in the poor conceptual model established for the groundwater model. There are two obvious errors. First, the modeler may assume there is too much segmentation. Second, the amount and location of the recharge is inaccurate in several ways discussed above including the amount not equaling an estimated outflow from the model domain and the application of recharge with little regard for the underlying geology. The errors lead to a vast uncertainty regarding the future of Cave Spring. Although there are indications it will not be affected by drawdown, unsupported assumptions in the modeling may have underestimated the dewatering and its effect to surrounding hydrogeology. The same problem exists for the question of whether the quarry lake will be terminal. Faster, seasonal, or interannual variations of inflow could lead to the lake rising and falling and discharging water to surrounding groundwater. The lack of understanding of quarry lake refilling also manifests in poor or no prediction of the groundwater chemistry entering the lake after flowing through the surrounding quarry lithology.	The numerical groundwater model prepared in 2023 (Piteau 2023) was used for assessing potential impacts and included all available data to represent the groundwater systems and was reviewed by the BLM and cooperating agencies and approved for use in NEPA analysis. The document stated in this comment (HGL 2000a) is an older version of groundwater modeling. The Piteau 2023 updated groundwater model domain was expanded from the HGL 2000 water model and went through BLM review and approval. In addition, a sensitivity analysis was conducted with the Piteau 2023 modeling effort. In-depth analysis of the direct, indirect, and cumulative impacts associated with the Proposed Action and alternatives were conducted in compliance with NEPA. The Final EIS Section 4.16 contains the water resources and geochemistry analysis. Impacts to groundwater-dependent ecosystems are discussed in Section 4.17. Additional information is in the Water and Geochemistry SER and Wetland and Riparian Resources SER. The presence of several geologic structures is supported by the drillhole, and surface geology data collected during exploration for the Project. However, only three fault structures were incorporated in the Piteau 2023 groundwater flow model based on water level observations. While limited in duration, the available pump test data does not contradict the fault interpretations. In addition, the sensitivity analysis evaluated the simulation of the three fault zones included in the model. Predicted drawdown changed little when the conductivity of the fault zones and other lithologic units were increased.

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			The model calibration results in acceptable calibration statistics. There is no spatial bias in the simulation of spring elevations. Instead, calibration to spring locations is biased by the assumption that the regional groundwater elevation is at the ground surface at the spring locations. This assumption overestimates groundwater levels at the locations of seeps and springs that are sourced from perched water zones rather than regional groundwater. Impacts detailed as a result of groundwater drawdown are considered predicted impacts based on the groundwater model developed for the Project, which details a predicted maximum extent of 10-foot drawdown. The EIS assesses the predicted 10-foot drawdown contour and a one-mile buffer. A change in groundwater elevations of 10 feet or more was selected by the BLM for identifying areas of potential drawdown impacts. This threshold was established by the BLM based on the fact that natural fluctuations in water levels, particularly in fractured rock aquifers, commonly exceed 10 feet. Drawdowns of less than 10 feet are not considered since these changes probably would not be measurable or distinguishable from natural seasonal and annual variations in groundwater levels. In addition, it is important to note that the 10-foot drawdown contour has been used as the threshold for defining the potential drawdown impact area for numerous other BLM EISs for mining projects in northcentral Nevada over the past 30 years. The BLM acknowledges that numerical models could be used to provide predictions of drawdown of less than 10 feet, and drawdown of less than 10 feet could significantly impact flow in some perennial springs and streams. However, considering the broad regional extent of the numerical modeling domain, and lack of hydrogeologic data outside of the mine exploration and mining area, it is not reasonable to use numerical modeling to predict areas with drawdown of less than 10 feet. The potential for drawdown effects is therefore addressed via monitoring requirements that can be expanded based on monitoring results. The one-mile buffer was added to account for additional areas where impacts from less than a 10-foot drawdown contour may take place. Due to uncertainty in the modeling, BLM Battle Mountain District required a one-mile buffer to be placed on the predicted maximum extent of 10-foot drawdown to address this potential modeling uncertainty and establish the locations for monitoring drawdown effects on surface water resources. The hydraulic connectivity of surface water resources with the deep groundwater aquifer in the area of analysis is currently unknown, therefore the potential for impacts at present seeps, springs, and streams throughout the area of analysis is acknowledged but subject to monitoring for verification. Drawdown monitoring would inform the actual extent of impacts from dewatering on surface water sites that are dependent on upon the extent of hydraulic connectivity between surface waters and the groundwater targeted by the dewatering. The Draft EIS does not draw conclusions regarding whether seeps and springs are connected to regional groundwater or perched water. Instead, it notes that predicted effects associated with groundwater drawdown would not occur “if these springs are perched features.”
108 and 183	108.92 and 183.91	Attachments: ANCOLD 2012.pdf; Bayer 2015.pdf; Acme Lithium 2023.pdf; BLM 2018 Donlin Gold FEIS Chapter 3_6.pdf; BLM 2022b letter to Control Technology Incpdf.pdf; BLM 2023 Email from Distel re Schedule.pdf; BLM 2024 distel email re haul road.pdf; BLM 2024 Email re extension.pdf; BLM Manual 1780.pdf; BLM Manual 6840.pdf; CBD 2021 Fish-Lake-Valley-Tui-Chub-Petition.pdf; CBD 2023 Tecopa Birds Beak.pdf; BLM 2014 Haile Mine FEIS Chapter 4.pdf; Albano 2021.pdf; Coates et al 2023.pdf; BLM 2023a Ormat FLV Exploration.pdf; BLM 2019 Copper Flat FEIS.pdf; Executive Order 13175.pdf; Esmeralda County 2022.pdf; FWS 2023 BSSG Proposed Rule.pdf; Harju 2010.pdf; Hunt 2001.pdf; Eakin 1950.pdf; FWS 2017 Springsnails.pdf; Junior Mining Network 2023.pdf; Huntington 2014.pdf; Kirol et al 2020.pdf; Lithium Corporation 2019.pdf; Lund 1982.pdf; Lithium Corporation 2023.pdf; Klohn Crippen Berger 2017.pdf; McClinton et al 2022.pdf; Myers 2017.pdf; National Technical Team 2011.pdf; Maochang 2001.pdf; NOAA 2024a Dyer.pdf; NOAA 2024b Silverpeak and Tonopah.pdf; Morrill et al 2022.pdf; Pratt and Beck 2019.pdf; Pres Memo on Tribal Consultation and G to G.pdf; Pres Memo on Tribal Consultation.pdf; NDWR 2019.pdf; Timbisha et al extension request.pdf; US 2022.pdf; US District Court 2024 SSA in CBD v USFWS.pdf; Rush and Katzer 1973.pdf; USDOE 2022.pdf; Rissmann 2012.pdf; USDOI 2000 Mining Regs.pdf; USDOJ 2019.pdf; USFWS 2022 DVT Emergency Listing.pdf; USFWS 2022 Tui Chub.pdf; USDOI M-37039.pdf; Open Mountain Energy 2022.pdf; White 1998.pdf; Coates et al 2020.pdf	References noted.
Personal Information Requested to be Withheld – June 3, 2024			
109	109.1	The development of lithium resources in an environmentally low impact method as well as addressing exisiting offshore worker safety issues is critical to addressing global climate change concerns. Ioneer has provided a comprehensive high tech low impact solution to lithium mining concerns that takes into consideration local communities, resource impact and resident environmentally sensitive components. Has the alternative submitted by BLM the north south overburden storage been evaluated as to cost impact on a long term operation as proposed by Ioneer?	Screening criteria was applied to all alternatives considered and included an assessment of the technical and economic feasibility of the alternatives. The

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		Has this alternative been evaluated as to how any additional cost or operating restrictions may impact the capability of Ioneer to successfully operate this mine long term? Have any potential safety impacts been assessed for this alternate oprating scheme? If so please publish the cost differentials and operating restriction impacts from the mining operating perspective and the feasibility of operating under this alternate system. The no alternative option is not viable given the need to rapidly reduce human impact on the environment that this proposal addresses.	implementation costs of the different alternatives do not influence the environmental impacts of the Project and therefore are not included in the EIS.
Not Provided – June 3, 2024			
110	110.1	Marikana Massacre. Ioneer has sold fifty percent of its project to Sibaney Stillwater (SS). Check out Wikipedia on SS. Include Marakana Massacre. In 2012 SS killed 34 striking miners. In 2014 they killed 6 more. In 2018 they trapped 1000 miners underground. Half of all miners in the country died in SS mines. In 2019 they burned down sixty homes of striking miners, burning children. They have the worst safety record in all of South Africa. Here is just some of wikipedia. Controversies Marikana miners' strike (Lonmin) Main article: Marikana massacre In 2012, what started as a peaceful protest resulted in a massacre. The Marikana massacre[15] was the killing of thirty-four miners by the South African Police Service (SAPS) on 16 August 2012, during a wildcat strike at the Lonmin platinum mine in Marikana, Rustenburg, North West province, South Africa. Why do you think this company with this track record will obey environmental and safety regulations in Nevada? Why didn't Ioneer mention this track record? Why didn't the EIS mention it? Do you really believe this company is a good fit for Esmeralda County? It looks like Ioneer is nothing but a front company for SS. Also Ioneer had never mined a single gram of lithium. Neither has SS. You really think these people with their resumes and dog and pony show are what we need here in Nevada?	Comment noted. The Project would be required to be in compliance with all federal, state, county, and local laws and regulations.
Chloe Novak – June 3, 2024			
111	111.1	As a botanist who has worked extensively with colleagues documenting the flora of Rhyolite Ridge and the Silver Peak Range, I urge the Bureau of Land Management to take the No Action Alternative and deny permitting for what would amount to an environmental disaster with far-reaching consequences. The reality is that our public lands are being strongarmed by corporate interests operating under the presumption that they can violate U.S. environmental laws with impunity, or otherwise absorb the cost of the penalties. Your responsibility is to uphold those laws, not undermine them. Allowing this project to proceed would set a dangerous precedent by undermining the intent and authority of the Endangered Species Act. Extractive industry corporations are eager to receive the message that the ESA is not a credible impediment to destructive activities, rendering our public lands little more than a resource warehouse for untrammeled profiteering. As a biologist and plant conservation researcher, it is outrageous that my access to a federally endangered, single-site endemic plant on public land would be mediated, chaperoned, and subject to pre-approval by the very corporation that threatens its extinction. It is extremely concerning that the potential for independent oversight and monitoring of a critically endangered species would be hampered in this way. There is so much more at stake than the fate of Tiehm's buckwheat. Eriogonum tiehmii plays a unique and integral role in an exceptionally diverse ecosystem with numerous rare and sensitive species, within one of the largest contiguous areas of intact, healthy habitat left in the continental U.S. The Rhyolite Ridge project would permanently destroy this vital functioning landscape, with far-reaching regional environmental impacts due to groundwater overdraw, light, noise and dust pollution, invasive plant introduction and continual disturbance. Having worked extensively throughout public lands in the western U.S.— including national forests and BLM land of Nevada, California, Utah, Idaho, Arizona and Oregon— I can say without exaggeration that Rhyolite Ridge and the Silver Peak Range easily rival any national park in terms of unique biodiversity, scenic beauty, and cultural significance. I believe it warrants designation as a national monument at a minimum, and to permanently preclude the possibility of such a designation by allowing this project to proceed would be to rob all future generations of the opportunity to experience this extraordinary place and the biodiversity that makes it unique. In the context of what is widely regarded as the sixth mass extinction event in Earth's history that is uniquely attributable to human activities and specifically habitat destruction, gambling with wholly preventable extinction events should be completely off the table. The threat of climate change is very real for all life and livelihoods, but our remaining biodiversity is an asset and not an obstacle to addressing it. Functioning ecosystems composed of diverse native organisms are a critical component of climate resiliency; decimating them to boost shareholder profits and industries that remain major contributors to greenhouse gas emissions (including EV manufacture) is not. Please don't let this project become the new standard of environmental protection in the "white gold rush" era. There is far more to lose than there is to gain, and those losses cannot be undone. Thank you.	The EIS was prepared in accordance with NEPA, FLPMA, NHPA, CEQ regulations, and BLM NEPA regulations. The Project is consistent with United States mining laws and BLM surface management regulations.
EPA – June 3, 2024			
112	112.1	Please see attached letter.	Comment noted.
182	182.1	Hi Scott, Please see EPA's attached comments on the Rhyolite Ridge DEIS. Thanks again for meeting with me on Friday to discuss. (I also submitted these through e-Planning.) Sarah	Comment noted.

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112 and 182	112.2 and 182.2	Douglas Furtado District Manager Bureau of Land Management, Battle Mountain District Office Attention: Rhyolite Ridge Lithium-Boron Mine Project 50 Bastian Road Battle Mountain, Nevada 89820 Subject: EPA Comments on the Draft Environmental Impact Statement for the Rhyolite Ridge Lithium-Boron Mine Project, Esmeralda County, Nevada (EIS No. 20240067) Dear Douglas Furtado: The U.S. Environmental Protection Agency has reviewed the above-referenced document pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. The CAA Section 309 role is unique to EPA. It requires EPA to review and comment on the environmental impact on any proposed federal action subject to NEPA's environmental impact statement requirements and to make its comments public. The EPA is also serving as a cooperating agency in accordance with the *Memorandum of Understanding Between EPA and Nevada BLM for Mining Environmental Impact Statements* (April 27, 2023). We provided scoping comments (February 3, 2023) and additional comments via cooperating agency meetings and review of the administrative draft of the EIS (February 13, 2024). The Bureau of Land Management is considering an application from Ioneer Rhyolite Ridge LLC proposing to construct, operate, close, and reclaim a lithium and boron mine approximately forty miles southwest of Tonopah in Esmeralda County, Nevada. The Project would include a quarry (i.e., open pit), three overburden storage facilities, a spent ore storage facility (i.e., tailings from processing), a processing facility, a sulfuric acid plant, and ancillary facilities. The mine boundary would include approximately 7,137 acres of BLM land and 29 acres of private land, and approximately 2,306 acres of new surface disturbance is expected. The life of the Project would be 23 years including 6 years of reclamation and closure, including monitoring pit lake water quality for as long as needed. The Draft EIS evaluates the Proposed Action, a North and South Overburden Storage Facility Alternative, and a No Action Alternative. The North and South OSF Alternative is identified as the BLM's preliminary environmentally preferred alternative. Review Summary The EPA identified public health, welfare, or environmental quality concerns and deficiencies in the analysis that EPA recommends be addressed in the Final EIS. Our primary concerns are the need to: provide additional details about disproportionate adverse impacts to communities with environmental justice concerns, identify mitigation, and conduct meaningful outreach prior to the Final EIS; report direct and indirect greenhouse gas emissions and correct and update estimates of the social cost of greenhouse gases; consider climate change adaptation measures; and offer additional Tribal consultation and include a formally trained cultural resource specialist on-site during new surface disturbance. Our other recommendations focus on water resources and air quality, among other areas. We appreciate the opportunity to review this Draft EIS. When the Final EIS is released for public review, please send an email with a link to the document to samples.sarah@epa.gov. If you have any questions, please contact me at (415) 947-4167, or Sarah Samples, the lead reviewer for this project, at (415) 972-3961. Sincerely, Jean Prijatel Acting Manager Policy and Operations Branch ENCLOSURE 1. EPA's Detailed Comments cc: Scott Distel Project Manager, Bureau of Land Management Matt Fockler Socioeconomic Specialist, Bureau of Land Management Ashley Taylor Minor Source Permitting Supervisor, Nevada Division of Environmental Protection Natasha Zittel Regulation Branch Supervisor, Nevada Division of Environmental Protection Justin Barrett Reno Fish and Wildlife Office Deputy Field Supervisor, U.S. Fish and Wildlife Service Colleen Draguesku Senior Fish and Wildlife Biologist, U.S. Fish and Wildlife Service Marissa Reed Regional Section 7 Coordinator, U.S. Fish and Wildlife Service	Comment noted.
112 and 182	112.3 and 182.3	**EPA'S DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE RHYOLITE RIDGE MINE PROJECT, ESMERALDA COUNTY, NEVADA – JUNE 3, 2024** **Environmental Justice**	EO 14096 language has been added to the Environmental Justice SER and Section 4.3 of the EIS. The BLM Tonopah Field Office has not received formal guidance from the CEQ and Department of the Interior for implementing EO 14096. Guidance will ensure the order is implemented consistently and

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		Section 3 (b)(i) of Executive Order 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All* (April 21, 2023),1 directs the EPA, in carrying out its Clean Air Act Section 309 responsibilities, to assess whether each agency analyzes and avoids or mitigates disproportionate human health and environmental effects on communities with environmental justice concerns. The EPA has concluded that updates and/or additions are needed in the Final EIS to adequately address these communities and concerns as well as appropriately consider mitigation measures. As part of our review of the Draft EIS, we offer further details regarding this recommendation through the following comments. ***Meaningful Involvement*** According to the Draft EIS, communities with environmental justice concerns within the vicinity of the project area, including people of color and low-income populations, may experience various disproportionate adverse impacts to water resources, noise, traffic, hazardous material transportation, and social and economic values (p. 4-5, 4-6). These disproportionate impacts are categorized as "moderate to major, long-term, and regional" (Environmental Justice Supplemental Environmental Report (SER) p. 3-6). As such, the EPA is concerned that the Draft EIS does not indicate how or if the BLM provided any opportunities for early and meaningful involvement for communities with environmental justice concerns, as directed by E.O. 14096, including Native American communities who may also have environmental justice concerns. E.O. 14096 includes specific directives for federal agencies to address in NEPA environmental reviews, including providing opportunities for early and meaningful involvement in the environmental review process with communities with environmental justice concerns potentially affected by a proposed action (E.O. 14096 Section 3(a)(ix)(C)). Beyond NEPA-specific directives, several opportunities for meaningful engagement that E.O. 14096 describes in Section 3(a)(vii)(A)-(D) include but are not limited to: providing notice and engaging in outreach to potentially affected individuals who do not typically participate in Federal decision-making; providing accessible information on Federal activities for individuals with limited English proficiency and individuals with disabilities; providing technical assistance, tools and resources to assist in facilitating meaningful and informed participation; and fully considering public input provided as part of the decision-making process. Although not disclosed in the Draft EIS, we understand that the BLM has engaged with communities with environmental justice concerns through BLM's development of an environmental justice outreach plan (M. Fockler, personal communication, April 23, 2024). This plan is characterized as focusing on distributing project information to targeted environmental justice communities and offers a variety of ways for meaningful engagement, yet it does not include engagement regarding disproportionate impacts and mitigation development. While we appreciate these outreach efforts, we are concerned that meaningful outreach, including addressing disproportionate impacts and potential mitigation, did not occur earlier in the project development since NEPA coordination has been ongoing since 2020. We also note that BLM Instruction Memorandum 2022-059 (September 22, 2022) commits to proactively providing opportunities for meaningful involvement of people of color and low-income populations in the decision-making process. To address both E.O. 14096 and BLM IM-2022-059, we recommend conducting further outreach and engagement opportunities prior to issuing the Final EIS, such as community events, to ensure that environmental justice concerns are identified and addressed and that mitigation measures are clearly laid out for public review. ***Recommendations for the Final EIS:*** • Include a summary of E.O. 14096 in the environmental justice section. • Seek and summarize input received from potentially affected communities regarding environmental justice concerns and potential measures that would avoid, minimize, or mitigate any identified disproportionate adverse impacts. Some best practices for outreach include: o Hosting community events or meetings and ensuring that these are scheduled at a time and location that is accessible for community participants, including scheduling meetings after work hours and on weekends, as appropriate, and providing opportunities for hybrid meetings. As part of these events, ensure that the informational materials that are distributed are accessible for a diverse range of audiences. o Providing ample notice of meetings and commenting opportunities so that community members have sufficient time to prepare and participate. o Promoting engagement opportunities within appropriate outlets used by affected communities, such as newspapers, radio, and social media. o Providing translation services, interpretation services, and other services as required to accommodate linguistically isolated populations and persons with disabilities, as applicable. o Addressing technology barriers that may prohibit participation from affected communities. This could include mailing notices to Tribes that have limited internet capacity, as needed. ***Identifying Disproportionate Impacts*** E.O. 14096 Section 3(a)(ix)(B) directs agencies to carry out NEPA reviews in a manner that considers the best available science and information on any disparate health effects arising from exposure to pollution and other environmental hazards, such as information on race, national origin, age, disability status, among others, of the individuals exposed. In addition, Section (3)(a)(i) also directs agencies to "identify, analyze, and address disproportionate and adverse human health and environmental effects (including risks) and hazards of Federal activities, including those related to climate change and cumulative impacts of environmental and other burdens on communities with environmental justice concerns." Under NEPA and E.O. 14096's direction, additional information is needed in the EIS to better understand direct, indirect, and cumulative impacts to communities with environmental justice concerns. For example, the Draft EIS's description of the affected environment does not describe additional baseline characteristics (e.g., human health vulnerabilities and environmental burdens) of the communities with environmental justice concerns which may affect how they are impacted by the project. EJScreen data identifies that Esmeralda County has a greater percentage of persons with disabilities (23.1%) than the state average (13.2%) as well heart disease and cancer rates that are higher than the state average.[2] EJScreen data also reveals high levels of ozone pollution in Esmeralda, Mineral, and Nye Counties in Nevada and Mono County, California, which were identified in the 50 kilometer (~31 mile) radius in the cumulative impacts analysis (p. 4-49). Exposure to ozone pollution may cause respiratory issues and could worsen preexisting conditions such as asthma and lung disease.[3] The Draft EIS also did not include a consideration of cumulative impacts and the reasonably foreseeable effects of climate change in the area through the anticipated life of the project as outlined in the E.O. 14096's directive. For example, in cooperating agency meetings that EPA attended for the BLM's Esmeralda Seven Solar Project, it is estimated that nearly one million truck trips may be necessary to deliver water to the 60,000-acre project site due to over-allocation in the groundwater basins in the planning area. These potential water quantity and air emissions are not captured in the current Draft EIS. The Fifth National Climate Assessment4 reveals that higher temperatures caused by climate change have intensified droughts in the Southwest region leading to a reduction of surface water and groundwater availability, which could further strain water quantity in the planning area. This assessment also highlights that these impacts are disproportionately experienced by	appropriately. The BLM will monitor for forthcoming guidance and prepare to implement it to the extent feasible. In cooperation with Esmeralda County, the BLM held in-person public comment meetings in Dyer and Tonopah to facilitate accessibility to these meetings and address technological barriers that residents of Fish Lake Valley and other affected communities discussed in the Draft EIS may be subject to. These meetings are documented in the Public Scoping report for the Project. An Environmental Justice Outreach Plan was developed for the Project and the BLM has been executing the Plan to the best of their abilities given the current lack of guidance from the CEQ for how to implement outreach. A description of the Environmental Justice Outreach Plan has been added to the EJ SER and EIS. BLM has not received any response on the outreach plan from the parties the plan was sent to. Health disparity data available on EJ Screen has been added to the Affected Environment sections of the EJ SER and EIS. BLM has not received formal guidance from CEQ for implementation EO 14096 in the NEPA analysis. There is not enough data or formal guidance to determine impacts from the Project related to some of the health disparities provided on EJ Screen, such as cancer risks. Potential impacts from hazardous transportation between Las Vegas and Reno relating to communities with environmental justice concerns are included in Section 4.3 of EIS. Additional data was added to the Environmental Justice SER from EJ Screen for the Hazardous Material route. Discussion on climate change related to environmental justice has been to the EJ SER and EIS. There is not currently enough data or formal guidance from the CEQ to specifically quantify the impacts that incremental climate change effects from the Project would have on communities with environmental justice concerns. Disproportionate impacts are currently disclosed in the EIS. Ioneer has provided the BLM a commitment letter to engage in a development agreement with Esmeralda County, which has been clarified in the Environmental Justice SER. No additional mitigation has been proposed for the Project. Ioneer has provided the BLM a commitment letter to engage in a development agreement with Esmeralda County, which has been clarified in the Environmental Justice SER and in Section 4.3 of the EIS. No additional mitigation has been proposed for the Project. Any additional agreements would be between Ioneer and collaborating parties, of which the BLM has no jurisdiction or authority overseeing.

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		certain communities in the region including Indigenous communities, Black communities, Hispanic communities, and low-income communities due to low-quality drinking water, lack of access to potable water, and lack of proper water infrastructure. ***Recommendations for the Final EIS*:** • Identify baseline characteristics, including existing environmental burdens and health and social conditions, of impacted individuals and communities with environmental justice concerns, such as existing environmental pollution, current or past industrial activities, the percentage of persons with disabilities, socioeconomic stressors, and asthma and cancer rates in the affected environment section. • Identify any communities with concerns outside the environmental justice area of analysis that may be along the transportation access path or the hazardous waste and solid waste area of analysis that were not discussed in the environmental justice analysis. • Discuss additional direct, indirect, and cumulative impacts to communities with environmental justice concerns that may result due to baseline characteristics. • In the analysis of the project's disproportionate adverse impacts to communities and individuals with environmental justice concerns, discuss how cumulative impacts and the foreseeable future effects of climate change in the area may magnify disproportionate effects in these communities through the life of the project, including post-closure. ***Measures to Avoid or Mitigate Disproportionate Impacts*** E.O. 14096 stresses the importance of not only identifying and analyzing disproportionate impacts, but also addressing such impacts. Specifically, Section 3(a)(vi) directs agencies "to evaluate relevant legal authorities and, where available and appropriate, consider adopting or requiring measures to avoid, minimize, or mitigate disproportionate and adverse human health and environmental effects (including risks) and hazards of Federal activities on communities with environmental justice concerns, to the maximum extent practicable." Considering that the Draft EIS concluded that communities with environmental justice concerns may experience disproportionate adverse impacts to water resources, noise, traffic, hazardous material transportation, and social and economic values, practicable measures to avoid, or mitigate adverse and disproportionate impacts to these populations are needed in the Final EIS. ***Recommendations*:** • Identify and implement measures to avoid or mitigate the project's disproportionate impacts that may affect individuals and communities with environmental justice concerns, factoring in the ongoing and future foreseeable effects of climate change. • Work with Ioneer to include these measures as Applicant Committed Environmental Protection Measures and disclose these in the Final EIS. ***Job Creation and Workforce Training*** The Department of Energy announced its conditional commitment to lend up to $700 million to Ioneer Rhyolite Ridge LLC for the development of the Rhyolite Ridge Lithium-Boron Mine.5 DOE's announcement states that "Rhyolite Ridge is committed to hiring locally and offering training opportunities, including funding higher education scholarships for local high school students and residents in various technical and managerial fields." E.O. 14096 section 3(a)(v) directs federal agencies to assess their legal authorities and, as available and appropriate, take steps to provide opportunities for workforce training and to support the creation of jobs for individuals who are part of communities with environmental justice concerns. The Draft EIS does not discuss the job and workforce development opportunities that would or could be created for communities with environmental justice concerns resulting from the Proposed Action. ***Recommendations for the Final EIS:*** • Add a discussion of Ioneer's commitments and available BLM authority to create opportunities for workforce training and support job creation for people who are part of communities with environmental justice concerns, and whether BLM would provide such opportunities. • Consider disclosing and summarizing any workforce and community benefits agreements being prepared with regards to the Proposed Action. 1 *Executive Order 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All*. (April 21, 2023). **https://www.whitehouse.gov/briefing-room/presidential-actions/2023/04/21/executive-order-on-revitalizing-our-nations-commitment-to-environmental-justice-for-all/** 2 U.S. Environmental Protection Agency. (2024, May 10). *EJScreen: Environmental Justice Screening and Mapping Tool*. **https://ejscreen.epa.gov/mapper/** 3 U.S. Environmental Protection Agency. (2024, April 9). *Health Effects of Ozone Pollution*. **https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution** 4 U.S. Global Change Research Program (2023). *Fifth National Climate Assessment: Chapter 28 Southwest*. **https://nca2023.globalchange.gov/chapter/28/** **5** Department of Energy. (2023, January 13). *LPO Announces Conditional Commitment to Ioneer Rhyolite Ridge to Advance Domestic Production of Lithium and Boron, Boost U.S. Battery Supply Chain.* **https://www.energy.gov/lpo/articles/lpo-announces-conditional-commitment-ioneer-rhyolite-ridge-advance-domestic-production**	
112 and 182	112.4 and 182.4	**<u>Climate Change</u>** ***Presentation of Greenhouse Gas Emissions*** The Council on Environmental Quality's January 2023 interim guidance, *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*,6 states that "[a]gencies generally should quantify gross emissions increases or reductions (including both direct and indirect emissions) individually by greenhouse gas, as well as aggregated in terms of total CO2 equivalence." According to the Draft EIS, the project would emit carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O) (p. 3-3); however, emission estimates are only reported for CO2-equivalents and not for individual gases. The EPA is unable to confirm calculations of the climate change damages using social cost of greenhouse gases (SC-GHG) without this required information. In addition, greenhouse gas emissions are only presented from project operations and do not include indirect emissions from construction activities, transportation of quarried materials, and emissions from equipment during the six-year reclamation period (Air Quality and Climate Change SER p. 3-5). In the Final EIS, estimates of individual greenhouse gas emissions from all sources are needed to better help the public and decision-makers understand the reasonably foreseeable direct and indirect emissions of the project alternatives. There are several other climate change items that need clarification. It is unclear why mobile/tailpipe emissions from the transportation of quarried materials are considered indirect rather than direct emissions and whether they are calculated based on the total distance traveled (to Reno or Las Vegas) or within the project boundary. Section 3.2.2.1 of the Air Quality and Climate Change SER adds the sum of on-site/on-road vehicles (298 tons per year), on-site/non-road equipment (14,333 tpy), and off-site/on-road vehicles (5,447 tpy) to equal 20,078 tpy. However, total mobile/tailpipe emissions are stated as 20,431 tpy in Table 3-2 of that document. In addition, the EPA notes that the Trinity Consultants 2023 Air Quality Impact Analysis report used to estimate potential air quality and climate change impacts contains information that needs to be disclosed in the Draft EIS and its corresponding documents to fully represent potential impacts from the project. The Final EIS needs to include reasonably foreseeable downstream greenhouse	The Air Quality and Climate Change SER Section 3.2.2.1, and Section 4.1.1 of the EIS was modified to break out greenhouse gas emissions for each individual gas, including CO_2 equivalent for operations and transportation. Clarification on distance traveled for transportation has been added to the Section 3.2.2.1 of the Air Quality and Climate Change SER and Section 4.1.1 of the EIS. Mobile/direct tailpipe emissions have been clarified in the Section 3.2.2.1 of the Air Quality and Climate Change SER and Section 4.1.1 of the EIS. A discussion on the battery supply chain has been added based on the best available data that was identified for use in the Air Quality and Climate Change SER and Final EIS. Percentages characterizing the extent of contributions to climate change were removed and clarification was added.

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		gas emissions from the transport and delivery of the anticipated lithium and boron products, and the reasonably foreseeable decreases in greenhouse gas emissions from driving electric vehicles that would not occur absent this action.[7]
		
		Recommendations for the Final EIS:
		• Consistent with the CEQ's interim guidance, report greenhouse gas emissions for each individual gas (CO2, methane, and nitrous oxide) in addition to reporting CO2-equivalent emissions.
		• Provide reasonably foreseeable direct and indirect greenhouse gas emissions for all sources—broken down by individual greenhouse gas—including the emissions from transportation of quarried materials.
		  o Clarify why transportation of quarried materials are considered indirect effects and what distance was used to calculate emissions.
		  o Resolve discrepancies in mobile/tailpipe direct emissions totals.
		• Include the following information from the Air Quality Impact Analysis:
		  o Reasonably foreseeable downstream greenhouse gas emissions from battery production and vehicle usage for years 5-8 (years corresponding to lithium carbonate production) and years 9-17 (years corresponding to lithium hydroxide production), where practicable.
		  o Anticipated end products from using the mined lithium and boron.
		  o Any reasonably foreseeable decrease in greenhouse gas emissions from driving electric vehicles that would not occur absent this action.
		
		Characterization of Greenhouse Gases
		When evaluating the cumulative effects of greenhouse gas emissions from the project, the Draft EIS estimates that the Proposed Action would represent approximately 1% of the gross greenhouse gas emissions for the state of Nevada and result in an increase of 1.01% of the total state's emissions (p. 4-49). CEQ's interim guidance does not consider this type of comparison as an appropriate method for characterizing the extent of contributions to climate change. Representing the project as a percentage minimizes the project's impacts and does not identify how "diverse individual sources of emissions each make a relatively small addition to global atmospheric greenhouse gas concentrations that collectively have a large effect." Instead, CEQ's guidance recommends that agencies should "place emissions in relevant context, including how they relate to climate action commitments and goals."
		
		***Recommendation for the Final EIS*:** Remove percentages characterizing the extent of contributions to climate change and instead discuss how project emissions relate to climate action commitments and goals.
		
		Monetized Climate Damages
		<u>Missing Emissions</u>
		The Draft EIS uses the Interagency Working Group (IWG) on SC-GHG 2021 *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*[8] to monetize the climate damages from direct greenhouse gas emissions but does not monetize damages from indirect downstream emissions[9] or construction and reclamation emissions (Air Quality and Climate Change SER p. 3-5). As the Draft EIS does not include all direct and indirect emissions, the SC-GHG values included in the Draft EIS present an incomplete estimate of the climate damages from the project alternatives.
		
		***Recommendation for the Final EIS*:** Estimate the SC-GHG for all the reasonably foreseeable direct and indirect greenhouse gas emissions of the project.
		
		<u>Lifetime Climate Damages</u>
		The Draft EIS only estimated and presented the climate damages from the project for one year as opposed to the expected lifetime of the project (i.e., 17 years plus the six-year reclamation period). The annual value of $32.96 million presented in Section 3.2.2.2 was estimated by multiplying CO2, CH4 and N2O emissions by the respective SC-GHG values for 2020 at the 2.5% discount rate. To correctly estimate climate damages, CO2, CH4 and N2O emissions from 2024 to 2047 need to be multiplied by the respective SC-CO2, SC-CH4 and SC-N2O values for each year at each discount rate. Before these estimates are included in the analysis, the monetized values of climate damages over time must be discounted to the present. In order to promote better public understanding of the climate damages of the project, the Final EIS needs tables that report the monetized climate change damages for each greenhouse gas as well as sufficient descriptions of data and methods on computing the monetized climate damages to allow confirmation of the calculations of the SC-GHG.
		
		***Recommendations for the Final EIS*:**
		• Estimate the total SC-GHG for each type of greenhouse gas emissions over the expected lifetime of the project.
		• Revise the SC-GHG calculation by multiplying the CO2, CH4 and N2O emissions for each year between 2024 to 2047 by the corresponding SC-CO2, SC-CH4 and SC-N2O values.
		• Include tables that report the monetized climate change damages separately for each greenhouse gas and provide sufficient descriptions of data and methods on computing the monetized climate damages to allow them to be reproduced by a qualified individual.
		
		Application of EPA's Social Cost of Greenhouse Gas Estimates and 2023 Update
		In November 2023, the EPA published the *Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances*.[10] This report provides updated estimates of the SC-GHGs that reflect advancements in the scientific literature on climate change and its economic impacts and incorporate recommendations made by the National Academies of Science, Engineering, and Medicine (National Academies 2017). In this update, the methodology underlying each of the four components, or modules, of the SC-GHG estimation process – socioeconomics and emissions, climate, damages, and discounting – is developed by drawing on the latest research and expertise from the scientific disciplines relevant to that component. Regarding discounting, EPA's report presents updated estimates of the SC-GHG at multiple discount rates. Considering the multiple lines of evidence on the appropriate certainty-equivalent near-term rate, the modeling results presented in this report consider a range of near-term target rates of 1.5%, 2.0%, and 2.5%. This range of rates allows for a symmetric one point spread around 2.0%. The updated SC-GHG estimates have also undergone an expert peer review and a public comment process.
		
		The EPA has recently released a Microsoft Excel "Workbook for Applying SC-GHG Estimates" spreadsheet to better assist lead agencies with the utilization of these updated estimates, and it can be accessed at https://www.epa.gov/environmental-economics/scghg. This workbook presents a straightforward tool for applying the updated SC-GHG values to monetize project SC-GHG emissions for the Final EIS.
			Social cost of greenhouse gas was updated in Section 3.2.2.2 of the Air Quality and Climate Change SER and Section 4.1.1 of the EIS as requested using the information and data sources provided in this comment.
			
			In response to the measures to reduce greenhouse gas emissions, clarification has been added to the Section 3.2.2 of the Air Quality and Climate Change SER and Section 4.1.1 of the EIS regarding NDEP Air permit conditions. BLM has provided Ioneer with the suggested mitigation measures, but there has been no commitment to include these measures in their Plan of Operations at this time. If Ioneer decides to incorporate these measures, the applicable NEPA documents will be revised at that time.
			
			In response to the stormwater and contact water handling facilities comment, stormwater and contact water handling facilities are designed to comply with NDEP WPCP requirements.

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		If the BLM needs assistance with correcting predicted climate damage calculations and/or using EPA's SC-GHG workbook, please contact Sarah Samples, the EPA's NEPA project lead for this project. She can connect BLM staff with EPA's National Center for Environmental Economics. ***Recommendation for the Final EIS*:** Revise the analysis monetizing greenhouse gas emission changes using EPA's updated SC-GHG estimates to reflect the latest science on the impacts of climate change. This can be done using EPA's Workbook for Applying SC-GHG Estimates. ***Measures to Mitigate Greenhouse Gas Emissions*** The EPA understands that the project would utilize the sulfuric acid plant to generate enough power for all operations, thereby negating the need for additional carbon-based energy sources. We believe additional measures could further avoid, reduce, and minimize greenhouse gas emissions. For this project, practicable measures to reduce mobile sources are included below. The EPA also recommends adopting the low emissions equipment specifications, as outlined below, unless: 1) a piece of specialized equipment is not available for purchase or lease within the United States; or 2) the relevant project contractor has been awarded funds to retrofit existing equipment, or purchase/lease new equipment, but the funds are not yet available. ***Recommendations*:** Work with Ioneer to reach agreement on adding the following measures to the Applicant Committed Environmental Protection Measures to avoid, reduce, and minimize greenhouse gas emissions, and disclose those commitments in the Final EIS: <u>Mobile and Stationary Source Controls</u>: • Minimize unnecessary idling of heavy equipment.11 (At the same time, this practice will result in fuel savings.) • Require advanced pollution controls and clean fuels for new equipment and older equipment be retrofitted with such controls. Use particle traps and other appropriate controls to reduce emissions of diesel particulate matter and other air pollutants. (Traps control approximately 80 percent of DPM, and specialized catalytic converters (oxidation catalysts) control approximately 20 percent of DPM, 40 percent of carbon monoxide emissions, and 50 percent of hydrocarbon emissions.) • Lease or buy newer, cleaner equipment using the best available emissions control technologies that meets the most stringent of applicable federal or state standards, including the following: o For on-highway vehicles, meet or exceed the U.S. EPA exhaust emissions standards for model year 2010 and newer heavy-duty on-highway compression-ignition engines (e.g., drayage trucks, long haul trucks, refuse haulers, shuttle buses, etc.).12 o The Draft EIS indicates that electric vehicle haul trucks are not currently available, and therefore use of EV trucks has been eliminated from analysis. It is possible that EV trucks will become available during the 17-year life of project construction and operations. We recommend the use of EV trucks be included as a mitigation measure that would be implemented once these trucks are available for commercial use. • Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, where applicable, and to perform at verified standards applicable to retrofit technologies. Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations.[13] • Provide supporting information on why conveyors are not technically feasible and describe why they are not "environmentally reasonable" (Appendix C, p. C-4). <u>Administrative Controls:</u> • Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications. • Prepare an inventory of all equipment prior to construction and identify the suitability of add-on emission controls for each piece of equipment before groundbreaking.[14] <u>Unavoidable Emissions</u> • Since environmental stewardship is stated as core to Ioneer's mission,15 consider including project elements to offset carbon (carbon offsets) or the voluntary purchase of carbon offset credits. ***Stormwater and Contact Water Handling Facilities*** The Draft EIS discusses anticipated climate change trends in the local environment and recognizes that climate risk can be "addressed by integrating climate adaptation into existing organizational investments, policies, and practices"; however, there is no discussion of the impact that future climate change may have on the project's infrastructure. The EPA has previously commented about inconsistencies in operational facility stormwater and contact water handling capacities that range from 25-year/24-hour to 100-year/24-hour events, and we have recommended upsizing operational facilities to withstand potential 500-year/24-hour events and accommodate more frequent and intense stormwater runoff. While the EPA understands that current stormwater handling capacities comply with Nevada Administrative Code 445A.433, we remain concerned that more frequent and intense downpours could overwhelm the capacity of both operational stormwater and contact water handling facilities should a 500-year/24-hour event occur during the life of mine and adversely affect water quality. ***Recommendations*:** • Discuss the impact of ongoing and projected climate change on the project's infrastructure. • Work with Ioneer to include the following measures in the Applicant Committed Environmental Protection Measures and disclose in the Final EIS: o Upsize all stormwater and contact water handling facilities to withstand a 500-year/24-hour event, especially the Acid Containment and Diesel Tank areas. o If upsizing to the 500-year/24-hour event is not feasible, upsize all facilities to the 100-year/24-hour event. 6 Council on Environmental Quality. (2023, January 9). *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*. **https://www.energy.gov/sites/default/files/2023-01/2023-01-CEQ%20interim%20guidance%20on%20GHG%20emissions%20and%20climate%20change.pdf** 7 The Department of Energy's Loan Programs Office conditional commitment to Ioneer Rhyolite Ridge estimates that the project "could reduce annual gasoline consumption by nearly 145 million gallons and prevent the release of 1.29 million tons of carbon dioxide each year." See **https://www.energy.gov/lpo/articles/lpo-announces-conditional-commitment-ioneer-rhyolite-ridge-advance-domestic-production**. 8 Interagency Working Group on Social Cost of Greenhouse Gases. (2021, February 19). *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*. **https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf**	

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		9 The EPA recognizes that indirect downstream emissions were disclosed in the Air Quality and Impacts Analysis; however, this information was not included in the Draft EIS and the analysis was not publicly available during the public review period. 10 U.S. Environmental Protection Agency. (2023, November) *Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances*. **https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf** 11 California Air Resources Board. (2024). *Heavy-Duty Diesel Vehicle Idling Information.* **https://ww2.arb.ca.gov/capp-resource-center/heavy-duty-diesel-vehicle-idling-information** 12 U.S. Environmental Protection Agency. (2016, March). *Heavy-Duty Highway Compression-Ignition Engines and Urban Buses: Exhaust Emission Standards.* **https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100O9ZZ.pdf** 13 U.S. Environmental Protection Agency. (2020, November). *EPA Tampering Policy.* **https://www.epa.gov/sites/default/files/2020-12/documents/epatamperingpolicy-enforcementpolicyonvehicleandenginetampering.pdf** 14 Suitability of control devices is based on whether there is reduced normal availability of the construction equipment due to increased downtime and/or power output, whether there may be significant damage caused to the construction equipment engine, or whether there may be a significant risk to nearby workers or the public. 15 Ioneer, LLC. (2023). *Rhyolite Ridge Sustainability*. **https://rhyolite-ridge.ioneer.com/sustainability/#tiehms**	
112 and 182	112.5 and 182.5	**Cultural Resources** The Draft EIS states a Memorandum of Agreement between the BLM, Nevada State Historic Preservation Office, and the Advisory Council on Historic Preservation is being prepared and would be executed to resolve adverse effects to historic properties (p. 2-13) and provides several measures that may be adopted to avoid, minimize, or mitigate impacts. We appreciate that the BLM would consult with interested Tribes for the cultural resources that do not meet the criteria of National Register of Historic Places eligibility but are significant to Tribes (e.g., sacred sites). In addition, if the resources fall under the Archaeological Resources Protection Act, BLM must follow ARPA to ensure these sites are not destroyed. Due to the high number of sites that may be affected, including the 100 sites that would be destroyed, the EPA recommends additional measures as the MOA is under development (p. 4-4). The Draft EIS also states that 12 NRHP-eligible sites would "potentially be physically impacted by access road improvements, including widening the road to 100 feet" (p. 4-23). We appreciate that "road design would be modified to avoid the 12 NRHP-eligible cultural resources along the road if possible" since the road design is conceptual at this time. We recommend committing to this measure in the Applicant Committed Environmental Protection Measures and the Record of Decision. ***Recommendations*:** • In development of the MOA: o Work with interested Tribes to develop a Tribal-approved list of formally trained cultural specialists. o Require hiring cultural specialists to be on-site during new surface disturbance to provide information and/or recommendations to the BLM. Consider requiring Tribal-approved cultural specialists on-site during reclamation activities and audits of water quality testing. o If a selected cultural resource specialist is not available within five days' notice, contact Tribes to obtain an observer while using a different cultural specialist not from the Tribal-approved list. o Consider treating non-evaluated pre-historic cultural resources as if they are NRHP-eligible or conduct necessary evaluation to make accurate determinations (as identified in the Cultural Resources SER p. 3.5, 3.6). o Appropriately include impacted Tribes affiliated with the Western Shoshone and Northern Paiute peoples. • In the Applicant Committed Environmental Protection Measures and Record of Decision, commit to designing the road to avoid any Tribal cultural resources among the 12 NRHP-eligible cultural resources along the road.	Comments noted. BLM is working with consulting parties on drafting the Memorandum of Agreement (MOA). ACEPMs for cultural resources are presented in Section 2.1.13.3. Mitigation measures for adverse impacts to specific sites would be detailed in the Historic Properties Treatment Plan (HPTP). This is stated in Section 4.2.1 of the EIS. Unevaluated cultural resources are addressed the same way as eligible cultural resources for the assessment of Project impacts as well as historic properties management and treatment until such time that their eligibility is determined. Unevaluated sites were included in the analysis presented in Section 4.2 of the EIS; however, this specific statement was added to clarify. Tribal consultation with tribes identified as having an interest in the area will be included as part of the MOA and HPTP. Not all of the 12 NRHP-eligible sites along the road can be avoided as some sites span the roadway.
112 and 182	112.6 and 182.6	**Tribal Consultation** ***Consulting Additional Tribes*** The EPA appreciates the Tribal consultation summary listed in the Draft EIS (Table, 5-1 p. 5-2 to 5-4). Due to regional Tribal concerns about lithium mining that have been expressed to the EPA at Regional Tribal Operations Committee and other EPA events,16 we encourage offering consultation with additional Tribes in the vicinity of the project area, including the Walker River Paiute Tribe, Bridgeport Indian Colony, Fort Independence Indian Community of Paiute Indians, and the Lone Pine Paiute Shoshone Tribe. In addition, it appears that the BLM intended to visit the South Fork of the Te-Moak Tribe of Western Shoshone Indians, yet this Tribe was not included in any other consultation within the summary (p. 5-3). As such, we encourage the BLM to formally consult with this Tribe as well. ***Recommendation for the Final EIS:*** Consider offering formal consultation to the Walker River Paiute Tribe, Bridgeport Indian Colony, Fort Independence Indian Community of Paiute Indians, Lone Pine Paiute Shoshone Tribe, and South Fork of the Te-Moak Tribe of Western Shoshone Indians. ***Disclosing and Addressing Tribal Concerns*** The Draft EIS states that Duckwater Shoshone Tribe, Timbisha Shoshone Tribe, and the Big Pine Paiute Tribe of the Owens Valley as well as the Western Shoshone Defense Project expressed multiple concerns about the project. While we appreciate that the resources of concern were listed, more information is needed to understand how the BLM responded to these Tribal concerns in the development of the EIS, how the project may have changed based on these discussions, and whether any mitigation was identified for the concerns raised by the Tribes. ***Recommendations for the Final EIS*:** • Provide summaries of the non-confidential concerns expressed by the Duckwater Shoshone Tribe, Timbisha Shoshone Tribe, Big Pine Paiute Tribe of the Owens Valley, and the Western Shoshone Defense Project and how each of those concerns was addressed. • Identify how consultation influenced the decision-making process including the selected alternative and mitigation to avoid, minimize, or compensate for impacts to Tribes. • Identify if any confidential concerns were expressed by the Tribes and how they were addressed. ***Indigenous Knowledge*** Table 5-1 indicates that the Western Shoshone Defense Project provided information about Indigenous Knowledge (Table 5-1, p. 5-3); however, this information was not included in the Draft EIS. While the EPA understands that it is important to Tribes that sensitive information be withheld, a summary of Indigenous Knowledge, if used in the decision-making process, remains important to disclose if it is not protected under the Freedom of Information Act exemptions or other federal statutes. In November 2021 during the early engagement period of this project, the CEQ and the Office of Science and Technology Policy (OSTP) issued a memo to federal agencies stating that "ITEK [Indigenous Knowledge] can and should inform Federal decision making along with scientific inquiry."17 CEQ and OSTP issued follow-up Indigenous Knowledge guidance18 that provides NEPA-specific information and discusses how to include Indigenous Knowledge into	As stated in the EIS, the BLM contacted the following tribes: Big Pine Paiute Tribe of the Owens Valley Bishop Paiute Tribe Utu Utu Gwaitu Paiute Tribe of the Benton Paiute Reservation Te-Moak Tribe of Western Shoshone Indians of Nevada Ely Shoshone Tribe of Nevada Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada Yomba Shoshone Tribe of the Yomba Reservation, Nevada Timbisha Shoshone Tribe. These are the tribes that BLM identified as having interests in the area. The Te-Moak Tribe of Western Shoshone Indians did not respond to BLM requests for consultation/ communication. Tribal concerns were disclosed in Section 4.8.1 of the EIS. As noted in the EIS, project re-design avoids two areas of tribal concern. Cave Springs will also be avoided. The Western Shoshone Defense Project is not a sovereign nation but rather a non-governmental organization. Therefore consultation is not appropriate. The BLM solicits and obtains indigenous knowledge via its government-to-government consultation, staff-to-staff project-level discussions, ethnographic studies, and tribal comments on its NEPA documents. As noted in the EIS, consultation with tribes is on-going and would continue through the life of the Project.

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		federal decision-making. Without disclosure of Indigenous Knowledge in the Draft EIS, it is unclear if or how the BLM incorporated this information in the Rhyolite Ridge decision-making process. As such, the EPA continues to recommend the identification, inclusion, and integration of Indigenous Knowledge into the EIS. ***Recommendations for the Final EIS*:** • Disclose the Indigenous Knowledge provided by the Western Shoshone Defense Project, and other Tribes if applicable. • Describe how Indigenous Knowledge was collected and used in the NEPA decision-making process. If Indigenous Knowledge was not used, describe why it was not. • Invite and include Tribes to incorporate any Indigenous Knowledge into the Tiehm's Buckwheat Protection Plan. **Communications Planning** The Draft EIS does not disclose methods of communication to alert surrounding communities about project reporting/monitoring and emergency response. Community members may be interested in seeing reports such as quarterly air and groundwater monitoring. In addition, being able to quickly reach external stakeholders at the appropriate level can help reduce concerns related to mine operations in the event of an emergency. We also encourage disclosing the Ioneer community relations manager's contact information for community members that may have questions or concerns during the life of mine. ***Recommendations*:** Update the Emergency Response and Spill Contingency Plan (Appendix E of the Plan of Operations) to ensure surrounding communities would be notified of impacts in the event of an emergency or spill, including: • Identifying where project reporting/monitoring would be available to allow community members access. • Disclosing the Ioneer community relations manager's contact information in communication plans and announcements. 16 The RTOC is a working committee of EPA and Tribal personnel that meets quarterly. For more information, please see **https://www.epa.gov/tribal-pacific-sw/regional-tribal-operations-committee-rtoc**. 17 Council on Environmental Quality and the Office of Science and Technology Policy. (2021, November 15). *Indigenous Traditional Ecological Knowledge and Federal Decision Making*. **https://www.whitehouse.gov/wp-content/uploads/2021/11/111521-OSTP-CEQ-ITEK-Memo.pdf** 18 Council on Environmental Quality and the Office of Science and Technology Policy. (2022, November 30). *Guidance for Federal Departments and Agencies on Indigenous Knowledge*. **https://www.whitehouse.gov/wp-content/uploads/2022/12/OSTP-CEQ-IK-Guidance.pdf**	The Emergency Response and Spill Contingency Plan will be updated throughout the life of the Project. Ioneer and their contractors would be required to abide by all federal, state, and local laws, including compliance with the Emergency Planning and Community Right-to-Know Act. The BLM has provided these recommendations to Ioneer for consideration. The recommendation to disclose the community relations manager's contact information has been provided to Ioneer for consideration. Project reporting and monitoring would be provided to the appropriate agencies, as applicable. The community relations manager's contact information and where project reporting/monitoring would be available would not impact the outcome of the NEPA analysis; therefore, are not included in the EIS.
112 and 182	112.7 and 182.7	**Water Resources** ***Pit Lake Water Quality*** The pit lake is predicted to exceed Nevada Division of Environmental Protection Profile III reference values for arsenic, boron, fluoride, and molybdenum (p. 4-5). The ecological risk assessment (ERA) concluded that there could be some exceedances of the No Adverse Effect Levels, though actual risk could be less. The ERA was interpreted to indicate a low probability of risk to wildlife. The Draft EIS does not appear to consider potential future human interaction with the pit lake, even though it would be a permanent fixture on the landscape. Signs and a berm would be placed around the lake, but it is not clear whether they would be maintained in perpetuity. It is also not clear whether future management of the pit lake would be different if water quality is other than predicted, for example due to climate change or the uncertainties associated with the pit lake model and geochemical analysis. ***Recommendations*:** To better characterize the environmental consequences and mitigate potential pit lake impacts: • Describe the potential for future human interactions with the pit lake (e.g., recreational users, Tribal users) and potential impacts to human users in the Final EIS. • Describe and commit to adaptive management measures should the pit lake water quality be worse than predicted. Work with Ioneer to include these measures in the Applicant Committed Environmental Protection Measures and disclose these commitments in the Final EIS. ***Groundwater Quality*** The Draft EIS states that the mobile concentrations of metals and metalloid oxyanions would be short-lived, except for arsenic (p. 4-34). However, it is not clear what is meant by short-lived or which compounds are of concern. More information is needed in the Final EIS to better describe the potential contaminants of concern and the extent to which they would impact groundwater quality to support the conclusion that impacts would be "minor, short-term, and localized." ***Recommendations for the Final EIS*:** Provide a more robust discussion of groundwater impacts by including the following information: • A table that lists contaminants of concern in leachate from overburden and spent ore storage facilities compared to existing groundwater concentrations and groundwater standards. • A figure or table that provides the estimated distance from the mine components (overburden and spent ore facilities) over which groundwater quality would be changed due to uncollected seepage. The Draft EIS states that the underdrain and contact water collection systems would minimize the volume of leachate contacting the environment (p. 4-34), but the EIS does not describe the extent to which leachate would be minimized/collected. Further information regarding the sufficiency of the collection system is needed to support the conclusions. ***Recommendation for the Final EIS*:** Describe predicted efficiencies of the leachate collection systems (e.g., what percent of leachate would be collected vs. lost to groundwater) and provide references for the efficiency determinations based on use of these same systems for other projects or other supporting information. ***Water Quantity*** As noted in the environmental justice section above, higher temperatures caused by climate change have intensified drought conditions in the Southwest region. Drought-induced reductions to available surface water and groundwater may strain water quantity planning for this project. The Draft EIS states that "[t]he analysis on water rights assumes that existing consumptive uses in Fish Lake Valley would continue at their current rate which are near the Fish Lake Valley basin's perennial yield" (p. 4-5). The EPA is concerned that climate change impacts to available water supply over the 23-year life of mine were not adequately considered. Considering that Nevada is the driest state in the country19 and this project "would represent 13 percent of the basin's perennial yield" (p. 4-5), more details are needed to understand how this project's anticipated water usage would impact water availability for surrounding communities amidst declining perennial basin yields. In addition, we understand that the project would use water from the quarry dewatering to reduce the need for pumped water from Fish Lake Valley. We encourage the BLM to ensure that any additional mitigation for reducing the mine's water usage is addressed in the Final EIS.	Pit Lake Water Quality Closure of the quarry lake is a component of the Project's reclamation closure plan. Human interactions with the quarry lake are not part of the closure plan as the quarry perimeter would be bermed as part of closure. Mined materials would be monitored and tested during operations and the predicted quarry lake chemistry would be updated at least every five years based on these monitoring results. Quarry lake monitoring would be required under closure and post-closure conditions for a period of at least 25 years. If the quarry lake water quality differs from predictions, management would involve measures to inhibit wildlife access to the lake. These details have been added to the revised Water Resources SER for use or reference in the Final EIS. Groundwater Quality Constituents of concern and information on the predicted distance of effects from mine components have been incorporated into the revised Water Resources SER for use or reference in the Final EIS. Water Quantity Climate change is not explicitly simulated in the groundwater flow modeling for the action alternatives. However, model sensitivities to parameters affected by climate change such as evaporation and groundwater recharge by meteoric water are examined in the groundwater flow model and effects analysis. The groundwater flow model is subject to regular updates required by NDEP-BMRR as part of its WPCP, and other regulatory agencies may require updates as well. These updates are based on monitoring data for groundwater levels, surface water flows, and meteorological data that would reflect any observed effects of climate change on conditions in the analysis area. Climate change has the potential to modify the amount and timing of groundwater recharge which contributes to the perennial yield of the basin. In general, annual precipitation in the region could be reduced over time, but

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		The EPA notes cumulative impact concerns to water quantity availability from reasonably foreseeable projects such as the Esmeralda Seven Solar Project and the Greenlink West Project (both also seeking BLM permits from the Battle Mountain District Office). Additional specificity about the water usage needs for and potential impacts from these proposed BLM-permitted projects would help clarify potential cumulative impacts to available water quantity. ***Recommendations for the Final EIS*:** • Describe how climate change may affect total water availability from the basin during the 23-year life of mine and how the mine's consumption of 13% of the basin's current perennial yield could impact other water rights. • Ensure that all practicable mitigation options for reducing the mine's water usage have been disclosed and incorporated into Applicant Committed Environmental Protection Measures or plan approval conditions, as appropriate. • Disclose cumulative impacts to water quantity from reasonably foreseeable projects such as the Esmeralda Seven Solar Project and the Greenlink West Project. ***Water Pollution Control Permit*** The Water Pollution Control Permit issued in August 2021 and referred to in the Draft EIS was specifically for the Proposed Action. According to NDEP, the WPCP will need to be updated for the preferred North and South OSF Alternative, but this is not explicitly stated in the Draft EIS (N. Zittel, personal communication, May 13, 2024). ***Recommendation for the Final EIS*:** If the North and South OSF Alternative is selected, disclose that NDEP would need to revise the WPCP permit, as necessary. ***Water Management – Water Balance*** The Draft EIS states that an operational site-wide water balance has been developed to achieve the applicant's goals of recycling water and achieving zero discharge (p.2-8). There is a general description of how water would be managed for each of the mine components, but information is not supplied to support the zero-discharge statement. In our experience, mining EISs typically contain a figure that shows water inputs and outputs from each of the project components so that readers can easily visualize the overall operational water flows and balance. ***Recommendation for the Final EIS*:** Include a figure that shows all the mine components (quarry, overburden piles, spent ore facility, contact water ponds, processing facility, etc.) and the water flows into and out of each, including water lost to groundwater and evaporation. For example, the Spent Ore Storage Facility components would show water entrained in the spent ore, runoff and seepage collection and recycling back to the process facility, seepage lost to groundwater, evaporation, etc. ***Classification of Stormwater and Contact Water*** Section 2.1.10.2 refers to water entering the quarry as stormwater. Water that contacts mine materials is not considered stormwater but instead is designated as mine drainage under Clean Water Act regulations (40 CFR 440.132(h)). To fully disclose how contact water would be managed, this clarification is needed in the Final EIS as well as a discussion of contact water management. We recommend adding a similar level of detail as provided in the stormwater section. ***Recommendation for the Final EIS*:** • Add a new section that describes how contact water is proposed to be managed, including water from the quarry, spent ore, and wastewater from processing; and • Move the discussion of water that encounters the quarry and pit dewatering water out of the stormwater section and into this new section. **<u>Long-Term Funding Mechanism</u>** The Plan of Operations for the proposed mine states that "the BLM may determine that a LTFM [long-term funding mechanism] is required to address post-reclamation/closure obligations (including long-term monitoring and mitigation) associated with specific components of the Project" (p. 75). The Draft EIS states that monitoring and reporting under mitigation measure WR-01 would continue for seeps and springs until the BLM determines there are no longer water drawdown impacts (p. 4-78). The Monitoring Plan also indicates that surface water monitoring (water quality and elevation) of the quarry lake would continue as required by NDEP until it has reached approximately 90 to 95 percent of its anticipated filling depth (Plan of Operations Appendix F, p. 18). The lake is modeled to be full in 60 years (p. 2-10), which implies monitoring would be ongoing for at least 50 years for pit lake level and water quality. Adequate and viable funding for long-term post-closure management can be a critical factor in whether a project is environmentally acceptable – especially in considering long-term post closure operations, maintenance, and monitoring. Although the BLM would require the applicant to secure a ***Recommendation for the Final EIS*:** Include a more detailed assessment of post-closure protective measures, specifically considering surface water mitigation for at least 50 years, and the identification of the long-term funding mechanism(s) to assist with the post-record of decision financial determination to be made by the BLM. **<u>Exporting Lithium and Boron</u>** The Draft EIS does not disclose the eventual destination of lithium and boron; however, the Trinity Consultants 2023 Air Quality Impact Analysis20 indicates that 85% of lithium would be exported to Asia and Germany and 94% of boron would be exported to Asia (AQIA p. 8-4). We note that, the DOE has offered a conditional commitment to lend up to $700 million to Ioneer for the project and expects the project to increase the availability of critical minerals in the United States and reduce U.S. dependency on foreign supply sources. Among other things, DOE points to near-term contracts and agreements to illustrate that expectation.21 The Draft EIS does not describe how the project would primarily increase the domestic supply of lithium, a critical mineral, and assist the US with its commitments to electric vehicle and renewable energy production. ***Recommendations for the Final EIS*:** • Disclose the reasonably foreseeable uses of lithium and boron that would be produced from the project. • Confirm if it is reasonably foreseeable that the exported products would ultimately re-enter the U.S. electric vehicle and renewable energy supply chain. [19]U.S. Environmental Protection Agency. (2016, May). *Saving Water in Nevada*. **https://19january2017snapshot.epa.gov/www3/watersense/docs/nevada_state_fact_sheet.pdf** [20]While this report is cited in the Draft EIS, it is not included on the project's E-Planning website.	surface water runoff and groundwater recharge are expected to occur earlier in the year due to rising temperatures. There is uncertainty regarding how these changes would affect utilization of water rights. However, the Proposed Action utilizes existing water rights rather than new water rights. Utilization of the existing water rights would have the same effect on other water rights as the No Action Alternative regardless of climate change effects. Utilization of new water rights would have an increased potential to affect the availability of groundwater for other water rights if climate change were to reduce perennial yield. The EIS evaluates the cumulative effects of reasonably foreseeable future actions on water quantity. Water Pollution Control Permit The relationship between BLM and NDEP-BMRR regulatory authorities is described in the Water Resources SER Section 2.2. This section indicates that any BLM decision would also be subject to approval by NDEP-BMRR. Water Management-Water Balance The suggested figure will be incorporated into the revised Water Resources SER for use or reference by the Final EIS. Stormwater and Contact Water The description of contact water management will be incorporated into the revised Water Resources SER for use or reference by the Final EIS. Long-Term Funding Mechanism See also the response above regarding quarry lake water quality. Information regarding post-closure effects and long-term funding mechanisms will be added to the Water Resources SER for use or reference by the Final EIS. Exporting Lithium and Boron Export of lithium and boron for use in manufacturing products in the supply chain would not have an effect on water quantity and water quality in the analysis area. Discussion of the battery supply chain has been added to Section 4.20.1 and the Air Quality and Climate Change SER..

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		[21]Department of Energy. (2023, January 13). *LPO Announces Conditional Commitment to Ioneer Rhyolite Ridge to Advance Domestic Production of Lithium and Boron, Boost U.S. Battery Supply Chain*. **https://www.energy.gov/lpo/articles/lpo-announces-conditional-commitment-ioneer-rhyolite-ridge-advance-domestic-production**	
112 and 182	112.8 and 182.8	**Air Quality** ***Class II Air Permit*** The Draft EIS states that the project currently has a Class II minor source air permit as defined by Nevada Administrative Code 445B.037 and requires testing and recordkeeping as determined by the Nevada Division of Environmental Protection (NDEP) (p. 4-1). Given that modelled emissions for non-fugitive nitrogen oxides and sulfur dioxide (SO2) are near the 100 tons per year limit for a Class II permit and that nitrogen dioxide and SO2 emissions are near the National Ambient Air Quality Standards limits (Table 4-2, p. 4-2), summaries regarding the responsibility and frequency for testing and recordkeeping are needed for public disclosure in the Final EIS. Information about short-term excess emissions events is also needed for the public to understand how the mine proponent would be required to respond if the Continuous Emissions Monitoring System indicates exceedances of SO2.22 In addition, the EPA understands that the North and South OSF Alternative would include a "higher output steam turbine generator," resulting in five additional megawatts of power than the Proposed Action for a total of 40 MW (p. 2-18). Without further information provided on this new generator, it appears that the Class II permit would need to be revised if this alternative is selected (A. Taylor, personal communication, May 6, 2024). ***Recommendations for the Final EIS*:** • Summarize requirements for testing, recordkeeping, and excess emissions mitigation, including the party responsible for collecting and reporting to NDEP. • If the North and South OSF Alternative is selected, disclose that NDEP would need to revise the Class II permit, as necessary. [22]The EPA recognizes that nitrogen oxide emissions are not included in the Continuous Emission Monitoring System under the NDEP permit.	Additional information was added to the Air Quality and Climate Change SER for use or reference by the Final EIS.
112 and 182	112.9 and 182.9	***Valley Fever*** The Centers for Disease Control and Prevention indicates that the project area falls within the zone that is endemic for *Coccidioides immitis*, a fungus causing Valley fever (*Coccidioidomycosis*) in humans.23 According to the CDC, rising temperatures have allowed the fungus to spread to new areas that previously were too cold and wet for it to survive. As a result, fugitive dust could disperse *Coccidioides immitis* spores, if present, to on-site workers. To reduce the human health risk of contracting Valley fever, it will be important to identify how onsite workers would be educated about the risks of contracting Valley fever, safety measures, and symptoms. ***Recommendations for the Final EIS*:** • Include a description of Valley fever, its potential presence within the project area, and risks to on-site workers. • Work with Ioneer to ensure that Applicant Committed Environmental Protection Measures identify measures to prevent or reduce the risk of exposure to fugitive dust, including training for workers and supervisors on the potential presence of Valley fever spores, methods to minimize exposure, and how to recognize symptoms and disclose these commitments. ***Fugitive Dust from the Crusher*** We understand that "water sprays or other dust control measures" would be used at the crusher to minimize fugitive emissions (p. 2-13). It is unclear if this would include covering the crusher, which is a standard mining practice. ***Recommendations*:** • Work with Ioneer to reach an agreement to cover the crusher to minimize fugitive emissions. • If the crusher would be covered, disclose this information in the Final EIS and update the Plan of Operations, the Applicant Committed Environmental Protection Measures, and the Record of Decision to include this commitment. [23]Centers for Disease Control and Prevention. (2023, July). *Valley Fever (Coccidioidomycosis) Awareness*. **https://www.cdc.gov/fungal/features/valley-fever.html**	The BLM has sent the information about valley fever to Ioneer for management considerations. Information about valley fever has been added to Section 3.11 and Section 4.11.1 of the Final EIS. Ioneer's air permit Class II air permit AP1099-4256 has been issued with all areas of crushing described as Fully Enclosed or Fully Enclosed/Saturated.
112 and 182	112.10 and 182.10	**BIOLOGICAL RESOURCES** ***Tiehm's Buckwheat*** The EPA understands that the North and South Overburden Storage Facility Alternative, which is the BLM's preferred alternative, was designed to avoid direct impacts to Tiehm's buckwheat subpopulations and minimize disturbance within designated critical habitat (p. 4-23). The EPA strongly supports the selection of the North and South OSF alternative over the Proposed Action since it would disturb 197 acres (22%) of critical habitat compared to the Proposed Action which would impact 354 acres (39%) of critical habitat (p. 4-21, 4-23). Given that the Tiehm's buckwheat population already experienced greater than 60% damage or loss of individual plants in 2020,[24] cumulative loss, including project impacts to Tiehm's buckwheat, would be exceedingly large. Adherence to the U.S. Fish and Wildlife Services' Biological Opinion requirements for avoidance, minimization, and mitigation will be critical to maintain the existing populations. ***Recommendations*:** • Append the USFWS's Biological Opinion to the Final EIS for public disclosure and demonstrate that the preferred alternative is consistent with the Biological Opinion. • Include all USFWS recommendations from the Biological Opinion into the Tiehm's Buckwheat Protection Plan. [24] Endangered and Threatened Wildlife and Plants; Endangered Species Status and Designation of Critical Habitat for Tiehm's Buckwheat, 87 F.R. 77368 (proposed December 16, 2022) (codified January 17, 2023, at 50 CFR 17.96(a)). **https://www.federalregister.gov/documents/2022/12/16/2022-27225/endangered-and-threatened-wildlife-and- plants-endangered-species-status-and-designation-of-critical**	BLM will choose an appropriate mechanism to ensure Biological Opinion requirements and/or applicable recommendations are included in the approval of the selected alternative.
112 and 182	112.11 and 182.11	***Migratory Birds*** To address the protection of migratory birds, the Draft EIS includes an Applicant Committed Environmental Protection Measure to conduct surveys when surface disturbance must occur during the avian breeding season (p. 2-16). The Draft EIS does not disclose whether the applicant would be required to avoid an area if active nests, young birds, or other evidence of nesting is observed (i.e.,	This ACEPM is a summary of the ACEPMs included in the Bird and Bat Conservation Strategy which includes timeframes and coordination with BLM on avoidance areas. The migratory birds effects analysis (Section 4.18) considers the implementation of the ACEPMs as written in the BBCS. The EIS

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		mating pairs, territorial defense, carrying nesting material, transporting of food, etc.) to prevent destruction or disturbance of nests until the birds are no longer present (p. 2-16). In addition, the Draft EIS does not provide a timeframe for how long a survey would be valid. Updates are needed to the Applicant Committed Environmental Protection Measures to address this information. ***Recommendations*:** Work with Ioneer to include the following measures in the Applicant Committed Environmental Protection Measures and disclose in the Final EIS: • Commit to area avoidance if active nests are located or other evidence of nesting is observed. Consider clearance surveys valid for 14 days and commit to re-surveying if surface disturbance would occur beyond that period. • Submit survey results to the BLM before surface disturbance occurs and to obtain BLM concurrence.	has been revised to include the details on when surveys would occur and nest protection buffers.
112 and 182	112.12 and 182.12	**INCORPORATION BY REFERENCE** The Draft EIS incorporates analyses and conclusions from many different project planning documents. We support streamlining efforts when referenced documents are reasonably available for review during the public comment period and the relevant content is briefly described (40 CFR Part 1501.12). However, we note that the Draft EIS lacks brief descriptions of the referenced documents and did not append or include referenced documents on the BLM E-Planning project website. For example, the Air Quality Impact Analysis, including its greenhouse gas and global climate change analysis, Bird and Bat Conservation Strategy, Geochemical Characterization Report, and Rhyolite Ridge Baseline Hydrogeology Report were not made available to the public. While the EPA had access to these documents as a cooperating agency, we are concerned the public does not have the same access to ensure they fully understand the project and can properly engage with the NEPA process. Ideally, all references would include specific page numbers to assist the reader to locate the relevant information. ***Recommendations for the Final EIS*:** • Make referenced documents reasonably available for review by posting on a public website or providing working hyperlinks. Briefly summarize relevant information and provide page numbers to assist in locating referenced information. • Publish the Air Quality Impact Analysis, Bird and Bat Conservation Strategy, Geochemical Characterization Report, Rhyolite Ridge Baseline Hydrogeology Report, and other appropriate documents on the BLM E-Planning project website and clearly describe how these documents relate to or support the analyses, methodologies, or conclusions of the EIS. • Summarize the full Greenhouse Gas and Global Climate Change Analysis section from the Air Quality Impacts Analysis, including reasonably foreseeable direct and indirect downstream greenhouse gas impacts.	The National NEPA Register, also referred to as ePlanning, allows online review and comment of BLM planning and implementation projects. Not all documents referenced in the EIS can be published on the BLM's National NEPA Register website due to the documents not being 508-compliant, being housed by the publisher(s) behind a paywall, or otherwise being protected by copyright laws. All documents referenced can be made available for inspection at the Tonopah Field Office or by request. Air quality and climate change is discussed in sections 3.1, 4.1, and 4.20.1 of the EIS. Additional supporting information is described further in the Air Quality and Climate Change SER.
Allison Henderson – June 3, 2024			
113	113.1	Dear Mr. Distel and Mr. Martin: The proposed Rhyolite Ridge Mine would push the endangered Tiehm's buckwheat to extinction, in violation of the Endangered Species Act and BLM's mandate under the Federal Land Policy and Management Act to prevent unnecessary or undue degradation. As you are aware, this wildflower exists on only a small amount of BLM managed lands in Nevada and nowhere else in the world. Yet the proposed mine would directly destroy 22% of the wildflower's 910 acres of designated critical habitat while allowing the rest of the habitat to be severely degraded and lost due to the proximity of the mining operations, including the massive open pit mine walls comings within a mere 44 feet of the imperiled wildflowers. The impacts from dust and impacts of dust management are unacceptable. The proposed approach would result in a massive increase in water in a highly arid area, which would cause a domino effect, changing the arid nature of the area, increasing introduction of invasive and noxious weeds, and lead to rampant herbicide application, creating yet another suite of problems like dust from the herbicide. The amount of fluids that would be applied also jeopardizes stability of the pit wall and thus the assumptions that the agency has made as to the percentage of direct impacts to the wildflower. There would be direct, indirect, and cumulative impacts on the species, the wildflower's 100 (or more) pollinators, as well as surrounding spring resources that have not been given proper and full consideration. It is particularly concerning that areas where the mine proponent has previously disturbed for exploration has had a direct correlation with the presence of invasive and noxious weeds to the area. Allowing further disturbance, destruction, and proven-weed spreading activities within and near the wildflowers' habitat is not compliant with BLM's duty to ensure that it's actions are leading to the recovery of endangered species and not resulting in unnecessary or undue degradation. The impacts dewatering that would be allowed would also result in acidification of not only the wildflower's habitat but the surrounding areas that provide critical spring resources to wildlife, including but not limited to iconic desert species like the desert bighorn and pronghorn. BLM cannot move forward with the proposed mine and comply with federal law. The impacts and harms are too great.	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Impacts to water resources are described in EIS Sections 4.16 and 4.20.16.
Svend Brandt-Erichsen – June 3, 2024			
114	114.1	Attached comments are submitted on behalf of Ioneer Rhyolite Ridge LLC (Ioneer).	Comment noted.
114	114.2	Rhyolite Ridge-1-500690418_Attachment 1	Comment noted.
114	114.3	2.1.13.3 | 2-13 | 5th line | Delete Advisory Council on Historic Preservation from list of reviewers, they will not be reviewing documents In their draft MOA BLM has not invited the Advisory Council on Historic Preservation (ACHP) to participate in consultation because the Mine does not meet the requirements for their participation (as specified in Component 5 of the 2012 National PA among BLM, ACHP, and the National Conference of SHPOs).	Revision made.
		2.1.13.3 | 2-13 | 14 | Replace the last line with If the site meets NRHP eligibility criteria, it will be mitigated during Phase II data recovery as detailed in the HPTP	Revision made.
		2.1.13.3 | 2-13 | 15 | Remove "or human remains funerary objects, or items of cultural patrimony" to distinguish how newly discovered sites are dealt with from how human remains and funerary objects are dealt with.	Revision made.
		2.1.13.3 | 2-13 | 16 | Replace Discovery Plan with Monitoring and Discovery Plan	Revision made.
		2.1.13.3 | 2-13 | 23 4d paragraph | Start first sentence fourth paragraph of section with "If human remains, funerary objects, or objects of cultural patrimony are	Revision made.

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					encountered, the location ….."	
		2.6	2-23		Table 2-6 (Entire). In reviewing this table, the summaries lack the nuance and specificity of the analysis provided in Chapter 4. In many instances there are two or three sentences that could be copied from the appropriate section of Chapter 4 that would provide a summary of impacts that would be useful to the decision maker/reviewer of the document. For example. The following copied from Section 4.12.1.1 provides a much clearer summary of the impacts of the project to monarch butterflies: "*There would be no impacts to leks or breeding BSSG due to the distances of these habitats from the Project. During construction, operation, and reclamation increased human presence and noise could cause those BSSG that occasionally travel through the OPA to avoid the area. Impacts would be negligible, long-term, and localized. While unlikely due to the limited use of the OPA by BSSG and established ACEPMs, vehicular traffic associated with the Project could injure or cause fatalities to individuals, but population- level impacts would not be expected. Impacts from vehicles would be minor, long-term, and localized.*"	The table presents a brief summary of impacts for each resource to provide for comparison. Detailed analysis is provided in the EIS in Section 4.0 with additional detail in the associated SERs.
		3.18.2.1	3-22		The EIS would benefit from an elaboration of the existing information in the record on the Fish Lake Valley tui chub, as outlined in GLA 2024 (EIS SharePoint//Documents/Baseline Reports/Groundwater/Evaluation of Hydrogeology of McNett Ranch). The springs, seeps, and flowing well on the Durk Pearson property that support the chub, as well as the Hot Box well and other springs and seeps near it are likely caused by the presence of a significant northeast-trending, basin-bounding fault zone that causes the upward welling of groundwater to land surface. The fault zone acts as a groundwater barrier. Chiatovich Creek is a major source of local recharge to the groundwater system in this area of Fish Lake Valley. Groundwater derived from Chiatovich Creek recharge flows toward the northeast where it encounters the basin- bounding fault barrier and rising deep geothermal groundwater that is also influenced by the fault zone. Geochemical data supports the conclusion that Chiatovich Creek is the likely source of recharge water to the area in and around the Durk Pearson well/springs (GLA 2024).	EIS and SER text revised to state that no dewatering impacts are expected for Fish Lake Valley tui chub and pyrg due to their location outside the drawdown contour.
		3.2	3-4	5	Add reference Ross-Hauer 2020	This has been added to the EIS.
		3.2	3-4	5-8	Replace these lines with - As a result of these inventories, a total of 227 sites have been identified within the Project Area. One site was determined and concurred upon by the SHPO as eligible for listing on the NRHP under Criteria A, C, and D, 24 sites were determined and concurred upon as eligible for listing on the NRHP under Criterion D, 14 sites were determined and concurred upon as unevaluated for listing on the NRHP pending subsurface testing, and 188 sites were determined and concurred upon as not eligible for listing on the NRHP under any evaluation criteria. A total of three architectural resources have also been identified within the Project Area, one of which was determined and concurred upon by the SHPO as eligible for listing on the NRHP under Criteria A, C, and D, while the remaining two were determined and concurred upon as not eligible for listing on the NRHP under any evaluation criteria.	During ongoing consultation with tribal representatives from the Timbisha Shoshone Tribe and Duckwater Shoshone Tribe of Duckwater Reservation, Nevada in August of 2024, two cultural resource sites were expanded to include other sites identified in previous surveys. In response to this, the number of sites was reevaluated and the FEIS and Cultural Resource SER were updated to reflect the changed number of sites (Westland 2024c).
		3.2	3-4	9	Third Paragraph: Move (i.e., historic properties) behind NRHP eligible. (only determined eligible sites are considered historic properties. Unevaluated sites are considered cultural resources)	Moved "(i.e., historic properties)" after "NRHP eligible". However, for purposes of the NEPA analysis, unevaluated sites are treated as eligible resources.
		4.12.1.3	4-21	3rd paragraph, 6th sentence	In the section regarding impacts to ERTI the following should be struck. "*However, the removal and storage of Tiehm's buckwheat preferred soils could alter the characteristics of the soils that the plant needs for survival.*" This mischaracterizes the intent of this section in the BPP included with the proposed action. While ERTI has been shown to grow in a wide variety of soils, none of the salvaged soils will be removed from extant ERTI subpopulations and therefore will not alter the characterization of soils within buckwheat subpopulations nor affect the survival of any ERTI.	Modifications to this section were made for clarification.
		4.18.1.2	4-40		Impacts discussion should be expanded for Fish Lake Valley tui chub to include the additional reasons why the waters that provide the chub's habitat are not impacted by the Project, along with the information provided in Section 4.18.1.1. Potential impacts to the springs and thus to the species endemic to the wetlands downstream of the well/spring are not expected. As discussed in Piteau (2023b) (EIS SharePoint//Documents/Baseline Reports/Groundwater/Groundwater Report/Rhyolite Ridge GW Impacts Report) the extent of the 10-foot drawdown isopleth, and including the one-mile analysis buffer, does not reach these springs. In addition, the analysis in GLA 2024 indicates a source of groundwater for the springs is disconnected from the groundwater pumped in the OPA for construction water and dewatering.	EIS and SER text revised to state that no dewatering impacts are expected for Fish Lake Valley tui chub and pyrg due to their location outside the drawdown contour.
		4.2	4-3	1	Modify the sentence to say: "…..six sites are found on one side of the road corridor and 7 span the corridor. One of the 6 sites is outside of the boundary of the proposed 100-foot corridor and will be monitored during construction."	Added that the sites are either on one side of the corridor or span the corridor. Did not change numbers.
		4.2	4-3	3	Replace to avoid the 12 NRHP-eligible sites with "avoid or minimize adverse impacts to the 13 sites along the road if possible. (7 cannot be avoided)	Added "or minimize adverse impacts."
		4.2.1	4-3	4	Sites that span the width of the road corridor cannot be avoided. Please delete "if these cultural resources cannot be avoided" (and replace the text with "the Proposed Action would "	Deleted "if these cultural resources cannot be avoided."
		4.2.1	4-4	1-3	Text in this section needs to more clearly indicate that the effects are to sites that are not eligible for designation to NRHP or to architectural features that are not eligible.	Added "Sites that are not eligible for the NRHP require no further management under Section 106."
		4.2.2	4-4	23-25	Text in this section needs to more clearly indicate that the effects are to sites that are not eligible for designation to NRHP or to architectural features that are not eligible for designation to the NRHP.	Added "Sites that are not eligible for the NRHP require no further management under Section 106."
		4.21	4-77		The mitigation and monitoring measures identified in section 4.21 supplement the many design features identified within DEIS sections describing the alternative actions and in the context of individual resources that avoid, minimize, and mitigate for Project effects. A note to this effect should be added to the first introductory sentence of section 4.21.	No edits made.
		4.21.1	4-77		TE-01 requires survey of all portions of critical habitat that will be disturbed prior to construction and surveys can be completed no more than two weeks prior to disturbance.	Revision complete.

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					The following should be added to TE-01 "This work will be done in accordance with a protocol reviewed and approved by the BLM."	
		4.22.1	4-80		Table 4-8. Threatened and Endangered Species: ERTI is pollinated by a generalist pollinator guild and Pollinator 'relationships' will not be permanently altered. The wording is awkward and not reflective of the biological meaning of the phrase – relationships are not expected to change. The overall number of pollinators in critical habitat will be reduced but considering the local nature of those pollinator communities (WestLand 2023) there is no data to support the notion that pollinator community composition would change nor is any data provided that would argue that pollinator services for ERTI would be reduced. There is no data provided in the EIS to support the conclusion provided in this table. Stating that the soil moisture in buckwheat subpopulations will be adversely affected by proposed drainage improvements overstates impacts and is not supported by best available science nor reflective of the topography in critical habitat.	Clarification added to Table 4-8.
		4.22.1	4-80		Table 4.8. Under N-S alternative change 19 to 16	Revised to 16 sites.
		4.22.2	4-83		Table 4.9. Under N-S alternative change 19 to 16	Revised to 16 sites.
		5.2	5-2	9th paragraph, last line	The sentence "Follow-up consultation with the Timbisha Shoshone Tribe, including Project area visits, were completed on April 27, 2023, and November 9, 2023" should be edited to correspond with the table indicating that there was a site visit on 6/20/2023 as well.	Revision complete.
		5.2	5-2		Table 5.1 Add: BLM sent a letter requesting consultation with all of the cultural survey reports on 5/28/2024 was sent to: • the Walker River Paiute Tribe, • the Fort Independence Paiute Tribe, and the Lone Pine Paiute Shoshone Tribe	Section 5.2 has been updated with all Tribal consultation that occurred after release of the DEIS for public comment.
		5.2	5-3		Table 5-1. Additional tribes besides Timbisha were present at the 4/27 Field Consultation - Duckwater Shoshone, Bishop Paiute and Big Pine Paiute. Ioneer and Westland were there too and have consistent notes as to what tribes attended.	Table 5-1 has been revised with information provided by the BLM.
		Appendix B			Please remove eagle take permit from the list of required permits. It is not among the required permits identified by the proposed MPO and no final decision has been made as to whether an eagle take permit is warranted. Ioneer remains committed to implementing measures to reduce impacts to eagles and continued coordination with USFWS on these measures and refinements to Ioneer's ECP.	Revision complete.
114	114.4	RhyoliteRidge-1-500690418_Attachment_2				Comment noted.
114	114.5	June 3, 2024 Submitted via BLM's National NEPA Register (ePlanning) Prudence Crampton, Acting District Manager Rhyolite Ridge Lithium-Boron Mine EIS c/o BLM Battle Mountain District Office 50 Bastian Road Battle Mountain, NV 89820 RE: Comment on Bureau of Land Management's Draft EIS for Rhyolite Ridge Lithium- Boron Project Dear Ms. Crampton: This letter is submitted on behalf of Ioneer Rhyolite Ridge LLC (Ioneer), the lithium-boron production developer that is the 100% owner of the Rhyolite Ridge Lithium-Boron Project (Rhyolite Ridge Project or Project) located on public lands in Esmeralda County, Nevada. Ioneer is pleased to provide these comments in support of the Bureau of Land Management's (BLM) Draft Environmental Impact Statement (DEIS) for the Rhyolite Ridge Project. At Ioneer, we are committed to undertaking the Rhyolite Ridge Project in an environmentally responsible, sustainable and community-focused manner. The Project will produce battery components that will power 370,000 Electric Vehicles annually and strengthen domestic supply chains. The Project will provide the United States with a significant, long-term, and secure source of lithium and boron, two materials necessary for multiple clean energy technologies, including lithium-ion batteries for EVs and renewable energy storage systems. It will also provide significant jobs for Nevada, estimated to be 500 jobs during construction and 350 direct jobs during operations. The Project design also ensures carbon-free energy production and limited greenhouse gas emissions, with no evaporation ponds, no tailings dam, and a footprint that has evolved and been modified to avoid protected resources.				Comment noted.
114	114.6	**PROJECT ALTERNATIVES** Ioneer supports the North and South Overburden Storage Facility (OSF) Alternative described in the DEIS, and asks that BLM adopt this Alternative as BLM's preferred alternative, and that BLM's Record of Decision approve Ioneer's Mine Plan of Operations (POO) for the Project with the North and South OSF Alternative. Ioneer first submitted a proposed POO to BLM for the Rhyolite Ridge Project in May 2020. This initial proposed POO would have involved relocating several subpopulations of Tiehm's buckwheat, a rare plant that has only been found only along a section of the western boundary of the site's mineral deposit on a total of about 10 acres to date and that U.S. Fish and Wildlife Service (USFWS) listed as an endangered species under the Endangered Species Act (ESA) on December 16, 2022. In response to concerns that successful relocation of Tiehm's buckwheat has not yet been demonstrated, Ioneer made several revisions to its initial POO, ultimately redesigning its quarry to entirely avoid all of the Tiehm's buckwheat subpopulations. This has been an iterative process that has required extensive evaluation of slope stability, quarry sequencing, collection of additional geotechnical data, and quarry wall stability assessment. The redesigned quarry was incorporated into Ioneer's July 2022 revised POO, which forms the basis for the Proposed Action evaluated in the DEIS.				Comment noted. The EIS provides detailed analysis of the environmental effects of the Proposed Action and the North and South OSF Alternative.

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		After submitting the July 2022 POO to BLM, Ioneer continued to work with BLM and USFWS to identify ways of avoiding and minimizing not only direct impacts to Tiehm's buckwheat, but also to the critical habitat that USFWS designated for the species in December 2022. For Tiehm's buckwheat, the designated critical habitat includes the approximately 10 acres actually occupied by the plants and about 900 acres of surrounding land, which was designated to protect potential pollinators. Through those efforts, Ioneer developed an applicant-preferred alternative, submitted to BLM in June 2023, which forms the basis for the North and South OSF Alternative. This Alternative minimizes ground disturbance and avoids overburden storage within designated Tiehm's buckwheat critical habitat, reducing disturbance within critical habitat by 166 acres (46%) compared to the Proposed Action Alternative.	
114	114.7	**Resources** The following comments highlight specific information regarding the Rhyolite Ridge Project, its potential impacts, and the permitting process for your inclusion into the administrative record for this Project. We also include with this letter more detailed comments regarding various pertinent matters set forth in the DEIS for your consideration.	Comment noted.
114	114.8	Socio-Economic Benefits The Project will generate significant economic growth and downstream benefits in rural America, as well as promote domestic independence in the critical minerals market. As noted above, the Project would add 500 direct jobs during the construction phase (four years) and 350 direct jobs during the quarrying and processing phase (17 years) to the natural resources and mining sector, an increase of 26% and 19%, respectively. In addition, total calendar year direct labor income generated from the construction phase (four years) of the Project is estimated to be approximately $54,141,401 per calendar year, and total calendar year indirect and induced labor income is estimated to be approximately $2,619,995 per calendar year. Overall, the estimated calendar year direct value added from the construction phase would be approximately $102,788,237 per calendar year, and total calendar year indirect and induced value added would be approximately $10,028,255 per calendar year. These estimated figures demonstrate the significant infusion of economic growth to this rural region from the construction phase of the Project. Additional economic growth will also result from the quarrying and processing phase of the Project. Total direct calendar year labor income generated from quarrying and processing phase (17 years) of the Proposed Action is estimated to be approximately $37,898,981 per calendar year, and total calendar year indirect and induced labor income is estimated to be $1,833,996 per calendar year. The total direct calendar year output that would be generated by employment from the quarrying and processing phase is estimated to be approximately $125,142,545 per calendar year, and total indirect and induced calendar year output is estimated to be approximately $18,709,469 per calendar year. Total estimated direct calendar year value added from quarrying and processing phase would be approximately $71,951,766 per calendar year, and total indirect and induced calendar year value added would be approximately $7,019,778 per calendar year. These increases in income would significantly improve annual household incomes in the region for the life of the Project. Average annual earnings per job would likely increase, as mining provides a higher annual wage in comparison to other industries. Overall, this economic growth along with other sources of revenue, such as tax benefits from Project's operation estimated to generate between $13 million and $31 million annually for state and local governments, can be found in the DEIS in the "Social and Economic Values Supplemental Environmental Report (April 2024)."	The EIS presents detailed analysis of impacts to social and economic values in Sections 4.10 and 4.20.10.
114	114.9	Domestic Supply Chain In addition to substantial economic benefits, the Project also advances the nation's top priority to domestically produce and process critical minerals, with lithium being an essential component of this national strategy. The demand for domestically-sourced critical minerals is growing at a rapid pace, necessitating the need for projects like Rhyolite Ridge. As recently noted by President Biden, "As the world transitions to a clean energy economy, global demand for these critical minerals is set to skyrocket by 400-600 percent over the next several decades, and, for minerals such as lithium and graphite used in electric vehicle (EV) batteries, demand will increase by even more—as much as 4,000 percent." See White House Fact Sheet: Securing a Made in America Supply Chain for Critical Minerals (Feb. 22, 2022); see also Exec. Order No. 14017, America's Supply Chain (Feb. 24, 2021) (noting the nation's need for resilient, diverse, and secure supply chains to ensure our economic prosperity and national security and directing agency studies on the same, including with regard to high-capacity batteries). Congress has similarly stressed the need for domestic production of critical minerals, as reflected in its historic enactment of the Inflation Reduction Act (IRA), which provides funding and tax benefits to promote domestic mineral development, particularly in support of lithium needed for batteries and electric vehicles. P.L. 117-169 (2022). For example, the IRA's Qualifying Advanced Energy Project Credit (48C) program consists of $10 billion in new funding to allocate credits to projects in three categories: (1) clean energy manufacturing and recycling, (2) greenhouse gas emission reduction, and (3) critical materials refining, processing, and recycling. Similarly, in the IRA's Section 45X advanced manufacturing production tax credit for eligible components, including critical minerals such as lithium, incentivizes domestic production that is vital to strengthening the country's renewable energy and energy storage supply chains. Indeed, the IRA has accelerated the increased domestic demand for critical minerals such as lithium, making Ioneer's project an essential part of the United States' portfolio: "Spurred by the IRA, energy- transition-related US demand for the critical minerals lithium, nickel and cobalt, taken together, will be 23 times higher in 2035 than it was in 2021." See S&P Inflation Reduction Act: Impact on North America Metals and Minerals Market (Aug. 2023). In short, Ioneer's Project is the embodiment of these national priorities, including its receipt of a conditional commitment for a $700 million Advanced Technology Vehicles Manufacturing (ATVM) loan from the U.S. Department Energy, where its production and processing of lithium will not only achieve the domestic independence that is so critical to our nation's energy and economic security, but also will ensure that other downstream tax benefits associated with domestic content requirements for high capacity batteries and electric vehicles are achieved.	Comment noted.
114	114.10	ESA – Tiehm's Buckwheat The changes Ioneer has made to the Project in the North and South OSF Alternative to avoid and minimize impacts to Tiehm's buckwheat and its designated critical habitat are highlighted in the discussion of proposed alternatives, above. In addition, Ioneer has developed a suite of fifteen applicant proposed conservation measures (APCMs), in consultation with USFWS and BLM. These are actions that Ioneer has taken or will be taking to protect Tiehm's buckwheat while providing minerals essential to address global environmental issues. APCMs include: • Fencing around each buckwheat subpopulation and the designated critical habitat; • Development of a pollinator habitat reclamation program within critical habitat; • Control of nonnative, invasive, and noxious weeds, using only methods approved by BLM and USFWS; • Dust control and monitoring of fugitive dust emissions within Tiehm's buckwheat subpopulations;	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat for the Proposed Action and alternatives in Sections 4.12 and 4.20.12.3. Additional details are provided in the Threatened and Endangered Species SER. The analysis included consideration of the respective Buckwheat Protection Plans for the Proposed Action and North and South OSF Alternative.

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		• Regular monitoring of the condition of critical habitat and of the demographics and recruitment of Tiehm's buckwheat subpopulations; • Development of in-quarry overburden storage (back-fill) to minimize ground disturbance and improve stability; • Adoption of site-tailored mining techniques to maintain stable quarry walls; • Geotechnical monitoring; and • Implementation of closure plans to provide long term stability once mining is completed. The DEIS references the Buckwheat Protection Plan & Applicant Proposed Conservation Measures developed in consultation with USFWS and BLM, which further details the APCMs for Tiehm's buckwheat and its designated critical habitat. Ioneer welcomes the addition of these important, protective measures for inclusion in any final decision of BLM and the USFWS. Ioneer also continues to consult with USFWS and BLM regarding potential ways to further minimize impacts to designated Tiehm's buckwheat critical habitat. In response to USFWS concerns regarding the proximity of disturbance to the Tiehm's buckwheat subpopulations, Ioneer has developed revisions to some existing APCMs and added three new APCMs since the DEIS was published. Information regarding these proposed changes was provided to BLM last week. • In response to a specific USFWS recommendation to consider relocating the Project's haul road, Ioneer has proposed a realignment of the haul road from the west to the east side of the quarry. This moves the haul road away from the Tiehm's buckwheat subpopulations that are located south of Cave Spring Road, thereby achieving the USFWS' objective of reducing the effects from dust, artificial light, and noise. This change also reduces overall disturbance of critical habitat by about 5 acres. • Addition of regular monitoring of light impacts and an annual audit of light fixtures. • Addition of noise monitoring proximate to Tiehm's buckwheat subpopulations. • Addition of monitoring of insect visitors and pollinator diversity and abundance. • Addition of a commitment to develop an ex-situ Tiehm's buckwheat conservation program in cooperation with USFWS and BLM. The program will build on Ioneer's ongoing, permitted seed collection work and its existing propagation of Tiehm's buckwheat in a greenhouse that Ioneer constructed for this purpose.	
114	114.11	Water Resources The DEIS provides a thorough discussion of potential impacts associated with the Project's water supply. Water from the dewatering system that supports quarry operations will supply the Project during the construction phase. During the Project's operational phase, the water supply will be supplemented by wells in Fish Lake Valley (from new or existing agricultural wells) and the water withdrawals from those wells will be offset by reducing existing agricultural water use, as noted in the DEIS. Groundwater modeling has shown that the Project's water use will not have a significant impact on the water table in Fish Lake Valley or around the Project site. Separately, an evaluation of the Valley's hydrology and water chemistry has shown that the Project will not affect surface waters important to sensitive species. Ioneer's water use also will be subject to any monitoring or other conditions that the State Engineer (head of the Nevada Division of Water Resources) attaches to approval of changes in the nature of water use and points of water withdrawal.	Impacts from dewatering on surface water and groundwater are discussed in EIS Sections 4.16 and 4.20.16.
114	114.12	**Tribal Engagement** A. Ioneer's Tribal Engagement Track Record Ioneer is committed to open and meaningful engagement with tribal nations and has proactively taken steps to engage with affected tribal nations on a parallel track with BLM's government-to-government consultation efforts, including BLM's responsibilities under Section 106 of the National Historic Preservation Act (NHPA). Ioneer has taken the initiative to engage early with tribes, has not waited for official federal permitting reviews to commence and has not relied solely on the federal government to government process to fulfill its tribal engagement commitments. Ioneer's first engagement was in 2020 during a BLM-sponsored site visit, prior to Ioneer holding its pre-application meeting with BLM in 2020. Furthermore, this engagement has been recurring and extensive. For example, since March 2020, Ioneer has had over 325 contacts with tribal nations or other tribal representatives in the form of written correspondence, phone calls, meetings including tribal council meetings, one-on-one conversations, or site visits. Many of these have been repeat engagements with specific tribes who have expressed an interest in ongoing conversations. From these engagements, Ioneer has learned about potential opportunities to collaborate with tribal nations on Inflation Reduction Act incentives or other economic development opportunities, areas of concern regarding cultural resources, or questions about the proposed Project's location, operational details, and employment opportunities. This feedback and engagement have been invaluable and Ioneer has adjusted its approach, project layout, and methodology in direct response to information learned. One specific accomplishment that Ioneer and certain tribal nations have achieved is the development of a tribal cultural resources monitoring MOU that addressed Ioneer's geotechnical drilling activity. Over several months, Ioneer and multiple tribal nations engaged in extensive conversations and mutually developed the MOU, which has previously been provided to BLM. The approach outlined in this early-stage MOU is now being applied to BLM's consideration of cultural resource monitoring provisions in its NHPA Memorandum of Understanding and Historic Properties Treatment Plan. This is a great example of how early collaboration can build mutual understanding and integration of tribal traditional knowledge into the permitting process. We look forward to implementing similar measures that emerge from the Section 106 consultation process. Additional highlights of Ioneer's tribal engagement efforts include: • BLM sponsored the first site visit during pre-planning in March 2020 with Ioneer participation. • BLM sponsored a site visit in March 2022 as part of the Section 106 consultation process. As a result of this meeting, Ioneer adjusted its plan layout to avoid important cultural resources. • BLM sponsored site visits in April 2023, June 2023, and November 2023 as part of Section 106 process, with Ioneer's support and participation. • Ioneer had tribal participation for cultural monitoring purposes in June/July and November 2023, for surface disturbance related to a 2920 permit for geotechnical drilling activity requested to support the Ioneer NEPA process. • Since 2021, Ioneer has provided written invitations to, and notice of, Fish Lake Valley Community meetings to Tribal Chairs and designated administrators, resulting in valuable tribal member participation. • Tribal members have been attending Fish Lake Valley Community meetings since January 2020. • Ioneer has presented to tribal councils for various tribal nations, starting in 2021, with some meetings occurring on repeat occasions with certain tribes.	Comment noted. Section 5.0 of the EIS describes government-to-government consultation and coordination for the Project. Tribal consultation is ongoing through the life of the Project and will continue. Table 5-1 has been updated with information as provided by the BLM.

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		• Ioneer provided written invitation to tribal chairs and designated administrators to meet when NEPA scoping process began in December 2022. • Ioneer had printed copies of the DEIS hand delivered to affected tribal nations across Nevada with the offer to meet to discuss any questions or concerns. • Ioneer provided invitations to the opening event for its Tiehm's Buckwheat Conservation Center greenhouse facility in Gardnerville in May 2023, resulting in tribal participation. In addition to these efforts, Ioneer has also supported and attended various tribal-related and cultural events. For example: • Scholarship Award as part of Ioneer's "Sustainable World" scholarship program • Duckwater Education Night • Ely Shoshone Fandango • Walker River Pinenut Festival (Schurz) • Pabanamanina Powwow (Bishop) • Regional Tribal Operations Caucus • ITCN Environmental Managers Meeting (Reno) • RES Economic Development Conference • U.S. Department of Energy Tribal Clean Energy Conference • Sponsorship support for earth day events, powwows, construction, and tribal conferences In addition to the above outreach, Ioneer has met with U.S. Department of Energy officials and other relevant agencies to discuss opportunities for economic development or other benefits for tribes, including under the Inflation Reduction Act. Ioneer, along with the tribes and federal agencies, have devoted significant time and resources to explore potential opportunities for partnerships in economic development ventures and other community benefit opportunities. This engagement remains ongoing and promising, and we hope it will bear fruit in the future. Lastly, Ioneer understands the importance of having in-house expertise regarding tribal affairs and cultural sensitivity. To that end, Ioneer established a tribal liaison position that has been filled since March 2023, which has resulted in enhanced communication and relationship building with tribal nations. For example, the tribal liaison was instrumental in coordinating communication among nine tribes to discuss and develop the MOU for cultural resource monitoring. In sum, Ioneer will continue its engagement with tribal nations to ensure that their interests and concerns are considered in the development of this Project. The protection of tribal cultural resources and exploration of tribal economic development opportunities is not incongruent with the development of this landmark Project that will create secure domestic supply of critical materials and support for emerging low-carbon or carbon-free technologies. B. BLM Tribal Engagement In addition to Ioneer's own efforts, BLM has been engaged in meaningful government-to- government consultations with the tribal nations, including under the NHPA's Section 106 consultation process. See Rhyolite Ridge, DEIS, Section 5.0. For example, BLM has discussed in the draft EIS its extensive consultations with the tribes and how it has adopted an approach that strives to avoid impacts to cultural resources within and near the Operational Project Area (OPA), and in the event avoidance is not feasible, to provide for agreed-upon procedures to mitigate impacts, as follows: A Class III cultural resource survey was performed within and near the OPA. The types and locations of cultural resources within this area have been documented and would be avoided, where possible, during all phases of Project implementation. In the event impacts to potentially eligible or unevaluated cultural resources are unavoidable, Ioneer would undertake actions in accordance with the Memorandum of Agreement (MOA) between the BLM, Nevada State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation, which is currently in preparation. For eligible cultural resources that cannot be avoided by the Project, Ioneer is working with the BLM and SHPO to develop a Historic Properties Treatment Plan (HPTP) for data recovery, archaeological and architectural documentation, and report preparation that would be based on the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (NPS 1983). See Rhyolite Ridge DEIS, Section 2.1.13.3. BLM is currently in the stages of the development of an MOA and HPTP to address any unavoidable impacts to cultural resources. With Ioneer's support, BLM has provided affected tribes with a draft MOA for their review and comment and will be providing a draft HPTP as well as a Monitoring and Discovery Plan in the near term. Ioneer welcomes the inclusion of cultural resources monitoring, discovery, and training processes within these documents to ensure that tribal knowledge and interests are known during the construction of the Project. Ioneer also recommends that BLM include in the administrative record any additional information regarding its communications with tribal nations, as the DEIS summarizes engagement through November, 2023. In closing, Ioneer appreciates BLM's efforts to ensure that the Project is sited and developed in a manner that is respectful of cultural resources protection and consonant with environmental stewardship. In furtherance of this shared goal, we also may submit additional feedback once Ioneer has had an opportunity to review the public comment record published by BLM after the close of the June 3rd public comment deadline. We look forward to proceeding to the next stages in the NEPA and related permitting and consultation processes in the coming months. Sincerely, Bernard Rowe President	
114	114.13	RhyoliteRidge-1-500690418_Attachment_3 Ioneer Tribal Communication Report As of 5/31/2024 Prepared by Ioneer*	The coordination and communication log provided has been added as Appendix A in the Native American Traditional Values SER.

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		Communication date	**Communication method**	**Stakeholders linked**	**Communication last updated by**	The coordination and communication log provided has been added as Appendix A in the Native American Traditional Values SER.
		Jan 23, 2020	In-person / face-to-face	Timbisha Shoshone Tribe	tjim	
		Jun 22, 2020	In-person / face-to-face - Site Visit	Duckwater Shoshone Tribe	tjim	
		Jun 22, 2020	In-person / face-to-face - Site Visit	Timbisha Shoshone Tribe	tjim	
		Apr 01, 2021	Letter/mail	Timbisha Shoshone Tribe	tjim	
		Apr 01, 2021	Letter/mail	Duckwater Shoshone Tribe	tjim	
		Apr 01, 2021	Letter/mail	Yomba Shoshone Tribe	tjim	
		Apr 05, 2021	Phone call	Yomba Shoshone Tribe	tjim	
		Apr 08, 2021	Phone call	Duckwater Shoshone Tribe	tjim	
		Apr 12, 2021	Phone call	Duckwater Shoshone Tribe	tjim	
		Apr 14, 2021	Phone call	Yomba Shoshone Tribe	tjim	
		Apr 15, 2021	Video Conference	Duckwater Shoshone Tribe	tjim	
		Apr 23, 2021	Video Conference	Timbisha Shoshone Tribe	tjim	
		Apr 27, 2021	Phone call	Yomba Shoshone Tribe	tjim	
		Jun 25, 2021	In-person / face-to-face	Timbisha Shoshone Tribe	tjim	
		Jul 09, 2021	Email	Timbisha Shoshone Tribe	tjim	
		Jul 19, 2021	Email	Duckwater Shoshone Tribe	tjim	
		Jul 19, 2021	Email	Yomba Shoshone Tribe	tjim	
		Feb 08, 2022	Letter/mail	Duckwater Shoshone Tribe	tjim	
		Feb 08, 2022	Letter/mail	Timbisha Shoshone Tribe	tjim	
		Feb 08, 2022	Letter/mail	Yomba Shoshone Tribe	tjim	
		Feb 17, 2022	In-person / face-to-face	Timbisha Shoshone Tribe	tjim	
		Mar 17, 2022	In-person / face-to-face	Duckwater Shoshone Tribe	tjim	
		Mar 25, 2022	In-person / face-to-face - Site Visit	Duckwater Shoshone Tribe	tjim	
		Aug 05, 2022	In-person / face-to-face	Duckwater Shoshone Tribe	tjim	
		Aug 24, 2022	Email	Timbisha Shoshone Tribe	tjim	
		Nov 22, 2022	Email	Duckwater Shoshone Tribe	tjim	
		Nov 22, 2022	Email	Timbisha Shoshone Tribe	tjim	
		Nov 22, 2022	Email	Yomba Shoshone Tribe	tjim	
		Dec 20, 2022	Email	Duckwater Shoshone Tribe	tjim	
		Dec 20, 2022	Email	Timbisha Shoshone Tribe	tjim	
		Dec 20, 2022	Email	Yomba Shoshone Tribe	tjim	
		Jan 06, 2023	Email	Big Pine Paiute Tribe	tjim	
		Apr 03, 2023	Email	Big Pine Paiute Tribe	tjim	
		Apr 03, 2023	Email	Bishop Paiute Tribe	tjim	
		Apr 03, 2023	Email	Timbisha Shoshone Tribe	tjim	
		Apr 03, 2023	Email	Walker River Paiute Tribe	tjim	
		Apr 04, 2023	Email	Fort Independence Indian Reservation	tjim	
		Apr 04, 2023	Email	Lone Pine Paiute Shoshone Tribe	tjim	
		Apr 04, 2023	Email	Utu Utu Gwaitu Paiute Tribe	tjim	
		Apr 05, 2023	Phone call	Lone Pine Paiute Shoshone Tribe	tjim	
		Apr 07, 2023	Phone call	Utu Utu Gwaitu Paiute Tribe	tjim	

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		Apr 13, 2023	Email	Fallon Paiute Shoshone Tribe	tjim	
		Apr 17, 2023	Phone call	Walker River Paiute Tribe	tjim	
		Apr 18, 2023	Phone call	Big Pine Paiute Tribe	tjim	
		Apr 20, 2023	Video Conference	Inter-Tribal Council of Nevada Inc	tjim	
		Apr 20, 2023	Video Conference	Inter-Tribal Council of Nevada Inc	tjim	
		Apr 20, 2023	Video Conference	Inter-Tribal Council of Nevada	tjim	
		April 22,2023	In-person / face-to-face	Fallon Paiute Shoshone Tribe	tjim	
		Apr 23, 2023	In-person / face-to-face	Big Pine Paiute Tribe	tjim	
		Apr 25, 2023	Email	Fallon Paiute Shoshone Tribe	tjim	
		April 27,2023	In-person / face-to-face - Site Visit	Big Pine Paiute Tribe, Bishop Paiute Tribe, Timbisha Shoshone Tribe, Duckwater Shoshone Tribe	tjm	
		Apr 28, 2023	In-person / face-to-face	Walker River Paiute Tribe	tjim	
		Apr 28, 2023	Email	Walker River Paiute Tribe	tjim	
		May 03, 2023	In-person / face-to-face	Duckwater Shoshone Tribe	tjim	
		May 04, 2023	Email	Bishop Paiute Tribe	tjim	
		May 04, 2023	Email	Duckwater Shoshone Tribe	tjim	
		May 04, 2023	Email	Timbisha Shoshone Tribe	tjim	
		May 04, 2023	Email	Big Pine Paiute Tribe	tjim	
		May 09, 2023	Email	Duckwater Shoshone Tribe	tjim	
		May 10, 2023	Phone call	Bishop Paiute Tribe	tjim	
		May 10, 2023	Phone call	Timbisha Shoshone Tribe	tjim	
		May 11, 2023	Phone call	Fallon Paiute Shoshone Tribe	tjim	
		May 10, 2023	Phone call	Timbisha Shoshone Tribe	tjim	
		May 11, 2023	Phone call	Fallon Paiute Shoshone Tribe	tjim	
		May 12, 2023	Video Conference	Duckwater Shoshone Tribe	tjim	
		May 17, 2023	Text message	Fallon Paiute Shoshone Tribe	tjim	
		May 24, 2023	Video Conference	Puyenpa Services, LLC	tjim	
		May 30, 2023	In-person / face-to-face	Bishop Paiute Tribe	tjim	
		May 30, 2023	In-person / face-to-face	Timbisha Shoshone Tribe	tjim	
		Jun 02, 2023	In-person / face-to-face	Walker River Paiute Tribe	tjim	
		Jun 06, 2023	Email	Shoshone-Paiute Tribes of Duckvalley Indian Reservation	tjim	
		Jun 06, 2023	Email	Walker River Paiute Tribe	tjim	
		Jun 07, 2023	Email	Bishop Paiute Tribe	tjim	
		Jun 07, 2023	Phone call	Ely Shoshone Tribe	tjim	
		Jun 08, 2023	Email	Timbisha Shoshone Tribe	tjim	
		Jun 09, 2023	Email	Timbisha Shoshone Tribe	tjim	
		Jun 12, 2023	Phone call	Big Pine Paiute Tribe	tjim	
		Jun 12, 2023	Voicemail	Yomba Shoshone Tribe	tjim	
		Jun 13, 2023	Email	Ely Shoshone Tribe	tjim	
		Jun 13, 2023	Email	Ely Shoshone Tribe	tjim	
		Jun 13, 2023	Video Conference	Duckwater Shoshone Tribe	tjim	
		Jun 14, 2023	Phone call	Yomba Shoshone Tribe	tjim	
		Jun 14, 2023	Email	Bishop Paiute Tribe	tjim	
		Jun 14, 2023	In-person / face-to-face	Walker River Paiute Tribe	tjim	
		Jun 16, 2023	Email	Bishop Paiute Tribe	tjim	
		Jun 16, 2023	Phone call	Yomba Shoshone Tribe	tjim	

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		Jun 20, 2023	In-person / face-to-face - Site Visit	Timbisha Shoshone Tribe	tjm	
		Jun 20, 2023	In-person / face-to-face - Cultural Resource Monitoring	Timbisha Shoshone Tribe	tjim	
		Jun 22, 2023	Email	Duckwater Shoshone Tribe	tjim	
		Jun 22, 2023	Email	Timbisha Shoshone Tribe	tjim	
		Jun 27, 2023	In-person / face-to-face	Timbisha Shoshone Tribe	tjim	
		Jul 10, 2023	Video Conference	Puyenpa Services, LLC	tjim	
		Jul 11, 2023	Email	Walker River Paiute Tribe	tjim	
		Jul 11, 2023	In-person / face-to-face	Ely Shoshone Tribe	tjim	
		Jul 20, 2023	Email	Bishop Paiute Tribe	tjim	
		Jul 20, 2023	Email	Utu Utu Gwaitu Paiute Tribe	tjim	
		Jul 25, 2023	Phone call	Utu Utu Gwaitu Paiute Tribe	tjim	
		Jul 26, 2023	Email	Ely Shoshone Tribe	tjim	
		Jul 26, 2023	Email	Utu Utu Gwaitu Paiute Tribe	tjim	
		Jul 29, 2023	In-person / face-to-face	Ely Shoshone Tribe	tjim	
		Aug 01, 2023	Email	Bishop Paiute Tribe	tjim	
		Aug 01, 2023	Email	Ely Shoshone Tribe	tjim	
		Aug 01, 2023	Email	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Aug 01, 2023	Email	Utu Utu Gwaitu Paiute Tribe	tjim	
		Aug 03, 2023	Email	Ely Shoshone Tribe	tjim	
		Aug 03, 2023	Email	Utu Utu Gwaitu Paiute Tribe	tjim	
		Aug 03, 2023	Email	Ely Shoshone Tribe	tjim	
		Aug 03, 2023	Email	Utu Utu Gwaitu Paiute Tribe	tjim	
		Aug 08, 2023	In-person / face-to-face	Inter-Tribal Council of Nevada Inc	tjim	
		Aug 08, 2023	Video Conference	Inter-Tribal Council of Nevada	tjim	
		Aug 15, 2023	Email	Bishop Paiute Tribe	tjim	
		Aug 18, 2023	Email	Bishop Paiute Tribe	tjim	
		Aug 18, 2023	Phone call	Yomba Shoshone Tribe	tjim	
		Aug 18, 2023	Video Conference	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Aug 18, 2023	Video Conference	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Aug 21, 2023	Text message	Yomba Shoshone Tribe	tjim	
		Aug 22, 2023	Email	Bishop Paiute Tribe	tjim	
		Aug 22, 2023	Email	Ely Shoshone Tribe	tjim	
		Aug 22, 2023	Email	Utu Utu Gwaitu Paiute Tribe	tjim	
		Aug 30, 2023	Email	Bishop Paiute Tribe	tjim	
		Aug 30, 2023	Email	Ely Shoshone Tribe	tjim	
		Sep 05, 2023	Email	Bishop Paiute Tribe	tjim	
		Sep 13, 2023	Phone call	Duckwater Shoshone Tribe	cyeftich	
		Sep 15, 2023	Email	Ely Shoshone Tribe	tjim	
		Sep 15, 2023	Email	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Sep 16, 2023	In-person / face-to-face	Walker River Paiute Tribe	tjm	

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		Sep 18, 2023	Email	Big Pine Paiute Tribe	tjim	
		Sep 19, 2023	Email	Bishop Paiute Tribe	tjim	
		Sep 19, 2023	Video Conference	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Sep 23, 2023	In-person / face-to-face	Bishop Paiute Tribe	tjm	
		Sep 29, 2023	Email	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Sep 29, 2023	Email	Bishop Paiute Tribe	tjim	
		Sep 29, 2023	Email	Ely Shoshone Tribe	tjim	
		Oct 02, 2023	Email	Ely Shoshone Tribe	tjim	
		Oct 03, 2023	Email	Ely Shoshone Tribe	tjim	
		Oct 03, 2023	Phone call	Big Pine Paiute Tribe	tjim	
		Oct 03, 2023	Phone call	Bishop Paiute Tribe	tjim	
		Oct 03, 2023	Phone call	Utu Utu Gwaitu Paiute Tribe	tjim	
		Oct 03, 2023	Phone call	Lone Pine Paiute Shoshone Tribe	tjim	
		Oct 03, 2023	Phone call	Walker River Paiute Tribe	tjim	
		Oct 03, 2023	Phone call	Yomba Shoshone Tribe	tjim	
		Oct 04, 2023	Phone call	Big Pine Paiute Tribe	tjim	
		Oct 04, 2023	Phone call	Bishop Paiute Tribe	tjim	
		Oct 04, 2023	Phone call	Utu Utu Gwaitu Paiute Tribe	tjim	
		Oct 04, 2023	Phone call	Lone Pine Paiute Shoshone Tribe	tjim	
		Oct 04, 2023	Phone call	Ely Shoshone Tribe	tjim	
		Oct 04, 2023	Phone call	Lone Pine Paiute Shoshone Tribe	tjim	
		Oct 04, 2023	Phone call	Ely Shoshone Tribe	tjim	
		Oct 04, 2023	Text message	Walker River Paiute Tribe, Walker River Paiute Tribe	tjim	
		Oct 04, 2023	Text message	Timbisha Shoshone Tribe	tjim	
		Oct 06, 2023	Email	Bishop Paiute Tribe	tjim	
		Oct 06, 2023	Email	Ely Shoshone Tribe	tjim	
		Oct 06, 2023	Email	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Oct 06, 2023	Email	Bishop Paiute Tribe	tjim	
		Oct 09, 2023	Phone call	Inter-Tribal Council of Nevada Inc	tjim	
		Oct 09, 2023	Phone call	Inter-Tribal Council of Nevada Inc	tjim	
		Oct 11, 2023	Email	Bishop Paiute Tribe	tjim	
		Oct 11, 2023	Email	Ely Shoshone Tribe	tjim	
		Oct 11, 2023	Email	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Oct 11, 2023	Phone call	Big Pine Paiute Tribe	tjim	
		Oct 11, 2023	Phone call	Duckwater Shoshone Tribe	tjim	
		Oct 13, 2023	Video Conference	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Oct 18, 2023	In-person / face-to-face	Inter-Tribal Council of Nevada Inc	cyeftich	
		Oct 23, 2023	Phone call	Inter-Tribal Council of Nevada Inc	tjim	
		Oct 23, 2023	Phone call	Inter-Tribal Council of Nevada	tjim	
		Oct 24, 2023	Email	Bishop Paiute Tribe	tjim	

Comment Letter No.	Comment Number	Comment				Response
		Oct 24, 2023	Email	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Oct 24, 2023	Email	Ely Shoshone Tribe	tjim	
		Oct 25, 2023	Email	Big Pine Paiute Tribe	tjim	
		Oct 26, 2023	In-person / face-to-face	Bishop Paiute Tribe	tjim	
		Oct 30, 2023	In-person / face-to-face	Duckwater Shoshone Tribe	tjim	
		Oct 31, 2023	Email	Big Pine Paiute Tribe	tjim	
		Oct 31, 2023	Email	Bishop Paiute Tribe	tjim	
		Oct 31, 2023	Email	Ely Shoshone Tribe	tjim	
		Oct 31, 2023	Email	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Nov 02, 2023	Email	Big Pine Paiute Tribe	tjim	
		Nov 06, 2023	Phone call	Inter-Tribal Council of Nevada	tjim	
		Nov 06, 2023	Video Conference	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Nov 06, 2023	Newspaper article	Timbisha Shoshone Tribe	tjim	
		Nov 08, 2023	In-person / face-to-face	Shoshone-Paiute Tribes of Duckvalley Indian Reservation	cyeftich	
		Nov 08, 2023	In-person / face-to-face	Inter-Tribal Council of Nevada	tjim	
		Nov 08, 2023	Email	Big Pine Paiute Tribe	tjim	
		Nov 09, 2023	Text message	Big Pine Paiute Tribe	tjim	
		Nov 09, 2023	Text message	Timbisha Shoshone Tribe	tjim	
		Nov 09, 2023	Text message	Big Pine Paiute Tribe	tjim	
		Nov 09, 2023	Text message	Timbisha Shoshone Tribe	tjim	
		Nov 09, 2023	In-person / face-to-face - Site Visit	Timbisha Shoshone Tribe	tjm	
		Nov 10, 2023	In-person / face-to-face - Cultural Resource Monitoring	Timbisha Shoshone Tribe, Big Pine Paiute Tribe	tjm	
		Nov 11, 2023	Text message	Margaret Cortez	tfalk	
		Nov 13, 2023	Text message	Timbisha Shoshone Tribe	tjim	
		Nov 14, 2023	Text message	Timbisha Shoshone Tribe	tjim	
		Nov 15, 2023	In-person / face-to-face - Cultural Resource Monitoring	Timbisha Shoshone Tribe, Big Pine Paiute Tribe	tjim	
		Nov 20, 2023	Phone call	Inter-Tribal Council of Nevada	tjim	
		Nov 20, 2023	Text message	Timbisha Shoshone Tribe	tjim	
		Nov 28, 2023	In-person / face-to-face	UNR Office of Indigenous Relations	tjim	
		Nov 28, 2023	Text message	Big Pine Paiute Tribe	tjim	
		Nov 28, 2023	Text message	Danelle Guiterrez	tjim	
		Nov 28, 2023	Text message	Timbisha Shoshone Tribe	tjim	
		Nov 29, 2023	Phone call	Duckwater Shoshone Tribe	cyeftich	
		Nov 29, 2023	Text message	Timbisha Shoshone Tribe	tjim	
		Nov 30, 2023	Email	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Nov 30, 2023	Email	Big Pine Paiute Tribe	tjim	
		Nov 30, 2023	Email	Ely Shoshone Tribe	tjim	
		Nov 30, 2023	In-person / face-to-face	Yomba Shoshone Tribe	tjim	
		Nov 30, 2023	Email	Bishop Paiute Tribe	tjim	
		Dec 04, 2023	Phone call	Inter-Tribal Council of Nevada	tjim	

Comment Letter No.	Comment Number	Comment				Response
		Dec 05, 2023	Text message	Timbisha Shoshone Tribe	tjim	
		Dec 05, 2023	Video Conference	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Dec 06, 2023	Phone call	Duckwater Shoshone Tribe	cyeftich	
		Dec 06, 2023	Text message	Big Pine Paiute Tribe	tjim	
		Dec 07, 2023	In-person / face-to-face	Yomba Shoshone Tribe	tjim	
		Dec 07, 2023	Video Conference	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Dec 07, 2023	Text message	Danelle Gutierrez	tjim	
		Dec 08, 2023	Text message	Danelle Guiterrez	tjim	
		Dec 08, 2023	Text message	Big Pine Paiute Tribe	tjim	
		Dec 11, 2023	Email	Bishop Paiute Tribe	tjim	
		Dec 11, 2023	Email	Bishop Paiute Tribe	tjim	
		Dec 13, 2023	Email	Big Pine Paiute Tribe	tjim	
		Dec 13, 2023	In-person / face-to-face	Big Pine Paiute Tribe	tjim	
		Dec 14, 2023	Email	Big Pine Paiute Tribe	tjim	
		Dec 15, 2023	Text message	Timbisha Shoshone Tribe	tjim	
		Dec 18, 2023	Phone call	Inter-Tribal Council of Nevada	tjim	
		Dec 18, 2023	Phone call	Duckwater Shoshone Tribe	cyeftich	
		Dec 18, 2023	Text message	Cheyenne Stone	tjim	
		Dec 18, 2023	Text message	Big Pine Paiute Tribe	tjim	
		Dec 20, 2023	In-person / face-to-face	Timbisha Shoshone Tribe	tjim	
		Dec 18, 2023	Text message	Big Pine Paiute Tribe	tjim	
		Dec 20, 2023	In-person / face-to-face	Timbisha Shoshone Tribe	tjim	
		Jan 02, 2024	Text message	Big Pine Paiute Tribe	tjim	
		Jan 04, 2024	Email	Bishop Paiute Tribe	tjim	
		Jan 08, 2024	Phone call	Inter-Tribal Council of Nevada Inc	tjim	
		Jan 08, 2024	Phone call	Inter-Tribal Council of Nevada Inc	tjim	
		Jan 08, 2024	Phone call	Inter-Tribal Council of Nevada	tjim	
		Jan 09, 2024	Email	Andrea Martinez (Walker River Paiute Tribe	tjim	
		Jan 13, 2024	Phone call	Utu Utu Gwaitu Paiute Tribe	tjim	
		Jan 13, 2024	Phone call	Utu Utu Gwaitu Paiute Tribe	tjim	
		Jan 15, 2024	Email	Bishop Paiute Tribe	tjim	
		Jan 15, 2024	Email	Ely Shoshone Tribe	tjim	
		Jan 15, 2024	Email	Timbisha Shoshone Tribe, Bishop Paiute Tribe, Big Pine Paiute Tribe, Walker River Paiute Tribe, Duckwater Shoshone Tribe, Yomba Shoshone Tribe, Ely Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe, Lone Pine Paiute Shoshone Tribe	tjim	
		Jan 17, 2024	Email	Ely Shoshone Tribe	tjim	
		Jan 17, 2024	Newspaper article	Timbisha Shoshone Tribe	tjim	
		Jan 18, 2024	Email	Duckwater Shoshone Tribe, Duckwater Shoshone Tribe	cyeftich	
		Jan 18, 2024	Phone call	Duckwater Shoshone Tribe	cyeftich	
		Jan 21, 2024	Email	Walker River Paiute Tribe, Walker River Paiute Tribe, Walker River Paiute Tribe	tjim	
		Jan 21, 2024	Phone call	Bishop Paiute Tribe	tjim	
		Jan 21, 2024	Text message	Timbisha Shoshone Tribe	tjim	
		Jan 22, 2024	Email	Bishop Paiute Tribe	tjim	
		Jan 22, 2024	Social media	Big Pine Paiute Tribe	tjim	
		Jan 22, 2024	Phone call	Inter-Tribal Council of Nevada	tjim	

Comment Letter No.	Comment Number	Comment				Response
		Jan 23, 2024	Email	Big Pine Paiute Tribe	tjim	
		Jan 24, 2024	Email	Duckwater Shoshone Tribe	tjim	
		Jan 25, 2024	Email	Duckwater Shoshone Tribe	tjim	
		Jan 25, 2024	Email	Timbisha Shoshone Tribe	tjim	
		Jan 26, 2024	Email	Big Pine Paiute Tribe	tjim	
		Jan 26, 2024	Phone call	Utu Utu Gwaitu Paiute Tribe	tjim	
		Jan 29, 2024	Phone call	Duckwater Shoshone Tribe	cyeftich	
		Jan 29, 2024	Text message	Timbisha Shoshone Tribe	tjim	
		Jan 30, 2024	Email	Ely Shoshone Tribe	tjim	
		Jan 30, 2024	In-person / face-to-face	Yomba Shoshone Tribe	tjim	
		Jan 30, 2024	In-person / face-to-face	UNR Office of Indigenous Relations	tjim	
		Jan 31, 2024	In-person / face-to-face	Walker River Paiute Tribe	tjim	
		Feb 02, 2024	Video Conference	Duckwater Shoshone Tribe, Puyenpa Services, LLC, Puyenpa Services, LLC	tjim	
		Feb 05, 2024	Text message	Timbisha Shoshone Tribe, Timbisha Shoshone Tribe	tjim	
		Feb 06, 2024	Email	Lone Pine Paiute Shoshone Tribe	tjim	
		Feb 06, 2024	Phone call	Lone Pine Paiute Shoshone Tribe	tjim	
		Feb 14, 2024	Email	Timbisha Shoshone Tribe	tjim	
		Feb 15, 2024	Email	Bishop Paiute Tribe	tjim	
		Feb 15, 2024	Email	Timbisha Shoshone Tribe	tjim	
		Feb 16, 2024	Email	Duckwater Shoshone Tribe	tjim	
		Feb 23, 2024	Email	Duckwater Shoshone Tribe	tjim	
		Feb 23, 2024	Video Conference	Duckwater Shoshone Tribe, Duckwater Shoshone Tribe, Duckwater Shoshone Tribe, Puyenpa Services, LLC, Puyenpa Services, LLC	tjim	
		Feb 28, 2024	Email	Andrea Martinez (Walker River Paiute Tribe	tjim	
		Mar 04, 2024	Email	Timbisha Shoshone Tribe	tjim	
		Mar 05, 2024	Video Conference	Duckwater Shoshone Tribe, Puyenpa Services, LLC, Puyenpa Services, LLC	tjim	
		Mar 07, 2024	Email	Duckwater Shoshone Tribe, Duckwater Shoshone Tribe	tjim	
		Mar 11, 2024	In-person / face-to-face	Bishop Paiute Tribe	tjim	
		Mar 11, 2024	In-person / face-to-face	Fallon Paiute Shoshone Tribe	tjim	
		Mar 11, 2024	In-person / face-to-face	Duckwater Shoshone Tribe	tjim	
		Mar 12, 2024	In-person / face-to-face	Bishop Paiute Tribe	tjim	
		Mar 13, 2024	In-person / face-to-face	Fallon Paiute Shoshone Tribe	tjim	
		Mar 13, 2024	In-person / face-to-face	Inter-Tribal Council of Nevada	tjim	
		Mar 13, 2024	In-person / face-to-face	Duckwater Shoshone Tribe	tjim	
		Mar 15, 2024	Email	Duckwater Shoshone Tribe	tjim	
		Mar 15, 2024	Email	Duckwater Shoshone Tribe	tjim	
		Mar 18, 2024	Phone call	Duckwater Shoshone Tribe	tjim	
		Mar 21, 2024	Email	Bishop Paiute Tribe	tjim	
		Mar 22, 2024	Email	Big Pine Paiute Tribe	tjim	
		Mar 22, 2024	Email	Big Pine Paiute Tribe, Big Pine Paiute Tribe	tjim	
		Mar 22, 2024	Email	Bishop Paiute Tribe	tjim	
		Mar 22, 2024	Email	Timbisha Shoshone Tribe, Timbisha Shoshone Tribe	tjim	
		Mar 22, 2024	Email	Utu Utu Gwaitu Paiute Tribe	tjim	
		Mar 22, 2024	Email	Lone Pine Paiute Shoshone Tribe	tjim	
		Mar 22, 2024	Email	Yomba Shoshone Tribe	tjim	

Comment Letter No.	Comment Number	Comment				Response
		Mar 22, 2024	Email	Fallon Paiute Shoshone Tribe	tjim	
		Mar 22, 2024	Email	Duckwater Shoshone Tribe, Duckwater Shoshone Tribe	tjim	
		Mar 22, 2024	Email	Ely Shoshone Tribe, Ely Shoshone Tribe	tjim	
		Mar 22, 2024	Email	Walker River Paiute Tribe	tjim	
		Mar 25, 2024	Email	Bishop Paiute Tribe	tjim	
		Mar 25, 2024	Email	Lone Pine Paiute Shoshone Tribe	tjim	
		Mar 25, 2024	Email	Fallon Paiute Shoshone Tribe	tjim	
		Mar 25, 2024	Email	Bishop Paiute Tribe, Bishop Paiute Tribe	tjim	
		Mar 27, 2024	Phone call	Big Pine Paiute Tribe	tjim	
		Mar 27, 2024	Phone call	Bishop Paiute Tribe	tjim	
		Mar 28, 2024	Email	Big Pine Paiute Tribe	tjim	
		Mar 29, 2024	Text message	Duckwater Shoshone Tribe	tjim	
		Apr 01, 2024	Email	Fallon Paiute Shoshone Tribe	tjim	
		Apr 01, 2024	Text message	Bishop Paiute Tribe	tjim	
		Apr 01, 2024	Text message	Duckwater Shoshone Tribe	tjim	
		Apr 03, 2024	Email	Fallon Paiute Shoshone Tribe	tjim	
		Apr 04, 2024	Email	Duckwater Shoshone Tribe, Duckwater Shoshone Tribe	tjim	
		Apr 08, 2024	Text message	Timbisha Shoshone Tribe	tjim	
		Apr 11, 2024	Email	Big Pine Paiute Tribe, Big Pine Paiute Tribe, Big Pine Paiute Tribe	tjim	
		Apr 11, 2024	In-person / face-to-face	Fallon Paiute Shoshone Tribe	tjim	
		Apr 17, 2024	Email	Fallon Paiute Shoshone Tribe	tjim	
		Apr 11, 2024	In-person / face-to-face	Fallon Paiute Shoshone Tribe	tjim	
		Apr 17, 2024	Email	Fallon Paiute Shoshone Tribe	tjim	
		Apr 18, 2024	In-person / face-to-face	US Department of Energy, US Department of Energy, US Department of Energy	tjim	
		Apr 24, 2024	Video Conference	Duckwater Shoshone Tribe, Duckwater Shoshone Tribe, Puyenpa Services, LLC, Puyenpa Services, LLC, US Department of Energy	tjim	
		Apr 29, 2024	In-person / face-to-face	Duckwater Shoshone Tribe	tjim	
		Apr 29, 2024	In-person / face-to-face	Te-Moak Tribe of Western Shoshone)	tjim	
		Apr 29, 2024	In-person / face-to-face	Shoshone-Paiute Tribes of Duckvalley Indian Reservation	tjim	
		Apr 29, 2024	In-person / face-to-face	Ely Shoshone Tribe	tjim	
		Apr 29, 2024	Phone call	Ely Shoshone Tribe	tjim	
		Apr 30, 2024	In-person / face-to-face	Big Pine Paiute Tribe	tjim	
		Apr 30, 2024	In-person / face-to-face	Utu Utu Gwaitu Paiute Tribe, Utu Utu Gwaitu Paiute Tribe	tjim	
		Apr 30, 2024	In-person / face-to-face	Walker River Paiute Tribe	tjim	
		Apr 30, 2024	In-person / face-to-face	Bishop Paiute Tribe	tjim	
		Apr 30, 2024	In-person / face-to-face	Timbisha Shoshone Tribe	tjim	
		May 03, 2024	In-person / face-to-face	Yomba Shoshone Tribe, Inter-Tribal Council of Nevada Inc	tjim	
		May 06, 2024	In-person / face-to-face	Big Pine Paiute Tribe	tjim	
		May 06, 2024	In-person / face-to-face	Bishop Paiute Tribe	tjim	
		May 06, 2024	In-person / face-to-face	Timbisha Shoshone Tribe	tjim	
		May 06, 2024	Text message	Walker River Paiute Tribe	tjim	
		May 14, 2024	Video Conference	Inter-Tribal Council of Nevada	tjim	
		May 15, 2024	Email	Ely Shoshone Tribe	tjim	
		May 16, 2024	Email	Bishop Paiute Tribe, Bishop Paiute Tribe	tjim	
		May 16, 2024	Email	Shoshone-Paiute Tribes of Duckvalley Indian Reservation	tjim	
		May 17, 2024	Email	Timbisha Shoshone Tribe	tjim	

Comment Letter No.	Comment Number	Comment				Response
		May 23, 2024	Phone call	Fallon Paiute Shoshone Tribe	tjim	
		May 23, 2024	Phone call	Timbisha Shoshone Tribe	tjim	
		May 23, 2024	Phone call	Bishop Paiute Tribe	tjim	
		May 23, 2024	Phone call	Duckwater Shoshone Tribe	tjim	
		* Additional detail on any entry available upon request.				Comment noted.
Ian Zabarte – June 3, 2024						
115	115.1	Rhyolite Ridge Lithium-Boron Mine EIS June 3, 2024 Comments of Ian Zabarte, Secretary of State of the Western Shoshone National Council of the Western Bands of the Shoshone Nation of Indians, Treaty of Ruby Valley 1863 (Consolidated Treaty Series Volume 127-1863 and 18 Statute at Large 689-692, US Constitution Article 6, Section 2).				Comment noted.
175	175.1	Comments attached. PM Ian Zabarte, Secretary of State Western Shoshone National Council Western Bands of the Shoshone Nation of Indians				Comment noted.
115	115.2	RhyoliteRidge-1-500690470_Attachment				Comment noted.
115 and 175	115.3 and 175.2	Comments of Ian Zabarte, Secretary of State of the Western Shoshone National Council of the Western Bands of the Shoshone Nation of Indians, Treaty of Ruby Valley 1863 (Consolidated Treaty Series Volume 127-1863 and 18 Statute at Large 689-692, US Constitution Article 6, Section 2). The Western Bands of the Shoshone Nation of Indians does not consent to the inclusion of Shoshone property defined by the Treaty of Ruby Valley into the boundary of any state or Territory of the United States (US) including Nevada or any unit of local government thereof, including Esmerelda County (Nevada Territorial Act 18611). Nevada, and disclaimed all lands in the Enabling Act of 1864 and the Western Bands of the Shoshone Nation of Indians have not given assent to be included in the boundaries of Nevada. The Western Bands of the Shoshone Nation of Indians have sought the creation of a reservation by the President under Article 6 of the Treaty of Ruby Valley. The fact that the President has not yet determined the need of a reservation for the Western Shoshone under Article 6 of the Treaty of Ruby Valley demonstrate unextinguished Indian title of the proposed Operational Project Area (OPA) bounded on the north by Wong-goga-da Mountains; on the west by Su-non-to-yah Mountains; on the south by Wi-co-bah; on the east by Po-ho-no-be Valley. Establishing a reservation under the treaty is a good alternative. Also distinguishing land ownership is the lack of knowledge of the full extent of the Shoshone homelands is the Doty treaty map (attachment 1) that accompanied the Shoshone Nation of Indians treaties with the US back to Washington, D.C. in 1863. Showing Southwest to Northeast are the words “UNEXPLORED” leaving boundaries undefined, except by the indigenous peoples themselves. The matter of ownership has not been satisfactorily addressed. We seek an extension of 60 days to comment. The proposed action is environmental racism and fails to recognize laws for the improvement of the Shoshone people or restraint of action by non-Indian people to prevent violations of the law, the Treaty of Ruby Valley. The agencies and proponent maintain a longstanding pattern and practice that deny any argument, evidence or fact that does not support the proposed action and in fact demonstrate a secret agenda. The Shoshone have no appetite for destruction of their land brokered by the US for foreign fast money mining interests that seek to destroy indigenous people’s sacred land used for spiritual faith. No effort is placed on investigating the faith of indigenous people closely connected to the land or potential impacts to people, plants, animals and environmental quality. The OPA contains uranium that will be disturbed with potential increased spikes above background. Radioactive fallout from US and United Kingdon testing of 928 nuclear weapons of mass destruction is plausibly deposited in the OPA and can expose the already vulnerable Shoshone people to cumulative risks of radiation exposure that has not been studied in the EIS process and ought to be. The Environmental Protection Agency (EPA) has not investigated the baseline radiation levels at the OPA from naturally occurring radioactive material that can spike as a result from the Ioneer mining; or resuspension of radiation by mining at the OPA from past fallout of testing nuclear weapons of mass destruction. In the past, the EPA has been silent on the risk of exposure to the Shoshonean people from radioactive fallout seeking higher radiation protection standard based upon lifestyle differences after we called into question safety by revaluating the DOE Off-site Radiation Exposure Review Profile.2 The Department of Energy (DOE) adopted the EPA standard without acknowledging Shoshone concerns of increased risk in the Site-Wide EIS process for the Nevada National Security Site (formerly the Nevada Test Site) and the proposed Yucca Mountain high-level nuclear waste repository EIS. The purpose of these comments is to question the assumptions of the Ioneer Lithium EIS as not being protective or beneficial to the Shoshone people and homelands. The involved agencies create boundaries of the mind. Use of linguistic boundaries are misleading and not constructs of property ownership, but instead agency efforts that seek to diminish Shoshone property interests defined by the Treaty of Ruby Valley. Property is not a thing; it is a relationship between people in regard to things and that relationship between the Shoshone Nation of Indians and the US is by the Treaty of Ruby Valley that is the supreme law of the land that binds this nation together. The linguistic references map of Steward is not to be trusted. It is identity politics and is questionable without further research. Moreover, the linguistic references are a culture war on indigenous people seeking to pit Shoshonean people against each other. Traditionally, the Shoshone homelands conform to physiological boundaries that place the OPA within the boundaries of the Treaty of Ruby Valley (Figure 2). The agencies involved have a long-standing pattern and practice of not acting for the benefit of the Shoshone people and instead act divest their trespassing from the Constitutional obligation to protect and defend the US Constitution Article 6, Section 2, treaty supremacy. Further, Steward acted against the Shoshone and Paiute people defining the stereotype of them as “primitive” so that the west can distinguish civilization and the progress made. The State of Nevada in a study of Native Americans at Yucca Mountain documented contemporary acts of the traditional council of the Western Bands of the Shoshone Nation of Indians together with legal and political study. Also, religion and world view were investigated, finding:				The BLM reviewed all requests for extensions and did not extend the public comment period beyond the 45-days. The Project is consistent with U.S. laws, including NEPA, NHPA, FLPMA and applicable EOs. Section 4.8 of the EIS contains the analysis as related to Native American Traditional Values. Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts. According to the EPA (https://www.epa.gov/radtown/radioactive-fallout-nuclear-weapons-testing#about-radioactive-fallout-from-nuclear-weapons-testing), “fallout typically contains hundreds of different radionuclides… Very little radioactivity from weapons testing in the 1950s and 1960s can still be detected in the environment now… The EPA maintains a system of radiation monitors throughout the United States. These monitors were originally designed to detect radionuclides that were released after a nuclear weapon detonation… Since the end of aboveground nuclear weapons testing, the day-to-day radiation in air readings from monitoring sites has fallen. For many years, analysis of air samples has shown risk levels far below regulatory limits. In fact, results are now generally below levels that instruments can detect.” Section 2.1.13.2 of the EIS includes commitments of Ioneer for managing dust, including implementation of fugitive dust control per Bureau of Air Control. Additionally, fugitive dust would be controlled on roadways and other areas of disturbance with water or NDEP/BLM-approved dust suppressants, where appropriate. Fugitive emissions at the crusher and material drop points would be minimized through application of water sprays or other dust control measures as per accepted industry practice and permit stipulation. Disturbed areas would be seeded with an interim seed mix developed in conjunction with the BLM to minimize fugitive dust emissions from exposed, unvegetated surfaces. Consultation is ongoing through the NEPA process and the literature cited in the EIS have been used for many years in the Great Basin region as ethnographic literature of the Western Shoshone and Northern Paiute tribes.

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		"Ethnographic data on Great Basin religion and world views are minimal at best. A major reason for this is that few ethnographers ever spent any length of time in a single community or with persons to get in-depth information. Most of the traditional ethnography in the region was of the survey type, and oriented toward subsistence, social organization, and material culture. The specific evolutionary theoretical orientation of Julian Steward (1938) also heavily influenced inquiry away from the subtleties of Great Basin religions." (Fowler et.al. 1991) According to McMillen, Steward worked at the Justice Department arguing cases against the Shoshone, Northern Paiutes, and Utes in adversarial cases before, and during the Indian Claims Commission (ICC). "That Steward developed key features of his theoretical position on hunter-gatherers' property while working at Justice, and with no further fieldwork, suggests the influence of the political-legal context in which he operated. (The ICC disagreed with Stewart and Justice in all three cases, siding with the Indian plaintiffs each time.)" (McMillen 2007) There is ample room for investigating the impacts unique to Shoshonean people practicing religious or spiritual ceremony and additional study should be done at the OPA and regionally. Lifestyle differences are important and should be studied further. Origin and ownership are important and documented by treaty. Shoshone have not received any benefits of jobs or independent research or payments equal to taxes while bearing disproportionate burden of risk of exposure to resuspended radionuclides that, exposure to is cumulative in that include US nuclear weapons testing fallout, etching out a fate of extinction of Shoshonean people. There are large gaps in the literature particularly in identifying Shoshonean people's enduring lifeways including unique spiritual practices, hunting, gathering of traditional food and medicine used for healing and religious purposes. The cooperating agency, the DOE documented the Native American "holistic world view" that is diametrically opposed with the "site specific" scientific world (Stoffle 1990). The Native American perspective views the regional landscape as seamless with all things connected. The scientist cannot answer a holistic question and therefore rephrases the question in terms that science can answer site specifically. "Is this burial, spring, of medicine plant at risk of contamination?" The DOE researchers conduct an analysis of the site-specific question and substitute their site-specific solution as the answer to the original Native American holistic question. The DOE research went further by creating a study protocol that would allow the DOE to subjectively mitigate Native American site-specific cultural resources. The process was called "cultural triage" that is defined as, "…a forced choice situation in which an ethnic group is faced with the decision to rank in importance equally valued cultural resources that could be affected by a proposed development project." (Stoffle1990). The DOE researchers also created two historic tribes that did not exist: The Pahrump Paiute Tribe and the Las Vegas Indian Center while denying the inclusion of the Western Shoshone National Council, traditional treaty governance of the Western Bands of the Shoshone Nation of Indians, manufacturing consent by the Consolidated Group of Tribes and Organizations now the Nuclear Energy Tribal Working Group led by the same fake tribe(s). The DOE researchers had created a systematic process to "mitigate" Native American living lifeways practiced since before the current era in what is ethnic cleansing, a violation of the Proxmire Act (18 USC 1091) and the 2009 Human Rights Enforcement Act (28 USC 509B). There is no doubt that the US has a trust responsibility to the Shoshone people as created in the 1903 case Lonewolf v. Hitchcock. Under the doctrine of the "plenary power of Congress," tribes themselves are incompetent and, as such, are wards of the US. Therefore, Native Americans, are unable to consent to participate in the project. The DOE itself, not the involved tribes, is responsible for the outcomes and recommendations that the researcher claims were made by tribal leaders recruited by the DOE as Official Tribal Contact Representatives (OTCR's) who met in Las Vegas on May 5, 1988. The proposed action is racial discrimination and should not go forward. Coordinate agency of the US government that practice occupancy and exclusion by attrition is intent evolved from the culture of secrecy withing the DOE, financier of the present proposed action. The OPA is wholly within the boundaries of the homelands of the Western Bands of the Shoshone Nation of Indians defined by the Treaty of Ruby Valley. The no Action Alternative protects Shoshone people, property and religion. None of the cooperating agencies seems to care how federal law, vis-a-via the Treaty of Ruby Valley, impact the indigenous Shoshone people and instead seek to accelerate extractive processes without further investigation. The EIS assumes ownership by convenience and does not use any legitimate basis for determining property ownership and instead substituting Esmeralda County's Land Use Planning document as a proxy and the BLM's Tonopah Resource Management Plan for ownership. Both planning documents make no claim to Shoshone property. All rights, title and interests defined by the Treaty of Ruby Valley boundaries in Article 5 are first and foremost ownership encumbrances upon the US agencies involved. The treaties between the US and the Shoshone Nation of Indians does not include the transfer of rights to foreign trans-national corporations and instead are enactment of restraint upon the US to provide protection to the Western Bands of the Shoshone Nation of Indians from exploitation by Ioneer Rhyolite Ridge LLC (Ioneer).	

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		 *Figure 1 Doty Map.*  *Figure 2 WSNC MAP* [1]Nevada Territorial Act 1861: Provided, further, That nothing in this act contained shall be construed to impair the rights of person or property now pertaining to the Indians in said Territory, so long as such rights shall remain unextinguished by treaty between the United States and such Indians, or to include any territory which, by treaty with any Indian tribe, is not, without the consent of said tribe, to be included within the territorial limits or jurisdiction of any State or Territory. [2]Quigley D, Handy D, Goble R, Sanchez V, George P. Participatory research strategies in nuclear risk management for native communities. J Health Commun. 2000 Oct-Dec;5(4):305-31. doi: 10.1080/10810730050199123. PMID: 11191016.	
MSandi Campbell – June 3, 2024			
116	116.1	Please accept my comments on the Rhyolite Ridge Lithium-Boron Project and BLM's draft EIS. THE PROJECT WOULD VIOLATE WESTERN SHOSHONE TREATY RIGHTS ..... ENDAGERED SPECIES: The Proposed action and North and South OSF Alternative would Jeopardize the Continued Existence of Tiehms Buckwheat and adversely modify its critical Habitat. WATER: Do you have adequate water rights? A current water pollution permit? What happens when you run the streams dry? which will happen in time. What about water quality impacts? BUCKWHEAT The DEIS significantly Underestimates the likelihood of pit wall failure and erosion of occupied Tiehms Buckwheat Habitat into the pit. The DEIS underestimates the dust impact on the Tiehms buckwheat. WILDLIFE. The DEIS fails to take a look at the impacts to sensitive and imperiled wildlife and also plant species.	The Project is consistent with United States laws, including NEPA, NHPA, ESA, FLPMA and applicable EOs. The EIS includes detailed analysis of impacts to Tiehm's buckwheat, special status wildlife and plant species, and water resources.
Personal Information Requested to be Withheld – June 3, 2024			
117	117.1	Please see attached the National Mining Association's comments.	Comment noted.

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117	117.2	June 3, 2024 U.S. Department of the Interior Bureau of Land Management Scott Distel Supervisory Project Manager 50 Bastian Rd. Battle Mountain, NV 89820 Submitted electronically via: https://eplanning.blm.gov/eplanning-ui/project/2012309/570 RE: Notice of Availability of the Draft Environmental Impact Statement for the Rhyolite Ridge Lithium-Boron Mine Project, Esmerelda County, Nevada, 89 Fed. Reg. 28,803 (April 19, 2024). Dear Mr. Distel, The National Mining Association (NMA) appreciates the opportunity to provide comments on the Bureau of Land Management's (BLM) Draft Environmental Impact Statement (DEIS) in support of the Rhyolite Ridge Lithium-Boron Mine Project (Rhyolite Ridge Project).[1] The DEIS, conducted pursuant to the National Environmental Policy Act (NEPA) and the Federal Land Policy and Management Act (FLPMA) assesses the effects of federal authorizations associated with the proposed action described within the proposed plan of operations. Ioneer, the Rhyolite Ridge Project proponent, is one of NMA's members. The NMA previously commented during the scoping process in support of the Rhyolite Ridge Project and its unique benefits locally and nationally that will further this administration's stated clean energy goals. The NMA hereby incorporates those comments by reference.[2] [1]89 Fed. Reg. 28,803 (April 19, 2024). [2]See National Mining Association's Scoping Comments on Rhyolite Ridge Lithium-Boron Project.	Comment noted. Comments submitted during the public scoping period were considered and used to develop issues for analysis in the EIS as discussed in Section 1.5.
117	117.3	**Introduction** America's mining industry supplies the essential materials necessary for nearly every sector of our economy – from technology and healthcare to energy, transportation, infrastructure, and national security. NMA has a membership of more than 290 companies and organizations involved in every aspect of mining in the United States. NMA's members work to ensure America has secure and reliable supply chains, abundant and affordable energy, and the American-sourced materials necessary for U.S. manufacturing, national security, and economic security, all delivered under world-leading environmental, safety, and labor standards. The Rhyolite Ridge Project will provide responsibly produced domestic sources of lithium and boron – materials necessary for a sustainable future and our national security. **Importance of U.S. Mined Minerals** As the Biden Administration has recognized, mining is the foundation of its electrification goals. The U.S. has abundant mineral resources to meet these goals. Yet, despite the exponential growth in mineral demand driven by global competition for more electric vehicles (EVs), wind turbines, solar panels, and the needed batteries to store energy, U.S. mineral production is stuck in first gear. In fact, over the last two decades, the U.S. has grown increasingly reliant on imports and supply chains dominated by geopolitical rivals, including China and Russia. Alarmingly, the U.S. is now import-reliant for 50 minerals, and 100 percent import-reliant for 12 of them.[3] The trendlines for lithium demonstrate how U.S. production has failed to keep pace with demand and the resulting reliance on imports. Until the mid-1990s, the U.S. was a leader in lithium production. The lithium industry started in the U.S. and led the globe in production for nearly 50 years. Today, according to the U.S. Geological Survey's (USGS) Mineral Commodity Summaries, the U.S. is more than 25 percent reliant on lithium imports from countries such as Argentina, Chile, China and Russia.[4] Lithium reserves in the U.S. remain unchanged – there are roughly eight million metric tons of lithium embedded in U.S. soil, placing us in the top five countries for lithium reserves. Over the last decade, however, the U.S. has seen a steady decline in active lithium mines and today we make up only 1 percent of global lithium production. With projects such as Rhyolite Ridge, the U.S. can remedy this overreliance. Now is the time to act to position the U.S. as a leader to meet the growing lithium demand projected by USGS and Benchmark Mineral Intelligence.[5] [3]Mineral Commodity Summaries 2024, available at https://pubs.usgs.gov/periodicals/mcs2024/mcs2024.pdf (last visited June 3, 2024). [4]United States Geological Survey Mineral Commodity Summaries, available at https://www.usgs.gov/centers/national-minerals-information-center/mineral-commodity-summaries (last visited June 3, 2024). [5]Minerals Make Life, Lithium: Electrifying America, available at https://mineralsmakelife.org/blog/lithium-electrifying-america/ (last visited June 3, 2024).	Comment noted.
117	117.4	**Rhyolite Ridge Project** The U.S. is poised to develop domestic supplies of lithium and boron, right here at home as the Rhyolite Ridge Project will deliver lithium from Nevada directly to battery makers. Recognizing this need, the U.S. Department of Energy (DOE) Loan Programs Office (LPO) in 2022 selected 12 lithium projects funded with $1.6 billion from the Bipartisan Infrastructure Law to support commercial-scale domestic facilities to extract and process lithium.[6] Importantly, the Rhyolite Ridge Project was one of those selected.[7] The LPO's loan for the Rhyolite Ridge Project will finance on-site processing of lithium carbonate that could potentially support lithium production for approximately 370,000 EVs each year.[8] As such, the project could reduce annual gasoline consumption by nearly 145 gallons, and prevent the release of 1.29 million tons of carbon dioxide each year.[9] Further, an on-site production facility will produce large quantities of borates that are essential for our future energy needs. The Rhyolite Ridge Project is committed to responsible development of lithium and boron, and has adopted a comprehensive set of environmental, social , and governance (ESG) standards to ensure that key mining risks are managed responsibly. These standards include early and meaningful outreach to Tribal Nations prior to the permitting process to foster consistent engagement and	Section 5.0 of the EIS describes government-to-government consultation and coordination for the Project with the Tribes.

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		collaboration in advancing Tribal interests and resolving any potential issues. For example, Ioneer has been working with Tribes to understand any cultural resource areas and environmental concerns, and exploring opportunities for economic development including job training and identifying initiatives for tribes to participate in the clean energy economy.[10] [6]Id. [7]Id. [8]U.S. Department of Energy, LPO Announces Conditional Commitment to Ioneer Rhyolite Ridge to Advance Domestic Production of Lithium and Boron, Boost U.S. Battery Supply Chain, available at https://www.energy.gov/lpo/articles/lpo-announces-conditional-commitment-ioneer-rhyolite-ridge-advance-domestic-production (last visited June 3, 2024). [9]Id. [10]Id.	
117	117.5	**Proposed Action** As outlined in DEIS, Ioneer is proposing the construction, operation, reclamation, and closure of a surface quarry from which lithium and boron would be extracted using conventional quarrying techniques and associated facilities. Ioneer has gone to great lengths to ensure the environmental, economic, and community sustainability for the approximately 23-year duration of the project. For example, Ioneer has pledged adoption of several environmental protection measures (applicant-committed environmental protection measures, or ACEPMs).. A snapshot of a few ACEPMs, outlined below, demonstrate Ioneer's sustainability commitment. From the outset, Ioneer has been actively engaged with the BLM and the U.S. Fish and Wildlife Service (FWS) to ensure the long-term viability of the Endangered Species Act (ESA) listed Tiehm's buckwheat and its habitat. The ACEPMs for the Tiehm's buckwheat include disturbance buffers, fences, and implementing a propagation and transplant program for new plants at varying locations. A Tiehm's Buckwheat Protection Plan outlines that all activities including quarrying have been designed to avoid any surface disturbance within a Buckwheat Exclusion Area that would be fenced off with locked gates. Furthermore, Ioneer intends to produce its lithium and boron using an energy-neutral process with minimal emissions and adequate emissions control equipment at stationary sources. Fugitive dust would be controlled on roadways and at the crusher and material drop points. Notably, air quality permits have already been obtained by the State of Nevada. Another ACEMP addresses how cultural resources surveys will be conducted to prioritize avoidance of such resources where possible. Additional ACEPMs for cultural resources include vibration monitoring at cultural sites, and mitigation for potentially adverse impacts to the sites.	The effects analysis presented in EIS Section 4.0 considers the implementation of ACEPMs to reduce impact.
117	117.6	**BLM-Preferred Alternative** The BLM has identified three alternatives in its evaluation: alternative A, or the prosed action; alternative B or the North and South overburden storage facilities (OSF); and a no action alternative. Alternative A and alternative B are substantially similar except for a few slight modifications. Alternative B would slightly reduce the mine and associated facility footprint within the endangered Tiehm's buckwheat and its critical habitat. Placement of overburden would occur in the North OSF, Quarry Infill OSF and the South OSF, resulting in an approximately 35 acres less of disturbance compared to alternative A. Because of the similarities between alternatives A and B, the ACEPMs described in alternative A would be included in alternative B. Further, Ioneer is working with BLM and other cooperating agencies to refine and expand the ACEPMs to prevent unnecessary or undue degradation of public lands throughout the life of the project, and consistent with BLM's regulations under the General Mining Law. Ioneer has also included analysis in its Buckwheat Protection Plan that outlines specific ACEPMs for alternative B, that is designed to avoid and minimize impacts to the Tiehm's buckwheat. As a result of the ACEPMs and commitments by Ioneer to develop a state-of-the-art mining project in an environmentally safe manner, the BLM made a preliminary selection of alternative B as its environmentally preferred alternative. The NMA strongly supports the BLM's environmentally preferred alternative and urges the BLM to work expeditiously to finalize the EIS.	The EIS contains detailed analysis of the Proposed Action and alternatives and considers the implementation of ACEPMs to reduce impacts.
117	117.7	**Conclusion** The NMA appreciates the opportunity to provide support for the Rhyolite Ridge Project. As outlined above, the U.S. is at a critical juncture for meeting the administration's clean energy goals and to reduce our reliance on foreign sources of mined materials. The Rhyolite Ridge Project is the right project at the right time. NMA believes the BLM should move forward with the finalization of the EIS as efficiently as possible and supports the BLM's environmentally preferred selection of alternative B. The NMA looks forward to continuing engagement with the BLM as it reviews the Rhyolite Ridge Project. Sincerely,	Comment noted.
Jennie Pakradooni – June 3, 2024			
118	118.1	As a frequent visitor to the Rhyolite Ridge area, I am writing to submit comments regarding the Rhyolite Ridge Lithium-Boron Project. I attended the May 9 BLM public meeting and heard the presentations from representatives of BLM and Ioneer providing some helpful and more detailed information on the proposed project. I recognize that we need a supply of lithium and boron for many purposes that benefit humans, and mining is necessary, but not at the expense of extinction. This mine and its 17-year long operations are situated far too close to the population of critically endangered Tiehm's buckwheat. As a naturalist and desert ecologist, I have visited the population multiple times and explored the surrounding area and habitat in Fish Lake Valley, and being aware of the impacts to local communities and wildlife by similar mining operations across the west including in Nevada, I have many concerns. Aside from having seen incomplete fencing and witnessed the "exclusion area" being breached multiple times by free roaming cattle who have destroyed biocrust and crushed plants, I do not feel that any of the three proposals adequately address protection of the endangered species present nor do any of the proposals take into account protections for local communities and wildlife who move through the area. Simply mitigating surface disturbance in a portion of the habitat while drilling hundreds of feet into the ground in close proximity to a designated critically endangered species with unknown impacts to an already compromised water table in a delicate desert region is not adequate. Yes we need these components, but the mine needs to be relocated elsewhere. We cannot simply continue to risk species to go extinct for one purpose. We as humans are a part of nature - and mining the earth may be a part of that but we must do it in a way that is responsible and the information and proposals I heard on May 9 did not convince me that this mine as proposed is a sound operation for human communities or for any species living in the region. Thank you for considering my comments and input. Sincerely,	The Project proposes development of a locatable mineral resource. Relocation of the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the resource deposit is located. The EIS describes ACEPMs in Section 2.1.13 that would be implemented to reduce impacts. Analysis of effects to Tiehm's buckwheat, local communities, and wildlife are analyzed in detail in EIS Sections 4.10, 4.12, and 4.18.

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		Jennie Pakradooni	
Sally Manning – June 3, 2024			
119	119.1	Please see attached letter from the Big Pine Paiute Tribe of the Owens Valley	Comment noted.
181	181.1	To Whom It May Concern: Here is a comment letter from the Big Pine Paiute Tribe of the Owens Valley on the draft EIR for the Rhyolite Ridge lithium-boron mining project. This letter was also just now uploaded online on the e-planning site. Sally Manning, Environmental Director Big Pine Paiute Tribe of the Owens Valley P. O. Box 700 825 S. Main St. Big Pine, CA 93513	Comment noted.
119 and 181	119.2 and 181.2	BIG PINE PAIUTE TRIBE OF THE OWENS VALLEY Big Pine Paiute Indian Reservation P.O. Box 700 · 825 South Main Street · Big Pine, CA 93513 (760) 938-2003 · fax (760) 938-2942 www.bigpinepaiute.org June 3, 2024 Bureau of Land Management Attn: Rhyolite Ridge Lithium-Boron Project 50 Bastian Road Battle Mountain, Nevada 89820 [submitted electronically] Subject: Comments on proposed Rhyolite Ridge Lithium-Boron Mine Project draft Environmental Impact Statement Dear Bureau of Land Management Decision Maker, The Big Pine Paiute Tribe of the Owens Valley (“Tribe”), a federally recognized Tribe, submits the following comments on the proposed Rhyolite Ridge Lithium-Boron Mine Project draft Environmental Impact Statement (“dEIS”) in accordance with the National Environmental Policy Act (“NEPA”). This extensive mining project is being pursued by a private company, Ioneer Rhyolite Ridge LLC (“Ioneer”). The Bureau of Land Management (“BLM”) is the lead agency, and there are several cooperating agencies. Lands withdrawn and managed by the United States federal government were taken from Indigenous peoples, and to this day, tribes rely on agencies such as BLM to be defenders and caretakers of these lands. The Tribe seeks meaningful protection of the land, air, water, and other resources in the Tribe’s traditional territory and throughout the nation’s public lands in general. The Rhyolite Ridge Lithium-Boron Mine Project as described in the dEIR would result in significant, adverse, irreversible damage and the harm far outweighs what little value the mostly for-profit project may have. The Tribe objects to the proposed Rhyolite Ridge Lithium-Boron Mine Project, and this letter explains some of the reasons this mining should not be allowed. To begin, the Tribe states two important points. First, in these public comments submitted on the dEIS, the Tribe will not discuss cultural resource issues in detail. The Tribe understands that consultation will continue between tribes and the BLM regarding these important matters. The Tribe hopes the NEPA consultation process concludes with BLM making a decision with which the Tribe concurs. Second, the period between the release of the (at least) 1,608 pages of NEPArelevant material and the due date for public comments is too short. The Threatened and Endangered Species Supplemental Environmental Report alone is 509 pages! More time is needed for the Tribe and others to read, fact-check, and provide necessary feedback on the information. Innumerable and diverse resources are put in jeopardy should the mining be allowed to proceed. The short public review period is unfair when so much is at stake. BLM’s decision to limit the period for public input gives the appearance the agency is expediting the mining project in order to please Ioneer and ignore the intent of NEPA as well as the important concerns expressed by tribes and the general public. The Tribe notes that BLM is tasked with priorities and objectives which contradict each other. The overall BLM mission statement is, “The Bureau of Land Management's mission is to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations” (https://www.blm.gov/about/our-mission). BLM is also tasked with allowing activities such as mining and installation of industrial-scale energy development (for example solar and geothermal) that destroy or degrade the health, diversity, and productivity of its land holdings. Mining operations conducted at the scale they now are carried out, and as planned in the proposed Rhyolite Ridge project, are completely inconsistent with the mission of the BLM. One important, overarching truth should be sufficient for BLM to deny mining, namely that it has never been shown that the lands can be fully restored to pre-project conditions after open pit mining has been allowed. Plans for reclamation for this and most mining projects include setting aside topsoil, recontouring disturbed areas, and scattering seeds; however, the lands do not recover, at least not at the scale of a human lifetime. Reclaimed lands remain visually and ecologically scarred for generations to come, never blending into the natural landscape. BLM knows this, and these unacceptable outcomes are contrary to the BLM mission. The No Project Alternative needs to be selected, because the Rhyolite Ridge Lithium-Boron Mine Project will result in an unacceptable level of adverse impacts. Table 2-6 of the dEIS compares the effects of Ioneer’s plan with BLM’s preliminary “environmentally preferred” alternative, which is also called the North and South Overburden Storage Facility Alternative or “North and South OSF Alternative.” It is not clear why BLM presents an alternative that causes nearly identical adverse impacts to existing resources as Ioneer’s plan and calls it “environmentally” preferred. What, exactly, is “environmental” about it? At best, the BLM preliminary preferred alternative very slightly reduces the acreage of outright destruction, “saving,” for example, 20 acres in the midst of	The public comment period was conducted in accordance with CEQ and BLM NEPA regulations. The EIS presents detailed analysis of the Proposed Action and alternatives and discloses environmental impacts associated with each. Impacts to Tiehm’s buckwheat are analyzed in EIS Sections 4.12 and 4.20.12. In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm’s buckwheat and its designated critical habitat. The Project has been considered as required by NEPA and CEQ regulations. Changes to NEPA are beyond the scope of the Project. Impacts from hazardous materials used for the Project are discussed in EIS Section 4.5.

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		2,000 acres of destruction. To any reasonable person, "saving" such a small percentage and calling it "environmental" is disingenuous. For both the project proponent's and the BLM's alternatives, there will be—as listed throughout the documents—significant, unavoidable, unmitigable, irreversible, and/or permanent adverse impacts to: plants and animals including endangered species; cultural resources; water resources; geology; Native American traditional values; air quality; night sky and visual resources; soils; greenhouse gas emissions; recreational and livestock grazing opportunities; social conditions; and traffic. In fact, while some of the impacts of both alternatives will be identical, the BLM preferred alternative admits to a significant increase in damage to cultural resources! Even with BLM's contradictory and confusing mission and mandates, and despite the statement in the dEIS that the final "BLM-preferred alternative will be determined following the Draft EIS public comment period," the impacts from mining at Rhyolite Ridge far exceed any level of disturbance which may be seen as acceptable to any reasonable person. The only way to protect the numerous resources at risk is to select the No Project Alternative. The Tribe understands that threatened and endangered plant and animal species occur within the mining project footprint, and the Tribe is particularly concerned about the rare plant Eriogonum tiehmii ("Tiehm's buckwheat"). The U. S. Fish and Wildlife Service ("USFWS") in December 2022 determined Tiehm's buckwheat to be "endangered." This plant species is known in the wild only from the Cave Springs Road canyon site where Ioneer plans to remove the substrate on which this species grows. Its limited distribution already makes its continued existence as a species precarious, but Tiehm's buckwheat was listed as endangered because of the threat of Rhyolite Ridge mining project. Humans know much about lithium, but very little about Tiehm's buckwheat. Which is more important: allowing a company to engage in massive digging and on-site chemical processing for the relatively common minerals lithium and boron or protecting a plant associated with the unique site now and for future generations? To the Tribe, and to be consistent with BLM's mission statement, the answer is clear: the plant must be protected. USFWS also designated nearly 1,000 acres of critical habitat, which is what they estimate as the land area necessary to support the plant now and into the near future, and all of its critical habitat is in the footprint of the Rhyolite Ridge proposed lithium-boron mine. Scientifically speaking, no one knows why this buckwheat grows here or why it has such a limited distribution. We do not know about its biology, including abiotic tolerances such as water and temperature, pollinators, seed production and viability, recruitment/reestablishment potential, the effects of grazing or ambient particulate matter, the effects of climate change, etc. There is always much humans may learn from a living organism, so its fate and long term survival should not be put in the hands of a mining company which will be allowed to operate within the plant's critical habitat for a generation or more. The Rhyolite Ridge mining project is completely inconsistent with the Tonopah Resource Management Plan ("RMP"), which dates from 1997, with regard to endangered species. As quoted from the Supplemental Environmental Report, the RMP, "identifies objectives related to special status species, including threatened and endangered species. The RMP states the objective: to protect, restore, enhance, and expand habitat of species identified as threatened, endangered, or Nevada BLM Sensitive Species under the ESA. "In addition, the RMP includes the following determination: habitat for all federally listed threatened or endangered species or Nevada BLM Sensitive Species (plant and animal) will be managed to maintain or increase current populations of these species." BLM's first step along the way to protecting Tiehm's buckwheat now and into the foreseeable future is to reject the proposed project. A next step would be to provide a higher level of land protection, for example by designating the site as an Area of Critical Environmental Concern. Lithium is not a rare element; it occurs all over the earth. Lithium can be recycled and thus recovered from existing materials such as everyday batteries, and in the not-too-distant future, lithium may be at least partly replaced by other substances for use in energy storage. The common metal lithium simply has a current market-rate value which makes this project viable for private industry in the short term. The future of a very rare plant species should not be compromised for a project to mine a common substance (which at Rhyolite Ridge is clay containing a tiny 0.18% lithium). The value of a plant that has evolved with an apparent affinity for a substrate with a unique mineral composition is not something that one may put a dollar figure on; these resources are truly irreplaceable thus of immeasurable value. Another significant problem with the proposed project is its anticipated water consumption. The project involves both dewatering the large open pit Ioneer plans to dig and pumping and piping water several miles from wells in Fish Lake Valley to the site for processing the ore. Page 2-9 of the dEIR says that quarry pit dewatering rates will range from about 60 gallons per minute (gpm) to a maximum annual average of 650 gpm. Page 2-8 says that water piped in from Fish Lake Valley would flow at approximately 2,500 gallons per minute (gpm). With minor exceptions, all of this water will be consumed through evaporation. At, say, 2,800 gpm, the Tribe estimates the project will consume at least 4,500 acre-feet of water per year. Vegetation communities and wildlife species, which are important to Native Americans, are likely to be impacted. The dEIR indicates there could be flow reductions and thus adverse impacts at some or all of the 32 nearby surface water sites, including Cave Spring, if the hydrologic response to quarry dewatering affects the aquifer from which these springs and seeps derive water. The Tribe expects the drought conditions already happening with the changing climate are stressful enough on these valuable arid-land water sources, so it is unacceptable to add to the threat by tampering with regional hydrology. Onsite ore processing could adversely affect water quality. The mine would also take water away from local people who rely on farming and ranching. The Tribe knows of no instances where the outcome of pumping and chemical pollution resulted in good or improved hydrologic conditions. The Tribe notes that Section 4.21 of the dEIS presents some mitigation measures proposed to be in place should the hydrology not respond as predicted. Ioneer will be required to monitor flows and changes within the zone of predicted 10-foot groundwater drawdown, quarterly, and report monitoring results to BLM annually. If flows diminish or environmental impacts exceed expectations, the mitigation does not mitigate for the environment, rather the measures allow Ioneer to seek additional water, such as drilling new wells or pumping and importing from elsewhere. As mentioned earlier in this letter, the Tribe knows of no former mining operation of comparable size and scope which has truly successfully cleaned up and left an area as good as or better than conditions when mining started. Even if an example or two exist, successful techniques in one situation most likely will not apply directly in another mining operation due to a multitude of reasons (different minerals being mined, slopes and aspects, climate, starting biological conditions, etc.). Nevertheless, Ioneer and BLM plan for a project lifespan approximately equal to one human generation. Ioneer will not be required to reclaim all of the disturbance: they will leave behind an open quarry pond and a total of 383 totally disturbed acres. The time periods exceed the tenure of most BLM and other government employees, such as those of the cooperating agencies, but the impacts persist indefinitely, at least several generations. The Tribe is, of course, alarmed to read about the onsite ore processing. If the BLM listens to public comment and refuses to allow the mining to proceed, this becomes a non issue. Should the wrong decision to be made and the project proceeds, then BLM will indeed need to take all precautions regarding hazardous liquid, solid, and gaseous materials which would be brought in or generated on site, used during the active project period, and no doubt left behind when the project ends (if it does). In addition, there is the infrastructure needed to carry out the processing, including generators, pads, liners, containers, and more. None of the above belong in a remote high desert canyon. They all present a threat to vegetation, wildlife, and human health. Components always escape, polluting the air or contaminating ground water. Once escaped, it is extremely difficult or impossible to recapture them or reverse the effects of the pollution. Adequate reclamation is not possible, so the project should be rejected to be consistent with BLM's mission and the Tribe's trust in federal resource management and protection agencies.	

Comment Letter No.	Comment Number	Comment	Response
		The Tribe applauds the nation's priority to tackle the climate crisis at home and abroad, and the Tribe is in favor of reducing to the point of zero the burning of fossil fuels, but the Tribe is alarmed that the federal government has prioritized the destruction of western lands and resources to achieve its goals. The nation cannot create a true environmentally-sound future using the same protocols, laws, and processes that have put the country and the world in the crisis it is in today. NEPA is more than 50 years old, and its approach to protecting the environment falls far short of what modern western science now understands about landscapes and ecosystems. NEPA fails to take a holistic, thus more realistic, view of the resources and systems in which they function. While NEPA is better than nothing, the nation is fooling itself that progress will be made in tackling today's big problems using yesterday's "western" tools and mindset. Indigenous approaches to land management need to be brought forward. For the Tribe, these well-tested, organic approaches work with natural systems, not in defiance of them. With regard to the nation's energy future, more focus is needed on the reasonable viable alternatives including energy conservation, recycling, energy storage technology, and decentralization. In conclusion, the Tribe respectfully requests BLM reject the Rhyolite Ridge Lithium-Boron Mine Project. For mining proposals, BLM has discretion to prevent land and resource degradation and significant impacts that can be avoided. The Tribe calls upon BLM to steadfastly protect irreplaceable, extremely valuable natural and cultural resources rather than subject them to degradation brought on by mining operations. The Tribe and other people rely on the agency to be a strong voice for ecological integrity. Please select the No Project Alternative. Sincerely, Cheyenne Stone Tribal Chairperson	
Not Provided – June 3, 2024			
120	120.1	Please see attached comment from Ford Motor Company.	Comment noted.
120 and 185	120.2 and 185.1	Mr. Scott Distel Battle Mountain District Office Bureau of Land Management U.S. Department of the Interior 50 Bastian Road Battle Mountain, NV 89820 May 30, 2024 RE: Rhyolite Ridge Lithium-Boron Project Dear Mr. Distel, As a representative of Ford Motor Company, I would like to express Ford's support for Ioneer's Rhyolite Ridge lithium project. Ford aspires to source only raw materials that are responsibly produced. We work to ensure that everything we do – or that others do for us – upholds our commitment to protect the environment and respect human rights. By advancing groundbreaking technology, supporting our people, our partners, and our customers, and protecting our planet, we are ensuring that Ford Motor Company will be here for generations to come. Around the globe, we are investing to advance our EV strategy and create a sustainable manufacturing system for our vehicles and the batteries that power them. We are working with directly contracted suppliers towards diversifying our supply chain, including domestic sources of lithium. This will allow us to have a stronger impact as we secure minerals for our EVs more directly and gain transparency into our EV battery raw material supply chains. As such, Ford has taken a distinct interest in the Rhyolite Ridge project. Our technical team has thoroughly reviewed the current draft of the Environmental Impact Statement (EIS) and are pleased to see a vigorous environmental monitoring and mitigation program, strong engagement with local indigenous communities, and a conscious effort towards conservation and biodiversity. Ford Motor Company looks forward to the development of this project and the continued support from the Bureau of Land Management for lithium mine and processing development in the U.S. to support the significant investments we are making throughout the U.S. in the EV supply chain. I appreciate your consideration, Tony Reinhart Director, State & Local Government Affairs	Comment noted.
Not Provided – June 3, 2024			
121	121.1	I do not support the endangerment of Tiehm's buckwheat habitat in order to mine Lithium. This endangered species plays an important role in pollinators, and spider species. This is the only place in the world where this plant grows, and extinction is not an option. We as humans can do better to have more sustainable mining practices that do not choose one species life over another. Please reconsider destroying a habitat of an endangered species that plays such an important role. Thank you	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat in Sections 4.12 and 4.20.12. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
Kathryn K LaShure – June 3, 2024			

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122	121.2	None of the proposals for this mine are adequate to protect the fragile water table. In the desert water is so precious and this mine would adversely affect a large area extending into Death Valley National Park making water even more scarce for the wildlife and plants that depend on it. And on the site itself there is a beautiful rare plant, Eriogonum tiehmii, that occurs no where else on the entire planet. None of the proposals put forth by the mining company would protect this plant from extinction. Lithium can be mined responsibly but this site is too fragile so Ioneer should look elsewhere for a suitable site.	The EIS assesses impacts to water resources using the predicted 10-foot drawdown contour from the numerical groundwater model and a one-mile buffer. The 10-foot drawdown contour and one-mile buffer do not extend into Death Valley National Park. Additional detail on the area of potential impacts can be found in EIS Section 4.16.
Suzanne Carter – June 3, 2024			
123	123.1	Please do not open this fragile desert environment to mining. The native species there are irreplaceable and the desert pavement is susceptible to massive damage. It will also require much more water than is available.	The lands in the Project area are open to mineral entry under the 1872 Mining Law, as amended. Impacts to native plants and wildlife are analyzed in EIS Sections 4.14 and 4.18. Impacts to water quantity are discussed in EIS Section 4.16.
Personal Information Requested to be Withheld – June 3, 2024			
124	124.1	As an Eriogonum lover who lives states away, i would love to be able to see this one day.	Comment noted.
Ian Zabarte – June 3, 2024			
125	125.1	Key points and issues raised by Ian Zabarte regarding the Rhyolite Ridge Lithium-Boron Mine EIS: Treaty Rights: The Western Bands of the Shoshone Nation of Indians assert that their property rights, as defined by the Treaty of Ruby Valley, have not been respected in the creation of state or local boundaries, including Nevada and Esmerelda County. They have not consented to inclusion within these boundaries and have sought the creation of a reservation under the treaty. Land Ownership: The extent of Shoshone homelands remains undefined, except by the indigenous people themselves. The Doty treaty map, which lacks clarity on boundaries, has not satisfactorily addressed the matter of ownership. Environmental Concerns: The proposed mining project is viewed as environmental racism, failing to consider laws for the improvement of the Shoshone people or to prevent violations of the Treaty of Ruby Valley. The project is seen as destructive to sacred lands and disregards potential environmental impacts. Radiation Risks: Concerns are raised about the disturbance of uranium and potential radioactive fallout in the Operational Project Area (OPA), which has not been adequately studied in the EIS process. The EPA's silence on baseline radiation levels and the DOE's adoption of standards without addressing Shoshone concerns are intentional infliction of conditions intended to bring about the destruction of Shoshone people, a peremptory norm in international human rights laws and US law 18 USC 1091 and 28 USC 509B. Cultural Impact: The comments question the assumptions of the Ioneer Lithium EIS as not being protective or beneficial to the Shoshone people and homelands. The use of linguistic boundaries is seen as misleading and diminishing Shoshone property interests. There is a call for further investigation into the impacts on Shoshonean people's religious and spiritual practices. Request for Extension: A 60-day extension is sought to allow for more comprehensive commenting on the EIS. This outline captures the main ideas, points of law, and issues from Ian Zabarte's comments regarding the Rhyolite Ridge Lithium-Boron Mine EIS. It highlights the need for further investigation and consideration of the Shoshone Nation's rights and concerns.	The BLM reviewed all requests for extensions and did not extend the public comment period beyond the 45-days. Establishment of state, county, homeland, and reservation boundaries is beyond the scope of the EIS. Several Indian Claims Commission and federal court cases have addressed alleged taking of land including territory described in the Treaty of Ruby Valley. Judgement on these cases found that a taking occurred and aboriginal title was extinguished. In response to these cases, Congress passed the Western Shoshone Claims Distribution Act to provide for distribution of the settlement funds. The EIS contains detailed analysis of the Proposed Action and alternatives and discloses the anticipated impacts. Section 4.8 of the EIS contains the analysis as related to Native American Traditional Values. Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts. According to the EPA (https://www.epa.gov/radtown/radioactive-fallout-nuclear-weapons-testing#about-radioactive-fallout-from-nuclear-weapons-testing), "fallout typically contains hundreds of different radionuclides… Very little radioactivity from weapons testing in the 1950s and 1960s can still be detected in the environment now… The EPA maintains a system of radiation monitors throughout the United States. These monitors were originally designed to detect radionuclides that were released after a nuclear weapon detonation… Since the end of aboveground nuclear weapons testing, the day-to-day radiation in air readings from monitoring sites has fallen. For many years, analysis of air samples has shown risk levels far below regulatory limits. In fact, results are now generally below levels that instruments can detect." Section 2.1.13.2 of the EIS includes commitments of Ioneer for managing dust, including implementation of fugitive dust control per Bureau of Air Control. Additionally, fugitive dust would be controlled on roadways and other areas of disturbance with water or NDEP/BLM-approved dust suppressants, where appropriate. Fugitive emissions at the crusher and material drop points would be minimized through application of water sprays or other dust control measures as per accepted industry practice and permit stipulation. Disturbed areas would be seeded with an interim seed mix developed in conjunction with the BLM to minimize fugitive dust emissions from exposed, unvegetated surfaces

Comment Letter No.	Comment Number	Comment	Response
Not Provided - June 3, 2024			
126	126.1	The obliteration of native species and intact ecosystems is unacceptable anywhere, but especially so when it involves profit-obsessed corporations laundering their work through the sellout BLM, a supposed protector of public land. The plan is insulting and transparent. If there were any justice Ioneer would be driven out with pitchforks.	Comment noted.
Christopher Berry – June 3, 2024			
127	127.1	I think the limited habitat of the Thiem Buckwheat should not be impacted by this project and the species should be fully protected from and harm or take from this project.	Avoidance of Tiehm's buckwheat critical habitat was considered but is not feasible due to the location of the mineral resource. Additional information is provided in the SIR.
Bill Helmer – June 3, 2024			
128	128.1	Bill Helmer's comment letter is attached.	Comment noted.
133	133.1	Comment letter from Bill Helmer attached in case the first comment letter didn't go through. I submitted a comment letter earlier, but I did not receive a receipt by email, and there was no download after pressing download/print.	Comment noted.
128 and 133	128.2 and 133.2	June 3, 2024 Bureau of Land Management (BLM) Attn: Rhyolite Ridge Lithium-Boron Project 50 Bastian Road Battle Mountain, NV 89820 Re: Comments on the Rhyolite Ridge Lithium-Boron Project (DOI-BLM-NV-B020-2021-0020-EIS) Dear Mr. Distel: I recommend the "No Action Alternative" for this mining proposal because it is the only Alternative which protects an endangered species, the Thiem's Buckwheat which grows nowhere else on earth, and the Native American ethnographic landscape which will be desecrated with the construction of a lithium-boron mine in this location. The following comments are being sent today because BLM refused a reasonable request for a comment extension of 45 days from today. The complexity of the Rhyolite Ridge Lithium-Boron Project (Project), and the listing of Theim's Buckwheat as an Endangered Species justified an extended period for comments. Public input and Tribal consultation have been inadequate, and once again the public and tribes are treated as nuisance hurdles to get through, and then to get on with this project. This subverts the spirit and letter of the public participation provisions of the National Environmental Policy Act. The accelerated schedule benefits no one except the developer, Ioneer. The Project is not "green," and will accelerate the extinction of the Tiehm's buckwheat, a listed endangered species, and will desecrate a culturally and spiritually important area to the Western Shoshone, Owens Valley Paiute, and the Northern Paiute. This Project will do NOTHING to combat human-induced climate change, but it will increase the profits of the multinational mining company, Ioneer, while callously pushing a unique species to extinction. The draft Environmental Impact Statement (DEIS), as required under the National Environmental Policy Act (NEPA), is being rushed through, and is very disorganized. Important impacts are obscured, and the actual environmental impacts of the Project are not emphasized or even clearly stated. Substantive tribal consultation needs to be conducted so that there is meaningful input in the analysis in the draft Environmental Impact Statement. Although by law there is supposed to be coordination of NEPA and the National Historic Preservation Act (NHPA), there is no NEPA and NHPA coordination in this DEIS.	The Project is consistent with NHPA and applicable EOs. Section 4.8 of the EIS contains the analysis as related to Native American Traditional Values. Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts. The EIS provides detailed analysis of the Proposed Action and alternatives and discloses anticipated impacts. Section 2.6 provides a summary of impacts while Section 4.0 provides detailed disclosure of impacts and rationale.
128 and 133	128.3 and 133.3	On pp. 4-11 and 4-12 of the DEIS it is stated: "Multiple tribes expressed preference to avoid prehistoric cultural resources. Where avoidance is not reasonably feasible, the BLM would consult with the appropriate Native American tribe(s) and individuals to obtain information about the identified concerns and what mitigation measures might be appropriate. After consulting with the appropriate tribe(s), the BLM, in consultation with the Tribes and the Nevada SHPO, would then determine the appropriate course of action." The Section 106 Regulations of the National Historic Preservation Act state (800.8(a)(1): "…Agencies should consider their section 106 responsibilities as early as possible in the NEPA process, and plan their public participation, analysis, and review in such a way that they can meet the purposes and requirements of both statutes in a timely and efficient manner." According to the DEIS passage above, the "course of action" is still to be determined even after four years of meeting with some of the affiliated tribes. On p. 5-1 of the DEIS, it states: On February 11, 2020, five tribal representatives from the Timbisha Shoshone Tribe accompanied the BLM on a visit to the Project. During the site visit, the tribal representatives expressed concern about impacts to prehistoric cultural resources and inquired about impacts to bighorn sheep and Tiehm's buckwheat. Tribal representatives stated that avoidance of cultural resources is preferred over mitigation." Since "Tribal representatives stated that avoidance of cultural resources is preferred over mitigation" why wasn't this followed up? If mitigation is not possible, what is the next step? Were tribal Elders consulted, was an ethnographic study for the Project area conducted? Apparently not, and this is one of the reasons that the DEIS is inadequate. For early coordination, meaningful government-to-government consultation should have already taken place in the last four years, and waiting for any "meaningful" consultation until after the DEIS comment period is over is unacceptable and a violation of NEPA and the NHPA.	The Project is consistent with NEPA, NHPA, and applicable EOs. Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts.
128 and 133	128.4 and 133.4	On p. 5-3 of the DEIS in Table 5.1 (Tribal Consultation/Coordination), comments from the Big Pine Paiute Tribe of the Owens Valley, 02/03/2023, state "Letter expressing opposition to the project, acknowledges ongoing consultation, and resource concerns including Tiehm's buckwheat, water, plants, wildlife." Comments from the Western Shoshone Defense Project (02/03/2023) state: "Letter expressing opposition to the project, resource concerns including impacts to springs and wildlife, the Cave Springs sacred site, Indigenous traditional ecological knowledge, ground and surface water contamination, and tribal treaty rights." (emphasis added).	The Project is consistent with NEPA, ESA, NHPA and applicable EOs. Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process.

Comment Letter No.	Comment Number	Comment	Response
		Two consulting parties expressed opposition to the project due to the issues cited, including the concern for the Thiem's Buckwheat and the Cave Springs sacred site. However, there was no discussion in the DEIS of how BLM conducted meaningful government-to-government consultation in order to deal with these extremely important concerns. Just collecting comments from tribes in letters and on site visits isn't meaningful government-to-government consultation. The Section 106 process of the National Historic Preservation Act has not been followed. A mining proposal can't be built anywhere a proponent wants because there are environmental and cultural resource laws which govern the appropriate locations for private developments on public lands. That's why there is the National Environmental Policy Act, the National Historic Preservation Act, and the Endangered Species Act. All three of these laws are being ignored in this DEIS.	The Project is consistent with the 1872 Mining Law, as amended, which confers a statutory right to enter upon public lands that are open to mineral entry to explore for and develop mineral deposits.
128 and 133	128.5 and 133.5	On p. 4-4, Cultural Resources, Proposed Action, 4.2.1, it is stated: "A MOA [Memorandum of Agreement] between the BLM, SHPO, Ioneer, and other consulting parties is being prepared and would be executed. The MOA would lay out the steps that the agency and other parties take to consider and resolve any adverse effects that the Project would have on historic properties. Unavoidable adverse impacts to historic properties would be minimized and/or mitigated through implementation of an HPTP [Historic Properties Treatment Plan], which is also in preparation." After years of meeting and "consulting" with tribes and tribal organizations, and after finding out the concerns of the Timbisha Shoshone Tribe and the Western Shoshone Defense Project, why was nothing done? Are the Tribes that were contacted about this Project involved in the development of the MOA and the HPTP? Were the Tribes and tribal organizations asked to be Signatory Parties to the MOA? Or will they be asked to sign on to an agreement which they didn't write, and which ignores the fact that the Project can't be mitigated?	During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts in accordance with the MOA and HPTP. The Tribes were sent the Draft MOA on April 18, 2024 for review. The HPTP was sent to the Tribes on June 12, 2024. Table 5-1 in the Final EIS has been updated with additional consultation and coordination conducted.
128 and 133	128.6 and 133.6	p. 4.51: Under the Cumulative Impacts section, 4.20.2.1, it states: "Historic properties located in the CESA [Cumulative Effects Study Area] on federal land or if there is a federal nexus, would be mitigated in accordance with applicable Section 106 consultation requirements. In addition, any previously unknown NRHP-eligible cultural resources discovered during construction activities would be treated in accordance with the MOA and ACEPMs [Applicant-Committed Environmental Protection Measure]. Compliance with Section 106 of the NHPA has minimized adverse effects to historic properties; however, past and present disturbances in the CESA have resulted in cumulative impacts to these properties. Cumulative effects to historic properties from past, present, and reasonably foreseeable future activities combined with the Proposed Action would be adverse, permanent, and localized; an MOA and HPTP would be implemented to mitigate these adverse impacts." The above passage is revealing in that it ignores tribal comments regarding opposition to the project and the fact that the adverse impacts to the Tiehm's buckwheat and cultural resources and sacred sites can't be mitigated. If they can be mitigated, where are the passages in the DEIS where the tribe agrees to mitigation? A Memorandum of Agreement and an Historic Properties Treatment Plan for cultural resources should have been completed before the DEIS was out for public review, and should have had the full approval of the involved tribes and tribal organizations. It is stated above "Compliance with Section 106 of the NHPA has minimized adverse effects to historic properties." Actually, compliance with Section 106 has not minimized adverse effects to any historic property. Data recovery is not mitigation. An ethnographic study needs to be initiated before the Final EIS is completed in order to find out the full effects of the Project on Cultural Resources and Native American Values. It is also stated in the same paragraph: "Cumulative effects to historic properties from past, present, and reasonably foreseeable future activities combined with the Proposed Action would be adverse, permanent, and localized; an MOA and HPTP would be implemented to mitigate these adverse impacts." Again, an MOA and HPTP will not mitigate any cumulative impacts.	The referenced text is referring to the development of ACEPMs, MOAs, or HPTPs to minimize effects from reasonably foreseeable future projects, and not the effects of the proposed Project.
128 and 133	128.7 and 133.7	What if the "No Action Alternative" is the most environmentally and culturally acceptable outcome for the project because, if approved, the Thiem's Buckwheat will become extinct, and the rights and spiritual values of the native people who know this land the best are trampled upon? Ioneer knows absolutely nothing about the Silver Peak Range except that it will make them lots of money. This a "green" future that paves the way for environmental and cultural degradation. Short term gain for a few, long term devastation for everyone else. Along with the No Action Alternative, the proposed Project location should be designated a Rhyolite Ridge Area of Critical Environmental Concern (ACEC), as submitted to the BLM in 2021 by the Center of Biological Diversity (CBD) and the botanist Naomi Fraga. Besides preventing the extinction of the Thiem's Buckwheat, the Native American ethnographic landscape would be preserved, and the area will be protected for present and future generations. There are other ways to combat the real threat of global warming—the world isn't a blank slate for a mining company's profit. This ACEC proposal should be included as part of the No Action Alternative to show that this Alternative is a proactive positive solution in contrast to the proposed Project Alternatives which will have destructive consequences for Rhyolite Ridge. I will end this comment with the conclusion of the ACEC nomination of the Center for Biological Diversity and Naomi Fraga to the BLM. This proposal, and an ethnographic study--with the full participation and approval of the involved tribes and tribal organizations-- can point the way towards a truly livable future for all, humans and non-humans alike. Reference: Center for Biological Diversity [CBD] and Fraga . 2021. Re: Nomination of Rhyolite Ridge Area of Critical Environmental Concern Submitted to BLM. Available at: https://www.biologicaldiversity.org/species/plants/pdfs/Tiehms_Buckwheat_ACEC_Petition _032921.pdf: In 2021, a petition to establish the Rhyolite Ridge Area of Critical Environmental Concern (ACEC) on BLM managed public land in the Tonopah Field Office was submitted (CBD and Fraga 2021). The proposed Rhyolite Ridge ACEC boundary includes all six subpopulations of Tiehm's buckwheat, and a one-mile buffer surrounding them, for a total of 4,015 acres. This proposal would be consistent with the No Action Alternative, as it would provide the opportunity to reclaim any roads or other disturbances from mining exploration that have already occurred. We also request that BLM should also deny any future requests to develop or extract locatable minerals within the proposed ACEC. This would be consistent with the purpose of the ACEC designation, BLM's special status species policy, and BLM's statutory mandate to prevent "unnecessary and undue degradation" of the public lands. (The Federal Land Policy and Management Act, 43 U.S.C § 1732(b).) In addition to prohibiting future mining development, BLM should take steps to re-acquire any interests in mineral rights within the proposed ACEC that may have already vested. The ACEC designation should also include management direction to reclaim any roads or other disturbances from mining exploration that have already occurred. Motorized travel, including OHV use, should be limited to existing, designated routes within the ACEC. Finally, BLM should develop appropriate and effective conservation and recovery measures for Tiehm's buckwheat. Thank you, Bill Helmer Independence, CA	Designation of an ACEC is beyond the scope of the Project's purpose and need.

Comment Letter No.	Comment Number	Comment	Response
Jessica Johnson – June 3, 2024			
129	129.9	I oppose permitting a gold mine on rhyolite ridge. Tiehm's buckwheat cannot be allowed to go extinct for the sake of profit. It would be a dangerous precedent for the entire environmental protection act. What is it even protecting if you allow entire populations with such limited to range to be obliterated forever? We're in an extinction and biodiversity crisis and cannot intentionally make species go extinct. You cannot get them back ever.	The Proposed Action and North and South OSF Alternative incorporate ACEPMs and Buckwheat Protection Plans to minimize effects to Tiehm's buckwheat and designated critical habitat. Impacts to Tiehm's buckwheat are discussed in EIS Section 4.12.
Personal Information Requested to be Withheld – June 3, 2024			
130	130.1	SAVE THE BUCKWHEAT	Comment noted.
Woody – June 3, 2024			
131	131.1	I implore the BLM to not allow this mining operation to occur at Rhyolite Ridge. Even if Eriogonum tiehmii plants are not directly destroyed by the mining equipment, the resulting dust and chemicals that will coat the plants as huge mining trucks drive back and forth will be just as deadly to this endemic plant. We as a society should not accept the extinction of or crippling of a plant that has been evolving for tens of thousands of years so that a foreign mining company can make a quick buck, permanently destroy the land and leave. The benefits do not outweigh the negatives by a long shot in this case. Eriogonum tiehmii has nowhere else to go, and its survival is now within your hands. Lithium can be had elsewhere. Do not allow this shameful, greed fueled action to take place.	The Proposed Action and North and South OSF Alternative incorporate ACEPMs and Buckwheat Protection Plans to minimize effects to Tiehm's buckwheat and designated critical habitat. Impacts from dust deposition are discussed in EIS Section 4.12.
Not Provided – June 3, 2024			
132	132.1	Save the plant	Comment noted.
Personal Information Requested to be Withheld – June 3, 2024			
134	134.1	For Christ sake don't go forward with this project. We're so lucky to have public land as a means to preserve biodiversity and you're going to eliminate the only population of a species of Eriogonum. I pay taxes and I have a stake in this land. Please don't go through with this.	The Proposed Action and North and South OSF Alternative incorporate ACEPMs and Buckwheat Protection Plans to minimize effects to Tiehm's buckwheat and designated critical habitat. Impacts to Tiehm's buckwheat are discussed in EIS Section 4.12.
Personal Information Requested to be Withheld – June 3, 2024			
135	135.1	Please do not allow the mining project to proceed and degrade the sensitive desert habitat of the critically imperiled species Eriogonum tiehmii. Extinction is forever.	Impacts to Tiehm's buckwheat designated critical habitat are discussed in EIS Section 4.12.
Michael Trier – June 3, 2024			
136	136.1	There is no way to proceed with the development of this proposed lithium mine and also prevent the extinction of Tiehm's buckwheat. Please protect this important part of our natural heritage rather than enriching a foreign mining company.	The Proposed Action and North and South OSF Alternative incorporate ACEPMs and Buckwheat Protection Plans to minimize effects to Tiehm's buckwheat and designated critical habitat. Impacts to Tiehm's buckwheat are discussed in EIS Section 4.12.
Julianna Paulsen – June 3, 2024			
137	137.1	The development of this lithium mine threatens so many beautiful and unique plants and animals that inhabit desert ecosystems. Many of the native ecosystems in the United States have been destroyed by human development projects before we had the chance to understand their importance to us. Deserts are clearly undervalued, and also understudied. If we allow lithium mine developments on these lands to destroy populations of rare and native plants and ecosystems, there could be severe, unforseen consequences to ecosystem health in the southwest and beyond. The value of biological life in these areas should be thoroughly assessed by experts and researchers before development of this kind is even considered.	The EIS contains detailed analysis of the Project on wildlife and plants and discloses anticipated impacts in Sections 4.14 and 4.18.
Personal Information Requested to be Withheld – June 3, 2024			
138	138.1	This project should be denied because it would take place on land that's home to endemic and endangered species. Our environments should be cared for and protected rather than sold and destroyed.	Comment noted.
Not Provided – June 3, 2024			
139	139.1	I provided my comment in the attached file.	Comment noted.
139	139.2	Hello Blm, I am here to voice my disapproval of the proposed Lithium mine (Rhyolite Ridge Lithium-Boron Mine Project). It is disgraceful that such an action is even being considered given it would decimate the only known population of Eriogonum tiehmii. In the age of staggering biodiversity loss (DOI: https://doi.org/10.1017/S0030605317001302), it is unacceptable to allow a mine to so visibly contribute to the greatest environmental challenge of all time, the sixth mass extinction. The BLM is supposed to protect biodiversity for future generations and the health of the environment: "The Bureau of Land Management's mission is to sustain the health, diversity, and productivity of public land s for the use and enjoyment of present and future generations" (BLM Mission). "As part of our multiple use and sustained yield mandate, we will address climate change and conservation in all we do " (BLM Priorities). The approval of this mine would so obviously go against these guiding priorities of the BLM. Thank you for listening to me, Student of Restoration Ecology, Botany, and Range Ecology at CSU (Colorado State University)	The Proposed Action and North and South OSF Alternative incorporate ACEPMs and Buckwheat Protection Plans to minimize effects to Tiehm's buckwheat and designated critical habitat. Impacts to Tiehm's buckwheat are discussed in EIS Section 4.12.
Raymond Mendez – June 3, 2024			
140	140.1	Extinction is final, but your greed will die with you. The lawsuits will drag on until everyone involved is worn to the bone.	Comment noted.
Not Provided – June 3, 2024			

Comment Letter No.	Comment Number	Comment	Response
141	141.1	Stop being close minded. You're taking away something that can never be replaced.	Comment noted.
Stephen Sharrett – June 3, 2024			
142	142.1	My name is Stephen Sharrett. I am an MSc student at Eastern Washington University, a biodiversity scientist, and the Friends of the Eastern Washington University Herbarium vice president. Current proposals for the project estimate 22% losses of individuals/habitat for the federally endangered species, Eriogonum teihmii. This is unacceptable. Any losses or damage to the species or its present habitat would ultimately doom this rare and beautiful wildflower to extinction. The loss of this species will result in unforeseen impacts reverberating across the ecosystem. Rare species are essential to biodiversity, as well as, ecosystem services, stability, and resilience. Countless organisms rely on this species, with the shortlist including a diversity of pollinating and non-pollinating arthropods constituting another highly threatened group of organisms. I am writing to express my adamant opposition to the Rhyolite Ridge Lithium-Boron Mine Project and to urge the BLM to recognize and protect this federally listed species by terminating this project.	The Proposed Action and North and South OSF Alternative incorporate ACEPMs and Buckwheat Protection Plans to minimize effects to Tiehm's buckwheat and designated critical habitat. Impacts to Tiehm's buckwheat are discussed in EIS Section 4.12. In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
Kiamara Ludwig – June 3, 2024			
143	143.1	Please recognize that the greater the diversity in species the greater resilience we have for the effects of climate change. We should not risk losing a species as important as this Eriogonum is. The extraction of components needed for energy storage while very important needs to be done in the sustainable fashion. These methods need to be addressed before the extraction can begin and in no way should we lose a species that sustains so much in its ecosystem	Comment noted.
Bryce Silver-Bates – June 3, 2024			
144	144.1	The Rhyolite Ridge project should be DENIED. This project will provide for a few months - a few weeks? - of the world's lust for lithium. Eriogonum tiehmii is a federally recognized endangered species. The fact that this is even a question speaks volumes of the state of our country. We have a chance to make - or unmake - history. The Rhyolite Ridge project should be DENIED.	Comment noted.
Not Provided – June 3, 2024			
145	145.1	Please don't approve this mining unless the endangered plant will be reliably and effectively protected. BLM should not be responsible for contributing to an extinction. Thank you.	The Proposed Action and North and South OSF Alternative incorporate ACEPMs and Buckwheat Protection Plans to minimize effects to Tiehm's buckwheat and designated critical habitat.
Jeff T – June 3, 2024			
146	146.1	It is UNACCEPTABLE we would allow ANY entity to mine and destroy America's biodiversity. Public land is for the people, not the corporate death cult. I condem the destruction of such beautiful habitat.	Comment noted.
Jonathon Schmidt – June 3, 2024			
147	147.1	This project threatens to extinguish the world's only population of Eriogonum tiehmii! Biodiversity is becoming evermore important as the impacts of climate change are made more clear with each passing year. It is important to preserve this species like all species. This project must not continue.	Comment noted.
Nicholas Rocha – June 3, 2024			
148	148.1	Knowingly dealing an extinction-level blow to Tiehm's Buckwheat for a non-renewable (it'll run out eventually) and for-profit (private, not public interest) enterprise is both immoral and avaricious. As a botanist and member of the public, I urge BLM to reconsider this proposal for the sake of biodiversity and, by extension, ecosystem health. Thank you.	The Proposed Action and North and South OSF Alternative incorporate ACEPMs and Buckwheat Protection Plans to minimize effects to Tiehm's buckwheat and designated critical habitat.
Elaine Larsen – June 3, 2024			
149	149.1	You cannot move forward with this project that will condemn a critically imperiled species to extinction. The plan as written will almost certainly result in the extirpation of Eriogonum tiehmii. End this now.	The Proposed Action and North and South OSF Alternative incorporate ACEPMs and Buckwheat Protection Plans to minimize effects to Tiehm's buckwheat and designated critical habitat.
Not Provided – June 3, 2024			
150	150.1	I would like to see the BLM prioritize protecting a Federally Listed Endangered Species (Eriogonum tiehmii) over opening their lands up to mining operations.	The Project area is open to mineral entry for the exploration and development of mineral deposits. In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
Not Provided – June 3, 2024			
151	151.1	As this proposed lithium mine would be built through endangered populations of buckwheat, how are you planning on reestablishing these populations? Similarly, how are you planning on restoring any of the native plant communities? This is a major concern of mine as historically we seen have that corporations will establish non-native plants instead of the original plant communities. Additionally, are there plans in place for lithium leaks that might occur and pollute the surrounding environment? These actions would need to occur quickly as lithium can quickly enter plant roots and move throughout the plants - plants that could be consumed by humans. Mining has already adding million of pollutants into terrestrial and aquatic ecosystems globally. By building this Lithium mine, I am concerned that this would be contributing to the global waste when there needs to be an emphasis on bioremediation and restoring ecosystems impacted by these pollutants.	Proposed reclamation activities are described in EIS Section 2.1.11. Additional reclamation for Tiehm's buckwheat critical habitat is described in the Buckwheat Protection Plans for the Proposed Action and North and South OSF Alternative.

Comment Letter No.	Comment Number	Comment	Response
Not Provided – June 3, 2024			
152	152.1	I have a handful of environmental concerns with the addition of a lithium mine to this mountain range. All mining activities produce some amount of by product waste, especially if the ore is low-grade. The removal and transport of heavy metals is not a controlled system. With this mine being situated near a valley, there's a high possibility that some of this waste could end up in loess or, more concerning, in water runoff into the valley. Lithium ions have been shown to be harmful to most life on earth in the right quantities. How do you plan on reducing or mitigating these effects in the local ecosystem? Will the surrounding area be vegetated with known metal resistant plants or bioaccumulators? What prevention would be put in place to prevent lithium seeping into any nearby aquifers? Are there any concerns with lithium polluting drinking aquifers or is this site far enough away from cities where that isn't a problem?	The processing circuit and management of spent ore is described in EIS Sections 2.1.3 and 2.1.4.
Kelan Long – June 3, 2024			
153	153.1	There is no reason other than ignorance and greed to allow a foreign company to desecrate the habitat of a beautiful and endangered species. Please do not allow the plans for the lithium mine to continue and commit to protecting Tiehm's buckwheat and all the other organisms in the region. Permitting this mining operation will set a dangerous precedent for the Endangered Species Act to be ignored. Do not flippantly allow a unique species to go extinct	In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
Katherine Sutherland, MD – May 28, 2024			
154	154.1	Dear Nevada BLM, I'm a physician who fears for my family in a warming world. We are rapidly losing biodiversity which is critical for how all living things are interconnected. I urge you to deny a permit for the Rhyolite Ridge lithium-boron mine. The mine would result in environmental harm, including the extinction of the rare wildflower, Tiehm's buckwheat. This wildflower is protected by the Endangered Species Act. If this permit is approved, it would jeopardize the species' existence, or cause adverse modification to its critical habitat - this mine would do both. The mine, and the heavy industrialization, will destroy 22% of the plant's critical habitat and severely degrade the rest. It will pollute the environment with toxic mining dust and sulfuric acid mist, interrupt the movement of pollinators and wildlife, and drain precious Nevada groundwater. Climate change is happening now. We must protect our water, our air and native wildlife. I urge you to comply with the Endangered Species Act and save our wildlife. Please deny a permit for the Rhyolite Ridge Mine. Sincerely, Katherine Sutherland, MD	In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Air quality impacts are described in EIS Section 4.1. As described in Section 2.1.3, processing is completed using a closed system that would contain the sulfuric acid. Impacts from hazardous materials are discussed in Section 4.5.
Tench C Page – May 28, 2024			
155	155.1	Tench C Page 4635 Saddlehorn Drive Reno, NV 89511 Mr. Scott Distel Project Manager US Bureau of Land Management Battle Mountain District 50 Bastion Road Battle Mountain, NV 89820 Re: The DEIS for loneer's Rhyolite Ridge Project Dear Mr. Distel, This letter is written in support of permitting loneer's Rhyolite Ridge Lithium-Boron Project in Esmeralda Co. NV. I am a retired geologist, a graduate of UNR with a Masters Degree in Economic Geology and a resident of Nevada from 1979 until and including today. I am familiar with lithium deposits in general and have worked extensively throughout Nevada and parts of Mexico. As the past Vice-President of Exploration for Minefinders Corporation I was responsible for permitting and environmental issues as well as contracting support services for all aspects of putting a mine in production. Additionally the importance of domestic production of the lithium and associated elements in regards to benefits to the entire country and its economic independence cannot be overstated. In particular one must weigh lloneer's commitment to mine in an environmentally responsible way with little impact on the land, ground water and the endangered Tiehm's buckwheat plant, in return for a very large benefit to many others. Although I have not reviewed the documentation in any detail my understanding is that the followng parameters apply: • The unique characteristics of the Rhyolite Ridge deposit will allow for extraction of lithium using much less water when compared with other lithium deposits and most other metal mines. • Recovery of lithium from the mineralized rock will be by the vat leach process with no leach pads, tailings ponds or tailings dams, and therefore ground water contamination is minimized. • A weak sulfuric acid solution, needed to dissolve lithium from the ore, will be produced on site. The heat produced as a by-product of sulfuric acid production will supply more than enough energy to power the entire operation for the life of the mine, making it independent of Nevada's power grid. • Currently, the US depends on importing lithium, mainly from Argentina, Chile, China and Russia, making our country dependent on imports from generally unreliable nations, thus creating a supply chain which can be interrupted at any time. Production of the lithium-boron minerals from the Rhyolite Ridge deposit will provide a reliable domestic supply chain for materials needed to boost domestic production of batteries for a cleaner, more energy efficient future. • The European Union, Canada, Australia and China have all listed lithium as critical to energy needs of their own nations, resulting in a reduction of their exports of lithium, and an increase in worldwide competition for this critical mineral.	Comment noted.

Comment Letter No.	Comment Number	Comment	Response
		• Once the project is in production, it will increase domestic lithium production by 400% and provide enough lithium to power approximately 370,000 vehicles per year for at least 20 years. • The Boron produced from this project will be used in items such as touch screens for smart phones and computers and in the production of semiconductors, medicinal grade glass vials, abrasives, cleaning products, insecticides, and insulation. • The financial impact on Nevada and Esmeralda County will be significant. The project will· employ up to 500 people during the construction phase, and then 350 people throughout the life of production with many of those jobs going to local communitees and additionally individual indigenous Indian populations. The median annual income of loneer's employees, including a generous benefits package, will be approximately $141,000. • Financial benefits to Esmeralda and adjacent counties, and the State of Nevada range from a myriad of direct employment opportunities and employment in a myriad of wide-ranging support service providers. Other sales taxes, property taxes and Net Proceeds of Mines revenue will range from approximately $600,000 in the first year of construction to between $5.2 to $11.6 million per year during the estimated 26 years of planned lithium-boron production. This is significant for a small-population rural county. In summary, this project is a rare win-win opportunity to capitalize on Nevada's mineral wealth to the benefit of the county, state and our nation, with minimal environmental impact. Thank you for your time reviewing my comments. And please recommend this project for the good of the State of Nevada, the United States of America, and local populations and infrastructure that will benefit from the mine. Sincerely yours, Tench C Page - BS Geology from Un;(e"rsity of North Carolina - Chapel Hill - 1977 Masters in Geology from Univ of Nevada - Reno, Mackay School of Mines - 1988	
Jan Schiff – May 29, 2024			
156	156.1	To whom it may concern Please stop the lithium mine project. I'm worried about the environment it will be damaging. Thank you A concerned NV resident, Jan Schiff Sent from my iPhone	Comment noted.
John Deymonaz – May 30, 2024			
157	157.1	PUBLIC COMMENT RHYOLITE RIDGE LITHIUM-BORON PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT DOI-BLM-NV-B020-2021-0020-EIS MAY 30, 2024 **These comments are to voice my strong support for the Rhyolite Ridge Lithium-Boron Project here in Fish Lake Valley, Esmeralda County.** After reading through the 230 page Draft Environmental Impact Statement I have found no significant negative impacts and numerous positive aspects to the project for our county, state and nation. I urge the BLM to grant Ioneer approval to move ahead with the project as outlined in the Proposed Action and allow this long delayed project to proceed. I am a long time resident in Fish Lake Valley and live approximately 12 miles from the proposed mine site. Given my close proximity to the mine site I will be directly affected by all activity associated with the mining as well as the social impact, population growth and positive financial benefits for our sparsely populated county (729 residents per the 2020 census) and local businesses. I have closely followed the project since the early exploration phase and have gotten to know many of the Ioneer employees, including Managing Director Bernard Rowe. I have found Bernard and other Ioneer staff to be open and honest and willing to address any concerns I have had. As a retired geologist in the geothermal industry I understand exploration and development and have been impressed with the skills, dedication and concern Ioneer has for the local residents and their understanding of the environmental and financial impacts on our small county. The 2,306 acre (3.6 sq. mile) area of disturbance is a very minimal footprint given the projected large volume and long term production of lithium carbonate and boric acid. I am very familiar with the nearby lithium operation at Silver Peak, which produces much less lithium carbonate than Rhyolite Ridge will produce and produces no other commercial minerals such as boric acid in their processes. The Silver Peak operation has turned the once lake filled Clayton Valley basin into a 25 square mile desolate moonscape by pumping and evaporating over 15 million gallons of water per day (over 16 thousand acre feet per year) to extract lithium. Ioneer has revolutionized the U.S. lithium industry with its innovative plan to extract lithium from hard rock using existing technology and a fairly modest sized open pit rather than the historic process of evaporating huge amounts of brines. The boric acid processing also generates heat which will be used to generate upwards of 15MW of electricity to power the mining and processing operations. Waste heat recovery to power the production of lithium for electric vehicles. The Ioneer project appears to be the perfect green new deal! Regarding the Tiehm's buckwheat, which somehow achieved "endangered species" status. Buckwheat is a common desert plant that is prolific throughout the western U.S., with over 200 variations/species (pers comm USFS). From my observations of the project area in the past, the "endangered" buckwheat appears to thrive on ground previously disturbed during prospecting efforts	The Proposed Action and North and South OSF Alternative incorporate ACEPMs, including fencing, to minimize effects to Tiehm's buckwheat and designated critical habitat. Impacts to access are discussed in EIS Section 3.13. Groundwater drawdown was modeled for the Project and included an analysis of the cumulative use of water in the area of analysis. Impacts to water rights are discussed in EIS Section 4.16.

Comment Letter No.	Comment Number	Comment	Response
		for borax and other minerals in the immediate area since the 1800's. Having to fence in 559 acres (714 acres in Alternative) for critical habitat, which limits public access as well as mining activity, for a plant occupying a mere 10 acres is incredibly excessive! Ground water concern is a convenient red flag that opponents have been waving, however, I do not see the proposed mining activity as having an adverse effect. Quite the opposite, existing water rights in FLV will actually be reduced! The state of Nevada controls all ground water in the state and in the past has over allocated water rights which resulted in the lowering of ground water in many of the states desert basins. The state is responsible for the existing ground water issue! Fish Lake Valley is a Designated Basin and no new water rights have been issued for years. Groundwater decline is an ongoing issue in FLV and agriculture accounts for over 99% of groundwater consumption in the valley, approximately 30,000 acre ft/year. Ioneer will be purchasing EXISTING water rights from agricultural operations in FLV. NO NEW WATER RIGHTS WILL BE INVOLVED! Since the state will reduce the amount of water by 20 per cent when the water right status is changed from agricultural to mining, Ioneer will be required to purchase approximately 5,000 acre feet of existing water rights to utilize the 4,000 acre ft/year of water rights the mining and processing may require. That is a reduction of approximately 1,000 acre ft/year of water rights in FLV. To put that in perspective, this is over four times the amount of all 2014 domestic water well pumping (213 acre ft/year, NDWR). The Ioneer purchase of existing water rights will actually improve the current groundwater situation in FLV! Like all residents of FLV, I obtain my potable water from a domestic well and declining water levels are a serious concern! Thank You, John Deymonaz P.O. Box 145 / 15500 Hwy 264 Dyer, NV 89010 (775) 225-3500 johndeymonaz@gmail.com 20240530_RR_DEIS_JohnDeymonaz_viaEmail_Attachment	
Susan Lewitt – May 30, 2024			
158	158.1	I urge you to deny a permit for the Rhyolite Ridge lithium-boron mine. The mine would result in environmental harm, including the extinction of the rare wildflower, Tiehm's buckwheat. This wildflower is protected by the Endangered Species Act. If this permit is approved, it would jeopardize the species' existence, or cause adverse modification to its critical habitat — this mine would do both. The mine, and the heavy industrialization, will destroy 22% of the plant's critical habitat and severely degrade the rest. It will pollute the environment with toxic mining dust and sulfuric acid mist, interrupt the movement of pollinators and wildlife, and drain precious Nevada groundwater. Climate change is happening now. We must protect our water, our air and native wildlife. I urge you to comply with the Endangered Species Act and save our wildlife. Please deny a permit for the Rhyolite Ridge Mine. Sincerely, Susan Lewitt	In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Air quality impacts are described in EIS Section 4.1. As described in Section 2.1.3, processing is completed using a closed system that would contain the sulfuric acid. Impacts from hazardous materials are discussed in Section 4.5.
Timbisha Shoshone Tribe – May 30, 2024			
159	159.1	Good Morning, Emailing on behalf of Chairwomen Cortez. Original will be mailed. Thank you Sookaaki Charley Tribal Administrator Timbisha Shoshone Tribe	Comment noted.
159 and 184	159.2 and 184.1	May 29, 2024 U.S. Bureau of Land Management (BLM) Attn: Scott Distel 50 Bastian Road Battle Mountain, NV 89820 sdistel@blm.gov Re: Rhyolite Ridge Project DEIS Comment Period; Extension Request The Timbisha Shoshone Tribe hereby requests a 45-day extension to the comment period for the Rhyolite Ridge Lithium-Boron Mine Project Draft Environmental Impact Statement (DEIS), DOI-BLM-NV-B020-2021-0020-EIS.	The BLM sent a letter on June 3, 2024 to the Timbisha Shoshone Tribe stating that the request for an extension was declined. The BLM public scoping period was extended twice at the request of the public and the BLM conducted three public meetings for the DEIS comment phase. At this juncture, as the result of prior extensions of the public scoping period, the BLM must maintain the project schedule while considering all public comments received during the comment period and continue with the Section 7 consultation efforts with the USFWS regarding Tiehm's buckwheat. Tribal consultation under Section 106 of the National Historic Preservation Act. Tribal consultation is ongoing.

Comment Letter No.	Comment Number	Comment	Response
		1. The Timbisha Shoshone Tribe being a small tribe with limited staff (11 employees) and with one THPO and Environmental worker, makes it difficult to read a 1,300- page document. 2. Forty-five days is an inadequate response time for a complex mining project which includes a threat to a listed endangered species, the Tiehm's buckwheat, a medicinal plant important to the Western Shoshone. 3. Government-to-government consultation, including Section 106 consultation is incomplete, and many of the concerns of the involved tribes have not been stated in the draft EIS; this includes surveys for the effects on the migration patterns of the Big Horn Sheep; Vibration Studies; Water Impact Studies and these are just to name a few. This makes tribal responses to the draft EIS more complicated, and the extremely inadequate comment period is disrespectful to the consultation requirements of the involved tribes. 4. The completion of the draft EIS has been accelerated against the wishes of the public as well as consulting tribes, such as the Timbisha Shoshone Tribe, and there is absolutely no reason to deny an adequate comment period within the context of meaningful consultation as required by Executive Order 13175. 5. The fact that the scoping period for the project--by necessity--had to be extended after the listing of the Tiehm's buckwheat (Eriogonum tiehmii) as an endangered species within the Project does not mean that a reasonable comment period has to be denied. It defies logic to provide time for scoping but then deny adequate time I for comments. ' Timbisha Shoshone Tribe - Bishop Office - 621 West Line Street, Suite #109, Bishop CA 93514 Phone: 760-872-3614 Fax: 760-872-3670 Should you require any other information please do not hesitate to contact me and your consideration would be greatly appreciated. Sincerely, Margaret Cortez, Tribal Chairwomen	Table 5-1 has been updated with additional information and Tribal consultation that has occurred to date.
Ariana Seeber – May 31, 2024			
160	160.1	As a Nevada local and Advertising Manager for the Tonopah Times Bonanza, I believe this project can house a lot of opportunities for us. I am in support of this project and hope it will do good things for our state. Thank you! -- Ariana Seeber Tonopah Times-Bonanza aseeber@tonopahtimes.com 150 N. Main St. Tonopah, NV 89049 775-482-3365 775-482-5042 Fax	Comment noted.
Ashlyn Lockey – May 31, 2024			
161	161.1	Dear Nevada BLM, I'm a high school student who is terrified for my future, the future of wildlife, and the future of my generation. I urge you to deny a permit for the Rhyolite Ridge lithium-boron mine. The mine would result in environmental harm, including the extinction of the rare wildflower, Tiehm's buckwheat. This wildflower is protected by the Endangered Species Act. If this permit is approved, it would jeopardize the species' existence, or cause adverse modification to its critical habitat — this mine would do both. The mine, and the heavy industrialization, will destroy 22% of the plant's critical habitat and severely degrade the rest. It will pollute the environment with toxic mining dust and sulfuric acid mist, interrupt the movement of pollinators and wildlife, and drain precious Nevada groundwater. Climate change is happening now. We must protect our water, our air, and native wildlife. I urge you to comply with the Endangered Species Act and save our wildlife. Please deny a permit for the Rhyolite Ridge Mine. Thank you. Sincerely, Ashlyn Lockey	In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Air quality impacts are described in EIS Section 4.1. As described in Section 2.1.3, processing is completed using a closed system that would contain the sulfuric acid. Impacts from hazardous materials are discussed in Section 4.5.
Bishop Paiute Tribe – May 31, 2024			
162	162.1	Mr. Distel, Please accept this attached request for a 45-day extension of the comment period for the above referenced project.	The BLM sent a letter on June 3, 2024 to the Bishop Paiute Tribe stating that the request for an extension was declined.

Comment Letter No.	Comment Number	Comment	Response
		If you have any questions, please feel free to write or call. Thank you. Brian	
162	162.2	Re: Request/or Consultation and for a 45 Extension of Comment Period on the Rhyolite Ridge Lithium-Boron Project Draft Environmental Impact Statement, DOI-BLM-NV-B020-2-21-0020-EIS Dear Mr. Distel, By this letter, the Bishop Paiute Tribe formally requests: (1) a 45-day extension to the comment period for the Rhyolite Ridge Lithium-Boron Mine Project Draft Environmental Impact Statement (DEIS), and (2) to engage in government-to-government consultation and consultation pursuant to Section 106 of the National Historic Preservation Act. As you know, the proposed project is located within the ancestral territories of the Tribe. The BLM recognizes in its own governing documents that meaningful tribal engagement provides for the education of both parties and "results in the best informed BLM land use decisions."[1] A 45-day extension is necessary for the BLM and the Tribe to engage in meaningful tribal Consultation, as required by the trust responsibility and the National Historic Preservation Act. As sovereign nations, tribes have a role and a relationship with the federal government that makes them distinct from other stakeholder groups throughout the NEPA process, as the "[f]ederal government and Indian tribal relationships reflect the political and historical development of the Nation."[2] The federal trust responsibility requires the BLM to engage in government-to-government consultation, and this mandate is reflected in the BLM's own governing documents.[3] BLM's Tribal Relations Manual provide that "[t]he BLM conducts government-to-government consultation with Indian tribes to improve collaborative and informed Federal decision making."[4] The handbook also recognizes that "Indian tribes are knowledgeable sources and experts concerning their own cultures," and that "[t]hey can provide unique insight and explanation of tribal history and land uses. When provided with such information, the BLM will take this into account when making decisions related to the identification, evaluation, treatment, and management of natural and heritage resources. "[5] This consultation responsibility is also affirmed by Executive Order No.13175 (Consultation and Coordination with Indian Tribal Governments dated November 6, 2000, which requires all agencies, bureaus, and offices within the Federal Government to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications). In addition, Presidential Memorandum for the Heads of Executive Departments and Agencies on Tribal Consultation dated November 5, 2009 (74 Fed. Reg. 57881), Presidential Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships dated January 26, 2021 (86 Fed. Reg. 7491), and Joint Secretarial Order on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters No. 3403 dated November 15, 2021, serve to strengthen and supplement Executive Order No. 13175. Collectively, these policies require that management decisions fulfill the "United States' unique trust obligation to federally recognized Indian Tribes and their citizens."[6] Finally, pursuant to Section 106 of the National Historic Preservation Act, federal agencies are required to consult with any Tribe that attaches religious and cultural significance to historic properties that may be affected by an undertaking.[7] At a minimum, The consultation shall provide Tribes a reasonable opportunity to: (1) identify their concerns about historic properties; (2) advise on identification and evaluation of historic properties, including those of traditional religious and cultural importance; (3) articulate its views on the undertaking's effects on such properties; and (4) participate in the resolution of adverse effects.[8] The Section 106 consultation process must respect Tribal sovereignty and represent the government-to-government relationship between Tribes and the federal government.[9] Here, by the BLM's own admission, the planning process for the Rhyolite Ridge project has been carried out at an unusually rushed timeline.[10] While the Tribe appreciates the BLM's outreach in the form of a press release dated December 19, 2022, an informational letter dated January 27, 2023, and the opportunity to conduct a site visit on April 27, 2023, the BLM did not invite the Bishop Paiute Tribe to become a cooperating agency or to engage in government-to-government consultation until August 2023. The Tribe exercised due diligence and obtained legal counsel to assist in reviewing these options. With the drafting of the DEIS already underway and only eight months between this invitation and the publication of the DEIS, this timeframe was insufficient for the Tribe to become fully educated about the project, identify concerns and potential impacts, and engage in consultation with the BLM such that those concerns could inform the DEIS before it was published.[11] Due to this limited timeframe and the complex nature of the DEIS and supporting documents, a 45-day extension to the comment period is necessary to provide the Tribe and the BLM with an opportunity to satisfy the robust requirements of tribal consultation described above. Sincerely Meryl Picar Tribal Chairwoman Bishop Paiute Tribe CC: Honorary Tribal Council, Bishop Paiute Tribe Kody Jaeger, Chief Operations Officer 1, Bishop Paiute Tribe Brian Adkins, Environmental Director, Bishop Paiute Tribe Tribal Environmental Protection Agency, Bishop Paiute Tribe Darren Delgado, Tribal Historic Preservation Officer (THPO), Bishop Paiute Tribe Margaret Cortez, Chairwoman, Timbisha Shoshone Tribe Cheyenne Stone, Chairperson, Big Pine Paiute Tribe Thomas Swab, Chairperson, Lone Pine Paiute Shoshone Tribe Advisory Council on Historic Preservation Rebecca L. Palmer, Nevada State Historic Preservation Officer Jon Raby, BLM Nevada State Director Douglas Furtado, BLM Battle Mountain District Manager Scott Lake, Nevada Staff Attorney, Center for Biological Diversity	The BLM sent a letter on June 3, 2024 to the Bishop Paiute Tribe stating that the request for an extension was declined. Government-to-government consultation and coordination for the Project has been conducted as required by NHPA, EO 13175 and other applicable EO and regulations. Consultation is described in EIS Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. Tribal consultation under Section 106 of the NEPA continues throughout the NEPA process and is not dependent on the public review and comment period. As such, these efforts can and will continue until the finalization of the Record of Decision.

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		Mia Montoya Hammersley, Director, Vermont Law & Graduate School Environmental Justice Clinic [1]BUREAU OF LAND MGMT., BLM MANUAL 1780 TRIBAL RELATIONS (P)AT 1-14 (Dec. 15, 2016), https://www.blm.gov/ ·ites/blm.gov/fi le. /uploads/MS%201780.pdf ("BLM Tribal Relations Manual"). [2]BLM Tribal Relations Manual at 1-3. [3]See generally BLM Tribal Relations Manual & BLM HANDBOOK (H) 1780-1, IMPROVING AND SUSTAINING BLM-TRIBALRELATIONS (Dec. 15, 2016), https://www.blm.gov/sitcs/blm .gov/fi l.es/uploads/I-I-1780-1 O. pdf. [4]BLM Tribal Relations Manual at 1-14. [5]BLM Tribal Relations Manual at 1-15. [6]U.S. Dept. oflnterior & U.S. Dept. of Agriculture, Joint Secretarial Order on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters No. 3403 (Nov. 15, 2021), https:.'"' iS\\ .doi. QC v/siks/doi.!W\ /fiks/dips!docun1~m '·o-J-WJ-jointSt:'Cretarial-order-on-fulfillin (T -the-trust-respon ' ibi lil._--to-indian-tribes-in-the-stem1rdshin-offeJeral-lands-and-waters. pd[[7]36 C.F.R. § 800.2(c)(2)(ii). [8]36 C.F.R. § 800.l(c). [9]36 C.F.R. § 800.2(c)(2)(ii). [10]See Letter from The Timbisha Shoshone Tribe, Center for Biological Diversity, Great Basin Resource Watch, Western Shoshone Defense Project, Earthworks, Basin and Range Watch, and Western Watersheds Project to Scott Distel (May 17, 2024) (Extension Request fur the Rhyolite Ridge Project DEIS Comment Period) (citing an email from Scott Distel, BLM, to Doug Furtado, BLM (Dec. 21, 2023) ("This is a very aggressive schedule that deviates from other project schedules on similar projects completely recently and concurrently at the Oistrict and State.") (Attachment 1). [11]The BLM Tribal Consultation Manual recognizes "that tribes have different interests and capacities" and commits the BLM "to working collaboratively with tribes to develop consultation procedures that meet the needs and capabilities of both the DLM and tribes." BLM Tribal Relations Manual at 1-3.	
Esmeralda County Land Use Advisory Committee – May 31, 2024			
163	163.1	Attached please find a letter of support from the Esmeralda County Land Use Advisory Committee (ECLUAC) for the Ioneer Rhyolite Ridge Lithium-Boron Project. We welcome any questions or follow-up you may require. Dan J. Peterson, Chair, ECLUAC - djpco33@gmail.com	Comment noted.
163	163.2	Transmitted by email to: BLM_NV_BMDO_P&EC_NEPA@blm.gov , Douglas Furtado dfurtado@blm.gov , Scott Distel sdistel@blm.gov Subject Line: Rhyolite Ridge Mr. Douglas Furtado, District Manager Bureau of Land Management, Battle Mountain District Office 50 Bastian Road Battle Mountain, NV 89820 Mr. Scott Distel, Project Manager, NEPA Compliance Tonopah Field Office 1553 S Main Street Tonopah, NV 89049 Re: Ioneer Ltd. Rhyolite Ridge Lithium/Boron Mine/processing plant Fish Lake Valley Esmeralda County, Nevada Subject: Recommendation Dear Mr. Furtado and Mr. Distel: Over the past several years, the Esmeralda Board of County Commissioners have reviewed and proposed conditions for the County's interest in the Ioneer, Ltd. Lithium/Boron mine and processing facility to be constructed/operated at the northeast end of Fish Lake Valley. Ioneer has: • shown its willingness to listen, engage and support the community and they are consistently available and have offered many opportunities to talk with them about issues that will affect Esmeralda County. • listened to the concerns of local elected officials and County employees regarding impacts to public safety and other services that the County provides. In order to help augment these services, Ioneer has publicly committed to entering into a development agreement with the County to help support public services. • provided resources to the County to hire several experts to provide opinion and analysis on the proposed plan of operations, ensuring that the County has had adequate resources to properly evaluate proposed impacts without any impact to local taxpayers. • emphasized and demonstrated their commitment to the local community for many years, and has likewise committed to hiring and doing business locally.	The EIS provides a detailed analysis of anticipated social and economic impacts in Section 4.10, including impacts from increased tax revenue.

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		The projected tax revenues that will be collected by Esmeralda County through the various tax revenue streams is considerable and will provide the County and its elected officials an opportunity to provide increased services in the area of public safety, emergency response, community facilities and more throughout the life of the Project. The Land Use Advisory Committee supports and endorses the Board of County Commissioners recommendations and conditions. Sincerely, Dan J. Peterson Chair, Esmeralda County Land Use Advisory Committee DP:kf	
Esmeralda County Board of Commissioners – June 3, 2024			
164	164.1	Dear Mr. Scott Distel, Please accept the attached comments from Esmeralda County, Nevada for the above identified project. Please let me know if you have any questions. Have a great day, Maureen Maureen Glennen Administrative Assistant Esmeralda County Board of Commissioners Director, Senior Transportation 403 E. Crook Street P.O. Box 517 Goldfield, NV 89013 775-485-3406 mglennen@esmeraldacountynv.org 6/3/24, 10:23 AM Mail - Distel, Scott J - Outlook https://	Comment noted.
164	164.2	Esmeralda County, Nevada Public Scoping Comments June 3, 2024 Attn: Mr. Scott Distel, Project Manger Bureau of Land Management 50 Bastian Road Battle Mountain, NV 89820 Transmitted via Email: BLM NV BMDO P&EC NEPA@blm.gov RE: Comments on DOI-BLM-NV-B020-2021-0020-EIS Rhyolite Ridge Lithium-Boron Mine Project on behalf of Esmeralda County, Nevada. Please accept the following public scoping comments on the Rhyolite Ridge Lithium-Boron Mine Project on behalf of Esmeralda County, Nevada. **WATER RESOURCES (Section 3.16)** 1. In ser 17, Section 3.2.2.1 on page 3.19 there is an orphaned sentence fragment "at levels that were well below the low-effect thresholds." What is this sentence referring to? 2. Quarry lake evaporation rate seems understated. The evaporation rate is listed as 347 acre feet on page ES-5. The evaporation loss for the 113 acre surface area of the quarry lake should be 598 acre feet based on the evaporation rate of 63.5 inches listed on page 2-4. It should also be noted that the 598 acre feet evaporation loss will forever be removed from the 30,000 acre feet perennial yield. Fish Lake Valley will have a perennial yield of 29,402 acre feet once the quarry lake is full. ser 17 pages 2-4 and ES-5. 3. Section 3.2.1.4 states that 5,377 acre feet of agricultural water rights are needed by the mine project. This is listed as 13% of the basin's perennial yield. This should be changed to an 18% reduction in the valley's usable water rights. ser 17, Page 3-12. We would like to see, once the operations have concluded, for this water to be put to beneficial use. 4. Section 3.2.2.1 states that the mature quarry lake water which will exceed NDEP Profile Ill limits for Arsenic, Boron, Fluoride, and Molybdenum will not have an adverse effect on wildlife because "Actual wildlife exposure that would be less than daily year-round and the low magnitude by which the calculated doses exceeded the NOAELs are interpreted to indicate a low probability that risks to wildlife would occur based on the predicted water quality in the Rhyolite Ridge quarry lake (Cedar Creek 2022)." and" . .. reduced foraging and drinking frequency at the higher TDS source in favor of lower TDS sources elsewhere. Therefore, combined with the ability to obtain water from alternative nearby sources (i.e., springs, water troughs), animals are unlikely to be affected by TDS concentrations in the quarry lake." ser 17, page 3-19. Many types of flying insects are attracted to lakes and ponds. Swallows and bats hunt for these insects above and around lakes. Other bird and animal species also hunt for aquatic insects living in the lake water. The assumption that these birds and other animals will hunt for food around and above the quarry lake but go elsewhere for a drink is speculative at best, considering nearby springs	Orphaned sentence was corrected. Clarification added on quarry lake evaporation rate. The ERA values and impacts analysis on wildlife are described in the Wildlife SER and stated in the EIS in Section 4.18. Backfill of the quarry was considered as an alternative but not carried through for analysis because of the likelihood that the lake would be flow-through with potential water quality impacts to the groundwater system. More information on backfill alternatives is provided in the SIR. Mitigation for impacts to surface water and groundwater is described in Section 4.21 and includes development of a surface water monitoring and contingency mitigation plan. The ERA (Cedar Creek 2022) was provided by the Esmeralda County on June 14, 2024.

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		may also be impacted by the 300 foot groundwater drawdown with a 200 year recovery period, and deemphasizes the harm to animals drinking the quarry lake water which will exceed. NDEP Profile Ill limits for Arsenic, Boron, Fluoride, and Molybdenum. On page 3-17 it states in reference to the effect of quarry lake water on wildlife, "Details on the problem formulation, selection of reference toxicity values, ecological exposure factors, bioaccumulation and risk assessment sensitivities are presented in detail in the ecological risk assessment document (Cedar Creek 2022)." This statement is problematic as the Esmeralda Land Use Advisory Committee is prohibited from reviewing the above referenced information in order to better understand, assess and comment on the quarry lake water quality issue. The quarry lake's exceedance of multiple NDEP Profile Ill levels coupled with the permanent loss of 598 acre feet of water to ranchers due to the necessity of acquiring a permanent water right at the quarry lake because of the evaporation loss begs the question why isn't the quarry lake back filled to the water table level. The reduced available water also permanently reduces this water availability for future use. It is recommended that to add clarity and understanding of NDEP Profile Ill the following statement from The Nevada Bureau of Mining Regulation and Reclamation guidance document, Pit Lake Characterization Analytical Profile, be added to Section 3.2.2.1: "[NDEP] Profile Ill was specifically designed to provide a method by which pit lake water quality could be compared to toxicity limits for lifeforms." It is additionally, recommended that to protect wildlife additional drinking water sources such as troughs or guzzlers, etc. be placed adjacent to the quarry lake to provide a safe alternative source of drinking water in case the nearby springs and seeps dry up due to the large groundwater drawdown and extended recovery period. 5. loneer, with review and input from the County and consultants, should be required as a condition of their water rights transfer application and therefore in order to receive the requisite water permits, will need to submit a comprehensive water monitoring plan to the State of Nevada so we can assess and, potentially mitigate, any impacts.	
164	164.3	**TRANSPORTATION & ACCESS (SECTION 3.13)** 1 . 4.13.1 should include loneer will be responsible for traffic control all stages of development for life of mine (ie. Flagman, pilot cars, proper signage in any area hazardous to public access.) 2. The current description of the MOU with Esmeralda County is unclear as to maintenance of secondary assess roads to the project. We recommend adding the language in bold italic to the paragraph below to clarify. 3. The access road and rerouted portions of Cave Springs Road would also be improved and maintained per loneer's MOU with Esmeralda County for Road Improvement and Maintenance to accommodate the additional traffic generated by the Proposed Action (Newfields 2022d; loneer 2023d). loneer would improve the roadway surface and drainage infrastructure to prevent washouts. Maintenance would include dust control, grading, and snow removal. The access road would be maintained at a minimum width of 24 feet wide and crowned to provide for proper drainage. Additional drainage control measures could include culvert installation, culvert repair, leadoff ditches, and fords/boardbased dips. A combination of techniques such as compaction, blending, cement stabilization, polymer soil stabilization, and cellular confinement would be used to stabilize the access road (Newfields 2022d). Continued maintenance and improvement of the access road for the duration of the Proposed Action would reduce the impacts from the increased amount of traffic by improving the condition of the road to meet the needs of the Project plus the existing traffic. The MOU with Esmeralda County also contemplates "secondary" roads near the Project area, whereby if use of these roads increases as a direct result of loneer's construction and operation of a mine at the Project such that additional or more frequent maintenance is necessary to assure safe use, Esmeralda County and loneer will establish a schedule for more frequent maintenance to be performed in accordance with the MOU. Impacts to traffic would be moderate to major, long-term, and regional as trucks would disperse to areas outside the area of analysis. (Page 4-26) Draft EIS 4. The road maintenance agreement between Esmeralda "County and loneer should be part of the forthcoming Development Agreement.	The access road considered for analysis in the EIS is the Hot Ditch/Cave Springs Road west of the OPA. The Proposed Action and North and South OSF Alternative do not include Project-related use of the Cave Springs Road to the east of the OPA. The Development Agreement is private agreement between Ioneer and Esmeralda County for which the BLM has no jurisdiction or input.
164	164.4	**RECREATION** (SECTIONS 3.0 AND 4.9) **HAZARDOUS MATERIALS, SOLID WASTE** (Section 3.5), **VEGETATION RESOURCES** (Section 3.14) **VISUSAL RECOURCES & VEGETATION** (Section 3.15) 1. With 186-248 mine vehicle trips (per 24 hour period) during construction and 230-288 vehicle trips during quarrying and processing in the OPA, how is the impact deemed moderate for travelers to the FLV Hot Springs on the Hot Springs Road, west of the OPA? The current mitigation is to "escort" vehicles entering the OPA, requiring the use of escorts and traffic signaling. The Hot Springs Road is designated a primary access route for mining operations, both east and west of the OPA. 2. The issue still remains that using the FLV Hot springs road both east and west of the OPA will cause "moderate effect for long term" on access to the hot springs, recreational traffic, hunter access, big game relocation due to road traffic, etc. Why isn't BLM furthering their investigation? This was evaluated as an alternative by the BLM, but it was into using the Gap Springs Road from the mining operations facilities north to state highway 6? Using Gap Springs Road would have less impact on travel time, fuel consumption, highway safety, and access restrictions. 3. Visual impacts to the HOT BOX need to be upgraded from MODERATE to MAJOR	The access road considered for analysis in the EIS is the Hot Ditch/Cave Springs Road west of the OPA. The Proposed Action and North and South OSF Alternative do not include Project-related use of the Cave Springs Road to the east of the OPA. Use of the Gap Springs Road was considered as an alternative and determined to not be technically or economically practical or feasible or environmentally reasonable. Additional detail is provided in the SIR. Impact definitions for each resource area are in EIS Appendix D. The impacts to visual resources described in EIS Section 4.15 are consistent with the impact definitions.
164	164.5	**WILDLIFE RESOURCES (Section 3.18)** 1. The seasonal migration of Tarantula crossing the County Road between the Hot Ditch and the mouth of the canyon should be assessed. We don't find evidence that this has been done. 2. If the current NDOW big game guzzlers are affected by mine operations in hunting unit 211 , when and where will the effected guzzlers be relocated and rebuilt per the EIS.	An NDNH request was submitted to identify additional species in the Plan of Operations boundary and its five-kilometer radius. A response was received on June 14, 2024. No tarantulas were identified (NDNH 2024). Newly identified species were added to the EIS and SERs, as applicable. Additionally, further coordination with NDOW occurred and no tarantula migration corridors are known to occur throughout the Project area. EIS Sections 3.18 and 4.18 have been updated to mention arachnids. EIS Section 4.21 describes the general location and timeframe for replacement of the existing guzzler and construction of the new guzzler.
164	164.6	**SOLID WASTE (Section 3.5)** .	Per the Plan of Operations, solid waste would be disposed of off-site at a licensed landfill. The analysis was conducted based on Ioneer's proposed Plan

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		1. 2.1.13.11 Should state Ioneer will not be utilizing Esmeralda County Landfill or Transfer Stations. Respectfully submitted: Ralph Keyes, Chairman, Esmeralda Board of County Commissioners	of Operations. Esmeralda County and Ioneer can privately coordinate this suggested EPM as BLM does not have jurisdiction.
Chris Stotka – June 1, 2024			
165	165.1	Your project has 100% approval and support from my company IRC. Chris Stotka INDUSTRIAL RAILWAYS CO. 675 EAST H STREET BENICIA, CA 94510 OFFICE MAIN: (707) 361-5732 FAX: (707) 752-2104 MOBILE: (510) 774-5262 EMAIL: cstotka@indrailco.com Please visit our website for a complete descripti on of all of our services, www.industrialrailways.com	Comment noted.
Ryan Cole – June 1, 2024			
166	166.1	I would like to voice my support for this fantastic project. This would be a huge step in the right direction for the USA's transition to Electric vehicles that will ultimately help with Global warming. Not only is this project great for the environment, it also secures the Lithium supply chain which is a Global security issue. On top of that it will be hugely beneficial for the local residents brining jobs & revenue to the state that will support family's & local tribes. Honestly, opportunities like this don't come around often if ever and this is so beneficial to Navada. There is push back from some groups that wish to protect the Buckwheat. However they have not been doing much to help this plant in terms of providing a plan or financially contributing to its future. Instead they just oppose the project. That being said Ioneer is the plants best long term plan for protection. They will have the revenue to propagate, protect and make sure this plant thrives into the future, and so that said I can't see any negatives with this project. It really is the future for the USA's position in the global race to go green. Thank you for hearing my view. Kind Regards, Ryan Cole Director Blessed Bowls Newport-Manly-Palm Beach m. 0407666777	Comment noted.
Caleb Cage – June 2, 2024			
167	167.1	To Whom It May Concern: Please find a letter of support from the Nevada Battery Coalition on behalf of Ioneer and the Rhyolite Ridge Project. Please feel free to contact me if you have any questions. Best, Caleb	Comment noted.
167	167.2	Bureau of Land Management Attention: Rhyolite Ridge Lithium-Boron Project 50 Bastian Road Battle Mountain, NV 89820 To Whom It May Concern: This letter is provided in support of the Rhyolite Ridge Lithium-Boron Project in Esmeralda County, Nevada. This project is crucial to meet national goals, it will have an extraordinary impact on state and local communities, and Ioneer has proven itself to be committed to ensuring the project is carried out responsibly, safely, and collaboratively. We support this project fully and without reservation.	Comment noted.

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		The Nevada Battery Coalition (NBC) was formed in 2023 in recognition of Nevada's growing role in the developing lithium and battery storage economy. NBC's focus is to provide coordination and support for projects that will strengthen, grow, and support Nevada's position as a national leader in the battery supply chain. Ioneer has been an important supporter of ours since before our founding, and their project is exactly the type of project that we wish to support. As you are aware, developing critical mineral resource projects, increasing the national reliance on alternative fuel vehicles, and onshoring essential parts of the energy supply chain are critical objectives for the Biden Administration. These are important steps for ensuring national security and energy independence, as well as ensuring that our nation's decarbonization goals are being met. In addition to developing goals and policies in support of these objectives, the Biden Administration has also invested enormous resources to achieving its objectives. The Rhyolite Ridge Lithium-Boron Project is one of two mining projects at a phase of development that can contribute to achieving these objectives in the next few years. Specifically, once online, this project is expected to quadruple national electric vehicle manufacturing capabilities over the life of the project. The Ioneer team has worked diligently and collaboratively over recent years in order to ensure that it is capable of achieving this result, and doing so in a responsible manner. This project is also extremely significant at the state and local level. As noted previously, Nevada is a national leader in the lithium and battery storage supply chain and is poised to improve its position in the. Nevada is the only state in the nation with companies in each of the seven stages of the lithium battery supply chain; we are home to the only operational lithium mine in the country; and Nevada companies have been the recipient of billions of dollars in federal loans from the U.S. Department of Energy, one of which is the largest federal loan for a natural resources project in the nation's history. This industry has the potential to transform Nevada's economy and to provide family-supporting jobs to Nevadans across the state. This project specifically will generate millions of dollars in public resources to Esmeralda County and its residents as well. We support this project for all of the national, state, and local reasons outlined above. I am happy to provide any additional comments or answer any questions that you may have. Thank you for your considerations of our comments. Sincerely, Caleb S. Cage Executive Director Nevada Battery Coalition	
Charles Galt – June 2, 2024			
168	168.1	I want to support fully the development of the Lithium prospects near Silver Peak Nevada by IONEER and other mining interests. The Federal Government continues to remove millions of acres of multiple use lands from the people, the private economy and the taxbase, There are vast tracts in southern Nevada that within the last year have been withdrawn from commercial, productive use in the name of "conservation". The private companies have detailed plans and processes that will insure the preservation of a small piece of land where the endangered Chenopod can be better salvaged and monitored unlike the lack of good protection under the administration of the Federal Government. Allow private industry to develop our mineral resources in an efficient manner without having to rely on China, or Russia or African nations to provide critical resources that we have available.	Comment noted.
Joe Westerlund – June 2, 2024			
169	169.1	[EXTERNAL] Support letter for the Ioneer Lithium Boron project located near Fish Lake Valley. As the Tonopah Town Manager and a long time resident of Tonopah NV, I can see the great financial impacts this project will bring to Tonopah and surrounding a... Joe Westerlund Town Manager Town of Tonopah 140 South Main Street PO Box 151 Tonopah, NV 89049 775-482-6643 - Office 775-482-4308 - Cell 775-482-3778 - Fax E-mail - tpu.joe@gmail.com http://www.tonopahnevada.com	Economic impacts are analyzed in EIS Section 4.10.
Blake Dore – June 3, 2024			
170	170.1	Dear Nevada BLM, I'm a father who fears for my family in a warming world. I urge you to deny a permit for the Rhyolite Ridge lithium-boron mine. The mine would result in environmental harm, including the extinction of the rare wildflower, Tiehm's buckwheat. This wildflower is protected by the Endangered Species Act. If this permit is approved, it would jeopardize the species' existence, or cause adverse modification to its critical habitat — this mine would do both.	In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Air quality impacts are described in EIS Section 4.1. As described in Section 2.1.3, processing is completed using a closed system that would contain the sulfuric acid. Impacts from hazardous materials are discussed in Section 4.5.

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		The mine, and the heavy industrialization, will destroy 22% of the plant's critical habitat and severely degrade the rest. It will pollute the environment with toxic mining dust and sulfuric acid mist, interrupt the movement of pollinators and wildlife, and drain precious Nevada groundwater. Climate change is happening now. We must protect our water, our air and native wildlife. I urge you to comply with the Endangered Species Act and save our wildlife. Please deny a permit for the Rhyolite Ridge Mine. Sincerely, Blake Dore Blake Doré Attorney at Law Licensed in Oregon and Washington He/Him/His Doré Law Firm, LLC 4511 SE 63rd Ave., Suite E Portland, OR 97206	
Nevada Department of Wildlife – June 3, 2024			
171	171.1	Good afternoon, Please see the attached pdf files presenting the Nevada Department of Wildlife's review input to the Draft EIS. Sincerely, Brad	Comment noted.
171	171.2	20240603_RR_DEIS_BradHardenbrook_NDOW_viaEmail_Attachment_2	Comment noted.
171	171.3	Daltrey Balmer, Acting Field Manager BLM Tonopah Field Office PO Box 911 Tonopah NV 89049 dbalmer@blm.gov BLM_NV_BMDO_P&EC_NEPA@blm.gov Re: Draft Environmental Impact Statement (DEIS) for the Proposed Rhyolite Ridge Lithium-Boron Project (Project), DOI-BLM-NV-B020-2021-0020-EIS Dear Mr. Balmer: As a Cooperating Agency, the Nevada Department of Wildlife (NDOW) has contributed to the development of the DEIS. In doing so, we have worked with the BLM and Ioneer Rhyolite Ridge LLC (Ioneer) for identifying and describing existing wildlife resources, developing reasonable wildlife impact minimization and mitigation measures, and planning for a post-mining landscape which is beneficial to wildlife. In this spirit, our comments are intended to build-upon this effort by requesting an optimal bat protection measure and outlining a desert bighorn sheep monitoring plan as reasonable wildlife considerations incorporated into the final EIS and Record of Decision. In addressing abandoned mine lands, NDOW completed subterranean surveys of existing adits within the Operational Project Area (OPA). Survey results suggested that feature ES-3480 should be closed using a bat compatible closure (e.g., bat gate). Therefore, we recommend that the Wildlife Resources – WL-03 mitigation measure be updated to include the installation of a bat gate which would promote public safety and protect bat habitat within the OPA. The location of the proposed Rhyolite Ridge mine is a known movement corridor for desert bighorn sheep within NDOW Unit 211. Empirical evidence from ground observations and aerial survey data shows frequent movements between the Rhyolite Ridge area and Argentine Canyon - Ice House Canyon vicinities. The precipitous terrain adjacent to the Project is known lambing habitat. Rolling hills and lower elevation areas are important winter ranges for both rams and ewes. Overall, the landscape affords escape terrain and multiple springs located adjacent to the surrounding hills provides ideal bighorn sheep habitat. The DEIS correctly finds that potential impacts to bighorn sheep could occur because of Project construction and operations. While we recognize the DEIS identifies several environmental protection measures (EPMs) and mitigation measures to reduce potential impacts to desert bighorn sheep, we believe even with full implementation, potential impacts to the Unit 211 bighorn sheep herd could occur. Because of this outstanding concern, NDOW proposes a bighorn sheep monitoring plan for the Project be undertaken. We have taken the opportunity to draft a bighorn sheep monitoring plan which is attached for reference. We are ever available to coordinate with the BLM regarding our comments. To this end, please contact Habitat Biologist Tracy Kipke located at NDOW's Southern Region office in Las Vegas. She can be reached by email at tkipke@ndow.org. Sincerely, D. Bradford Hardenbrook Supervisory Habitat Biologist Nevada Department of Wildlife, Southern Region 3373 Pepper Lane, Las Vegas NV 89120 702.688.3960; bhrdnbrk@ndow.org	Mitigation Measure WL-03 has been revised. The Bighorn Sheep Monitoring Plan has been provided to Ioneer for consideration. Ioneer has committed to funding the monitoring and will continue to coordinate with NDOW. Information about the monitoring plan and Ioneer's commitment to fund it have been added to the Final EIS..

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171	171.4	Desert Bighorn Sheep Monitoring Proposal - Rhyolite Ridge Lithium-Boron Project **INTRODUCTION AND PROJECT OVERVIEW** The Bureau of Land Management (BLM) Tonopah Field Office has prepared a Draft Environmental Impact Statement (EIS) for the Rhyolite Ridge Lithium-Boron Project (Project). The Draft EIS analyzed the Plan of Operations (NVNV106205338 [NVN 373 098058]) submitted by Ioneer Rhyolite Ridge LLC (Ioneer) for the Project, including two alternatives. Ioneer's Plan of Operations proposes a surface quarry from which lithium and boron ore would be extracted and processed at associated facilities. The mine's construction phase would take approximately four years, the quarrying and processing phase 17 years, and the closure and reclamation phase would continue for six years after mining is completed. The DEIS found that potential impacts to bighorn sheep could occur as a result of Project construction and operations. Because of the potential impacts, this desert bighorn sheep monitoring plan was prepared. This monitoring plan (MP) is intended as a guidance document for initially determining if impacts to desert bighorn sheep occur during the Project's four-year construction phase, identify measures that may be implemented to minimize potential impacts through reactive management actions, and an adaptive management vehicle for facilitating future actions as needs arise. With exception to the intent of MP goals and objectives outlined below, this MP should be considered a living document, where the cooperators may agree to make change modifications, additions, or exclusions of any aspect of MP guidance. Any modifications to this document would be made through a collaborative process involving the BLM, Nevada Department of Wildlife (NDOW), and Ioneer. This monitoring plan includes the following components: • Goals and objectives • A description of the types of monitoring, locations, and procedures • A monitoring schedule, including the timing and frequency of monitoring • Documentation and reporting requirements Much of the background discussion and analysis presented in this MP document are derived from the DEIS. The reader is referred to the DEIS for more details on the descriptions of the affected environment and the environmental effects of the project. **Rhyolite Ridge Lithium-Boron Project and Management Unit 211 Desert Bighorn Sheep** The Project is proposed in the Silver Peak Range, approximately 40 air miles southwest of Tonopah and 13 air miles northeast of Dyer, Nevada, and involves construction, operation, and closure of a new lithium-boron mine. The Project encompasses approximately 7,166 acres, consisting of a 6,369-acre Operational Project Area (OPA) and the 797-acre Access Road and Infrastructure Corridor. Approximately 7,137 acres are public lands administered by the BLM, and roughly 29 acres of private land are within the Project area. The western side of the Silver Peak Range is identified as occupied desert bighorn sheep habitat. Bighorn sheep occurring throughout the Project area utilize a variety of habitats. NDOW identifies the bighorn sheep a part of the Management Unit 211 Herd. The Project area is within mapped year-round bighorn sheep habitat, and a large proportion of the Unit 211 Herd lives within the basin of the proposed mine. This makes a large portion of the Unit 211 bighorn sheep habitat potentially impacted from the proposed mine. The adjacent escape terrain and multiple springs located in the surrounding hills afford ideal bighorn sheep habitat. NDOW provided the following summary of the Unit 211 bighorn sheep herd. Bighorn sheep populations within NDOW's Management Area 21 are some of only a few remnant herds in west-central Nevada. These bighorn herds have been analyzed genetically, found to be unique, and given the moniker of the "Great Basin Race". Historically, bighorn sheep movement occurred regularly between the Silver Peak Range (Unit 211), Monte Cristo Range (Unit 213), and Lone Mountain (Unit 212). In Unit 211, aerial surveys in 2023 detected lamb ratios that were greatly improved (2023 lamb ratio was 42 and the previous most recent survey in 2021 was 24), but sample size were drastically decreased from previous years. This population has experienced population level contractions in recent years primarily caused by bacterial pneumonia and drought conditions. Given the importance of retaining the remnant herd genetics, the conservation of their habitat is paramount. **Project Environmental Protection Measures and Applicant Committed Actions** As part of the Plan of Operations for the Rhyolite Ridge Mine, Ioneer has committed to several environmental protection measures (EPMs) to reduce potential impacts to bighorn sheep. The DEIS outlines the following actions and EPMs: • Operators would be trained to monitor the OPA for the presence of larger wildlife such as deer, antelope, and sheep. Mortality information would be collected and reported, as necessary. • Ioneer would establish wildlife protection policies that prohibit feeding or harassment of wildlife within the OPA boundary. • Following Project construction, areas of disturbed land no longer required for operations would be reclaimed as required by the BLM to promote the reestablishment of native plant and wildlife habitat. • Speed limits would be posted at 35 miles per hour (mph) on haul roads, 45 mph on access roads, and 25 mph in the OPA. The processing facility, the quarry, explosive storage area, and contact water ponds would be fenced to specifications outlined in the BLM Handbook 1741-1, as applicable. All fences would include double swing gates to allow for human access. Ioneer would also coordinate with NDOW on fencing specifications. Avian and wildlife protection measures would be in compliance with Industrial Artificial Pond Permit measures. **Project Mitigation and Monitoring (See DEIS Section 4.21)** Wildlife Resources – WL-02 *Mitigation Measure:* Increased human activity may cause wildlife, including big game species avoidance of the NDOW Silver Peak 04-guzzler, limiting access to water. Groundwater use and drawdown may impact surface water sites used by wildlife; however, guzzlers are not affected by drawdown since they are either sourced by precipitation of manually filled. As mitigation, Ioneer would establish two guzzlers (outside of Tiehm's buckwheat designated critical habitat) to address potential impacts to water sources used by wildlife, including big game species. NDOW Silver	The BLM provided the proposed monitoring plan to Ioneer for consideration, and the EIS has been revised to state that this Plan was prepared by NDOW and provided to Ioneer for voluntary consideration. The BLM analysis has not identified this as required mitigation for the Project. The BLM manages habitat and this plan is specific to species management. Mitigation for wildlife is described in EIS Section 4.21. Effects to desert bighorn sheep are analyzed in EIS Section 4.18 and considers these potential impacts. The impact analysis for desert bighorn sheep also considers the implementation of ACEPMs.

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		Peak 04 (Cave Springs) Guzzler would be relocated, and one new guzzler would be established east of the OPA and within the maximum extent of the predicted 10-foot groundwater drawdown contour and its one-mile buffer. Ioneer would relocate and rebuild the Cave Springs guzzler and build an additional new guzzler based on recommendations from NDOW and the BLM. Both guzzlers would be established during the four-year construction period of the Proposed Action. **Potential Project Impacts** Even with the implementation of the EPMs and wildlife resources mitigation (WL-02), potential impacts to the Unit 211 bighorn sheep herd could still occur as a result of Project implementation. The location of the Rhyolite Ridge mine is a known movement corridor for desert bighorn sheep within Unit 211. Empirical evidence from ground observations and aerial survey data show frequent movements between the Rhyolite Ridge area and Argentine Canyon/Ice House Canyon. The precipitous terrain adjacent to the Project is known lambing habitat and the rolling hills/ lower elevation areas are important winter ranges for both rams and ewes. It is unknown the effects that this project will have on the Unit 211 desert bighorn sheep movement patterns and demographic parameters. Potential impacts are as follows: • Habitat loss, including removal of vegetation. Disturbance within the OPA may lead to the establishment or spread of invasive weeds that may degrade bighorn sheep habitat. • Fragmentation of movement corridors. Displacement of individuals and habitat fragmentation decreases survival rates of affected individuals to some degree and increases competition. • Collision with vehicles. The additional presence of roads and mine traffic may increase mortality from vehicle collisions. • Noise and human activity would be expected to cause desert bighorn sheep to avoid areas of active disturbance. Activities can cause alternative movement patterns and seasonal use for desert bighorn sheep. o Lambing locations and land use can be altered. Demographic parameters can be affected by these alternative strategies. o Use of water sources can be altered. **GOALS AND OBJECTIVES** The goal of this desert bighorn sheep monitoring plan is to identify and minimize potential mining related impacts to the Unit 211 bighorn sheep herd. The objectives of the monitoring and adaptive management strategy are to: 1. Determine bighorn sheep use and movement within the Project area; 2. Determine whether mining operations cause disturbance to bighorn sheep utilizing the basin and adjacent terrain; 3. Based on results from Objective 2, identify whether adaptive management actions may be required to reduce impacts to bighorn sheep; and 4. Based on the results of Objective 3, implement site-specific adaptive management actions that would minimize or avoid any additional impacts. **MONITORING PROCEDURES** Monitoring of bighorn sheep will be accomplished by deploying GPS collars on bighorn sheep residing within and adjacent to the OPA. Key information collected during monitoring of bighorn sheep would include, but is not limited to: • If bighorn sheep are able to move around the Project area without energetic consequences (e.g., changing course, stuck in a bottle neck); • If bighorn sheep are moving through mine facilities such as roads and haul roads; and • If bighorn sheep can access suitable lambing habitat and water sources adjacent to the Project area. **Approach and Timeline** Desert bighorn sheep captures will be conducted during January 2026. A licensed vendor under the state of Nevada will complete the capture work of 20 desert bighorn sheep. The states current licensed vendors are Quicksilver, Heliwild or Wildlife Capture Inc. With this being said, the state is currently going through the request for proposal process so additional professional contractors may conduct this work. The capture crew will use a net-gun to capture desert bighorn sheep and will physically restrain individuals with hobbles and blindfolds then sling them back to a basecamp operation. Once at basecamp, Nevada Department of Wildlife personal will collect biological samples, collect morphometric data, check for injuries and outfit each sheep with a GPS collar and identifying ear tags. GPS collars will remain on Desert Bighorn sheep for approximately 2 years, after which, a locking mechanism will release and allow the collars to drop off. Collar location data will be collected every 4-6 hours for the duration of time the collar is deployed. Data is uploaded daily and can be viewed and exported. Area biologists will regularly monitor desert bighorn sheep movements online and will investigate mortalities when they occur. Movement data will be analyzed to determine movement corridors, critical lamb use areas, and season habitat selections/high use areas. Information will be shared with BLM and Ioneer Raw data will not be accessible to the public until after one year in accordance with Nevada Revised Statute. NDOW Biologists will compile data and complete a preliminary report annually. Additional in-depth analysis will be completed at a later date, once the collars have dropped off. In-depth analysis may require contracting with a private consultant or research institute. The need and design of additional collaring after the construction phase and Project operations begin will be evaluated following the initial data analysis. **Budget** **Project Components** / **Amount Requested from Ioneer** Bighorn Collars and Associated Fees 1. GPS/VHF Collar ($1,500.00 X 20) — $30,000.00 2. Collar Activation Fee ($40/collar X 20) — $800.00 3. Annual Collar Data Fee ($300/collar X 20 X 2) — $12,000.00 **Sub Total (Collars)** — **$42,800.00** Capture Costs 1.Helicopter Capture Crew ($1,000/animal X 20) — $20,000.00 **Total Funding Requested from Ioneer** — **$62,800.00**	

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		Guzzler and Spring Monitoring Guzzler and spring monitoring are necessary to identify the potential issues associated with Project operations, which may affect bighorn sheep habitat use within the basin of the proposed mine site. Guzzler and spring monitoring would occur in order to determine if water developments need maintenance or filling. Guzzler monitoring would be implemented at the discretion of NDOW or by Ioneer. A surface water monitoring and contingency mitigation plan is in development as part of the DEIS water resources mitigation. **ADAPTIVE MANAGEMENT ACTIONS** Potential adaptive management actions would be dependent on understanding how the bighorn sheep utilize the active mine site. Adaptive management actions could include, but are not limited to, one or more of the following: • Creation of a travel path suitable for bighorn sheep. • Reduce noise pollution during peak parturition season. • Excluding bighorn sheep from areas determined to be hazardous that are not currently identified. If these adaptive management actions are not effective in protecting bighorn sheep from the potential hazards of the mine, Ioneer would work collaboratively with BLM and NDOW to develop other adaptive management actions based on the threat at the time of the event to mutually develop a solution.	
Dan Peterson – June 3, 2024			
172	172.1	Corrected letter Please disregard previous draft, thanks, Dan Douglas Furtado; District Manager; Battle Mountain District Office BLM_NV_BMDOwebmail@blm.gov Perry B Wickham Field Manager Tonopah office BLM_NV_BMDOwebmail@blm.gov Mr. Wickham Mr. Furtado Please include this letter in the comments for Ioneer' s Rhyolite Ridge Lithium-Boron Project DOI-BLM-NV-B020-2021-EIS, April 2024 Please review these comments and I would appreciate a response to me regarding the access issue separately. Thank You for your consideration Dan J. Peterson	Comment noted.
172	172.2	Dan J. Peterson Comments on Ioneer's Rhyolite Ridge Lithium-Boron Project (mine) for DOI-BLM-NV-B020-2021- EIS, April 2024, transmitted by email to: BLM_NV_BMDO_P&EC_NEPA@blm.gov *The Plan states:* **SUMMARY** **Transportation and Access** **Section 2.1.8.1 Plan Boundary Access - - - states:** "Once operational, Mineral Ridge Mine traffic would use the Cave Springs Road through the OPA for access to the Mineral Ridge Mine site for truck traffic and light vehicles would utilize Coyote Road (BLM 2014). When operational, the Mineral Ridge Mine estimates that mine-related traffic could account for 16 to 18 commuter vehicles (for two operating shifts), and two to four semi tractor-trailers for freight and chemical delivery and product shipment, for a total daily average (round-trip) traffic count of 40 vehicles per day, seven days per week (NewFields 2020)." *The Plan further states:* This seems to be somewhat mis-leading because in the Transportation section of the Draft EIS the description is different. **Transportation and access** **Supplemental Environmental Report** **Rhyolite Ridge Lithium-Born Project** **Executive Summary - - - states:** "Public access to the OPA from US 6, a two-lane arterial highway that provides the east-west connection between US 95 in Nevada and US 395 in California, is to turn south onto SR 264 or SR 773. US 6, SR 264, and SR 773 are paved roads. Continue traveling southward SR 773 to SR 264 or continue traveling southward on SR 264 for approximately 13 miles to the intersection with Hot Ditch Road. Hot Ditch Road is the beginning of the access road and continues for eight miles before becoming Cave Springs Road. Continue on Cave Springs Road for five miles until the OPA is reached. The entire access road is unpaved from SR 264 through the OPA". Basically, this plan just assumes that the access to the mine will be over State Highway 264 and Hot Ditch Road to where it joins Cave Springs Road, then to the mine.	Several alternate access routes were considered as an alternative and determined to not be technically or economically practical or feasible or environmentally reasonable. Additional detail on consideration of alternate access routes is provided in the SIR. The air quality analysis in EIS Section 4.1 includes an emissions inventory and modeled air quality impacts. Effects of increased traffic associated with the Project are analyzed in detail in the EIS and include analysis of transportation system impacts, impacts to wildlife, dark skies, and wildlife. The EIS analyzed use of the Hot Springs portion of the access road as currently aligned and proposed in the Plan of Operations. The EIS discloses that this portion of the road crosses private land in EIS Sections 2.1 and 3.6.

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		NO OTHER ACCESS WAS ANALYZED IN THE PLAN (that I could find). Fish Lake Valley residence's have asked Ioneer about using the Cave Springs alignment to Highway 6 instead of the Hot Ditch road and have been informed that Ioneer would look at this alternate after BLM approves this [completely flawed] access plan. Ioneer personnel have informed me that when this EIR is approved, they will consider this alternate access. Ioneer's excuse has been that to add this alternate, and much shorter route study now, would delay BLM's approval of this [flawed] Plan. At the Esmeralda County Land Use Advisory Committee meeting on Thursday, May 30, 2024, there was unanimous opposition to the use of the Hot Ditch Road for access to the Ioneer mine. The Committee's written response to the EIS states these facts and conditions. The people of Fish Lake Valley have been supportive of the mine, although it will disrupt the quiet Ranch style life in fish Lake Valley. But the FLV people don't need to be disrupted with the horrible amount of truck traffic over our highways and county roads, when there is a very excellent alienate to Hot Ditch Road access. The residents of FLV didn't or haven't filed a lawsuit like the environmentalists did and unnecessarily delayed the project approximately 2 to 3 years and cost Ioneer stockholders approximately 5 to 10 million dollars to a save a (what FLV people call a) flower or weed. The obvious mine access should be on the Cave Springs corridor from U.S. Highway 6, near the intersection of state Highway 773, to the mine location (see attached map) This would reduce mine access travel by 19.6 miles per trip. An analysis of increased costs to Ioneer to use the Hot Ditch Road. 1. extra diesel fuel for lithium trucks at 4 trips per hour, each way, 24 hours per day, 7 days per week, for 23 to 30 years. $46,252,800 2. extra diesel fuel for construction trucks 186 to 248 vehicle passes per day for 4 years, daylight hours (ave. 12 hours/day (6 days per week) = (200 trips x 6 days x 52 weeks x 4 years) = 249,600 trips extra Diesel fuel $5,491,200 3. Damage to State highway roads. With this much heavy duty truck traffic, it is estimated that the road surface on 264 & 773 will need replacement every 4 years plus, ongoing pothole maintenance. Estimate of road replacement for approximately 12 miles of 2 lane highway . (cost per mile $1,000,000.) 12 miles = $12,000,000 x 7 replacements [28 years divided by 4 = 7 replacements]. $84,000,000 4. Extra truck driver costs, 630,720 hours for the extra 13.2 miles $ 1,261,440 $137,005,440 TOTAL These are monetary costs not considered in either Ioneer nor BLM's, EIR analysis. Seems like Ioneer is oblivious [blind] to such costs. The EIS Plan also does not consider the environmental cost to the residents of Fish Lake Valley. 1. the increased truck traffic spewing diesel soot and smoke and lungdamagingchemicals into the valley for 27 to 30 years estimated 3504 tons of soot per year • Diesel engines produce CO2- 22.38 pounds per gallon for this mine project, if the Hot Ditch access is used 209,265,532 pounds of CO2 will be disbursed into FLV during mine operation [over 104,000 tons]. That will blacken FLV air, stick on and damage farm products, deposit on cars and homes and may cause numerous illnesses. If the Cave Springs road is used, none of this amount of possible lung, health and property damage will occur. This is one of the environmental costs the April 2024, BLM EIS doesn't even mention. • heavy-duty diesel vehicles account for 20%. of all NOx emissions from US transportation sources, • NOx includes nitrogen dioxide (NO2), which is toxic, and nitric oxide (NO), which reacts with oxygen to create NO2. • Particulate matter (PM2.5), Diesel exhaust contains solid material known as diesel particulate matter (DPM), which is a subset of PM2.5. • heavy-duty diesel vehicles accounting for 25%.of all PM2.5 emissions, with • Other toxic emissions, Diesel vehicles also emit nitrous oxide (N2O), a greenhouse gas. 2. the interference with wildlife on the roads, such as (wild horses) (cattle) (birds) etc. estimated Wild Horses 10,950 impacts Cattle 7,800 impacts Birds 1,560 impacts 3. the interference with the school buses 6 per day for school year (9 months) 1080 impacts 4. the disruption and traffic control while repaving the pot holes caused by the heavy truck traffic (probably monthly) 28 years x 12 times per year = 336 traffic control disruptions. [BLM IRS says these are minor) but not to the residents of fish Lake Valley. 5. truck headlight pollution at night for 8 trucks per hour going up and down the Hot Ditch road. Assume winter average darkness, 5 PM to 6 AM = 13 hours, 30 years, 8trips/hr = 567,840 trips Assume summer average darkness, 8 PM to 5 AM = 9 hours 30years, 8trips/hr = 393,120 trips TOTAL 960, 960 trips 6. the highway roadbed through Fish Lake Valley is not constructed for truck traffic weight and is narrow with minimal shoulders, increasing the danger to residents driving on the road with the trucks. 7. The tax payers will be footing the bill for highway repairs unless the Cave Springs Road is used. 8. If Ioneer hasn't pursued the alternative routes by now, then I believe they were never serious when they led us on for the last several years, to believe they were looking at those alternative routes. This could be a bad sign of things to come from Ioneer, once they get their permits, they won't need our support. At that point we just become a nuisance to them like a insect that needs to be swatted away.	

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		All of these environmental impacts can be eliminated with the mine access being the Cave Springs corridor instead of the Hot Ditch Road & highway 264 & 773 corridors. None of these environmental impact were analyzed or considered in the current April 2024, Draft EIR. Ioneer personnel have related to the community that all of these environmental impacts will be analyzed after the approval of the April 2024 EIS. This is unacceptable to the Fish Lake Valley Community. These impacts MUST BE cured prior to approval of the April 2024 EIS. Ioneer personnel have related to the community that the Cave Springs Road may cross Indian burial ground and may cross some dried up wetlands. This is Ioneer‘s excuse for not now analyzing and proposing use of this road. That is completely unacceptable to the residents of Fish Lake Valley. If these concerns are a problem, the Cave Springs corridor can and should be detoured around these obstacles. Not using this obvious access is just an insult to the residents of Fish Lake Valley and needs to be rectified before mine construction commences. A Design/Build RFP could be prepared by Ioneer for the design and construction Cave Springs Road. Probable time to design & construct the road is approximately 6 months. This could already have been completed, if Ioneer had started the process in 2022, when suggested by Mr. Peterson. (see attached 2/19/22, letter to Ioneer) Fish Lake Valley residents have been very patient with the Ioneer’s intrusion and Ioneer employees has verbalized that they will “work with FLV to minimize its impacts life” in Fish Lake Valley. Ioneer could terminate these employees tomorrow and where would the trusting residents of Fish Lake Valley be?? In addition, with the proposed EIS ”assumption” that the Hot Ditch Road is the access to the mine, was performed without analyzing the impacts to the residents is not very nice. When a strange lawyer threatened to sue Ioneer over a Flower that no one in FLV knew about and did not interfere with the FLV life style, Ioneer stopped the mine construction plans and Ioneer spent 2 to 3 years (and millions of dollars) appeasing these outsiders over an (unknown to FLV people) plant. But, with the issue of this road impact to the actual life of FLV, is raised. Ioneer says it will (maybe verbally, but not in writing, take care) of that later (after the BLM approves the EIR), The April 2024, EIR just assumes that using the Hot Ditch will not cause the FLV residents pain and suffering for the next 27 to 30 years. Therefore, this plan should be revised and resubmitted to the Public, with the road access revised to eliminate this very real and very objectionable daily impact on the residents of Fish Lake Valley. In addition, the current alignment of the Hot Ditch Road crosses private property where it joins Highway 264. The BLM and Ioneer were appraised of this interference in 2022, and again almost a year ago, but nothing was analyzed in the EIR regarding the relocation of the Hot Ditch Road off of Private property. Neither the BLM nor Ioneer responded in writing to the concerns expressed in the written communications, nor was any of these concerns included in the EIS. Ioneer (not the BLM) have verbally discussed these road concerns with Mr. Peterson and the County, but it is always “we will do something after approval of the EIS”. Seems like in 2 years Ioneer could have analyzed the Impacts for using the Hot Ditch Road & Highway 264/773 and had a plan in place to correct these obvious errors. Nothing was done. Ioneer wastes huge amounts of money appeasing outside lawyers about a Flower, but just give lip service to the Residents of Fish Lake Valley. *Former commissioner Tim Hipp made an interesting observation about the Gemfield mine in Goldfield. When the Gemfield mine (Waterton) was pursuing their permits they were very helpful and readily open to communicating and participating with the community. When Gemfield received their permits, they stopped returning calls and as Tim said they don't need us anymore once they got what they wanted.* The people of Fish Lake Valley do not believe this will occur with Ioneer, but ‘the proof is in the pudding’ so to speak. So far Ioneer’s actions speak louder that words. This obvious road dilemma has been discussed for over 4 years and could/should have been resolved during that period. Ioneer has not put anything in writing to respond to various requests for solving this obvious road access problem. The FLV residents question the need to approve a very flawed EIS without any writings from Ioneer that they will correct this problem after approval of the April 2024 EIS. This recommendation is to solve the obvious access road dilemma, before EIS approval instead of “maybe” after approval. Ioneer has had permission to use this private property road for their exploration activities, but this permission will cease when construction begins. (See Dan J. Peterson attached letter dated February 14, 2022 and July 14, 2023. cc: BLM, Tonopah office Esmeralda County Land Use Advisory Committee Tyson Falk, Ioneer Bob Bender, Arlemont Ranch Attachments: Dan J. Peterson letter to Ioneer dated February 19, 2022 Dan J. Peterson letter to BLM and Ioneer dated July 14, 2023 Google maps of Cave Springs Road, Hot Ditch Road and State Highway 264, 773, US 6 & US 95	

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172	172.3	Transmitted only by email to: Robert Stepper rstepper@ioneer.com Tyson Falk tfalk@ioneer.com Mr. Robert Stepper, Director of Process Operations Mr. Tyson K. Falk, MPA, Government and Public Affairs Manager Ioneer, Inc. 9460 Double R Blvd. Suite 200 Reno, NV 89521 USA RE: Lithium Mine access roads Subject: Road to State Highway 773 State Highway 264 Dear Mr. Stepper and Mr. Tyson: I would just like to put in writing what I thought was discussed regarding Ioneer's access roads to the mine. Ioneer apparently was not aware of the road along the base of the silver peak mountains that connects with State Highway 773, just about a 1/4 mile+/- west of U.S. 6 Highway. On Goggle Maps it is called Emigrant Pass Road. Mr. Ralph Keyes, County Commissioner, related that he had discussed the use of Emigrant Pass Road with some Ioneer personnel. Mr. Keyes, had recommended/suggested that this access be explored. Ioneer had been concentrating on improving the 264 access road. As I explained, the distance from the intersection of each access road which is just east of the "Hot-Box" to a State Highway is almost equal-distant (approximately 8 miles). Having lived in Esmeralda County since 1978, and observing various mining projects, it is my opinion that a majority of Ioneer's workers will want to live in Tonopah. I estimate that maybe 1/3 will end up living in Fish Lake Valley. In addition, for Ioneer's delivery/supply trucks, once they realize the shorter distance to Hwy 6, they will use Emigrant Pass Road rather than take the extra 12 to 20+/- miles using highway 264 and/or 773 to highway 6. I was surprised by the number of people that were concerned about traffic and lights at night coming towards Hwy264. Using Emigrant Pass Road would probably reduce this concern. I appreciate the time of Ioneer to consider this travel issue. Improving both roads should be a consideration for Ioneer. As I explained during our meeting, I have experience in road design and construction and I will more than happy to assist/consult with the Ioneer team to accomplish this task. Sincerely, Dan J. Peterson Cc: Mr. Ralph Keyes, Esmeralda County Commissioner commissionerkeyes13@yahoo.com Mr. Bob Bender, Arlemont Ranch bob.bender@tastefulselections.com	Several alternate access routes were considered as an alternative and determined to not be technically or economically practical or feasible or environmentally reasonable. Additional detail on consideration of alternate access routes is provided in the SIR.
172	172.4	Transmitted only by email to: Robert Stepper rstepper@ioneer.com Tyson Falk tfalk@ioneer.com Mr. Robert Stepper, Director of Process Operations Mr. Tyson K. Falk, MPA, Government and Public Affairs Manager Ioneer, Inc. 9460 Double R Blvd. Suite 200 Reno, NV 89521 USA RE: Lithium Mine access road location Subject: re-location of road near State Highway 264 through private property Summary of conversation with Ioneer, Tyson Falk and Robert Stepper, 1:00 to 1:25Pm, 7/13/23 regarding Ioneer using my property for access to their lithium mine over what is refereed to as the "Hot-Ditch" road between State highway 264 and east, to the mine location. Ioneer recognizes that the existing road crosses both Peterson and Arlemont private property. Ioneer is planning on relocating the portion of the road on private properly to the north section line, after the BLM completes its first review of the mine plan. Ioneer says it is easier to perform this task after the first BLM review is competed, instead of including this road relocation in the original plan. Ioneer will perform this road-relocating task after the initial BLM approval is issued and before any construction is started at the mine site. Peterson pointed out that Ioneer has permission to use the current road over his property while the permit process is progressing, but that permission will be withdrawn when mine construction begins. The Road relocation to the north is not in the current BLM approval process, but Ioneer states that after the initial BLM process is competed, that Ioneer will relocate the road to the north off of private property DJP pointed out that approximately 20 years ago Esmeralda County sued VonDyrk, Knighten and Peterson , to use its private property for this County road. The Nevada Supreme Court ruled that the County road on VonDyrk, Knighten and Peterson's private proper was not a county road. Thereafter, the County constructed a County road on the north section line of the private property on BLM land. The "Hot-ditch" road is an extension of the relocated county road.	Proposed road realignments are described in EIS Section 2.1.8. The EIS analyzed use of the Hot Springs portion of the access road as currently aligned and proposed in the Plan of Operations. The EIS discloses that this portion of the road crosses private land in EIS Sections 2.1 and 3.6.

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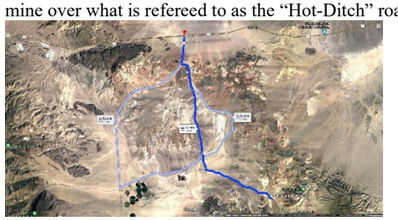
		In fact, there is already use of this “section-line” portion of the “Hot-Ditch” Road and completing the grading of the existing road will be quite inexpensive. Ioneer in its conversations, has assured Peterson that after the initial BLM approval process is completed, that Ioneer will notify the BLM that the current location of the “Hot-Ditch” road over private property will be relocated to the north section line coinciding with the existing County Road west of State highboy 264. Ioneer related that the BLM has stated that the road from the mine to State Highway SR773/US6 has some environmental issues and the BLM has/is refusing the use of that road for mine access. Use of this exiting road would prevent all the truck traffic from traveling into Fish Lake Valley and severely disrupting valley life. It was pointed out that this (SR773/US6) access is a shorter route for all the truck traffic and probably would be used once truckers realized that they can reduce their trip by approximable 16 miles by using this access road. The phone call ended with assurances from Mr. Tyson and Mr Stepper representing Ioneer’s intention that the Hot Ditch road over private property would be relocated to the north section line prior to mine construction. Attached is the February 19, 2022, letter to Ioneer regarding the road relocation. Ioneer via Mr. Falk on numerous past occasions has verbally related the above Ioneer position when discussed with both during Esmeralda County Land use Planning Commission meetings and private conversations. Dan J. Peterson printed 6/3/24, 3:11 pm, July 14, 2023, Summary of conversation with Ioneer Tyson Falk and Robert Stepper, 1:00 to 1:25Pm, 7/13/23, regarding Ioneer using my property for access to their lithium mine over what is refereed to as the “Hot-Ditch” road between State highway 264 east, to the mine location  	
Nevada Mineral Exploration Coalition – June 3, 2024			
173	173.1	To Whom it may concern: Please see the attached letter of support from the Nevada Mineral Exploration Coalition. Thank you. David R. Shaddrick, President Nevada Mineral Exploration Coalition	Comment noted.
173	173.2	May 28, 2024 Rhyolite Ridge Lithium-Boron Mine EIS c/o BLM Battle Mountain District Office 50 Bastian Road Battle Mountain, NV, 89820 *Submitted via email: BLM_NV_BMDO_P&EC_NEPA@blm.gov* **Comments on Rhyolite Ridge Draft EIS** Dear Mr. Distel: **Introduction** The Nevada Mineral Exploration Coalition (NMEC) is submitting this letter in response to the BLM’s solicitation for comments on the Rhyolite Ridge lithium-boron project’s Draft EIS, proposed by Ioneer. These comments highlight three positive impacts to be afforded by the project: contributing to the establishment of a robust, domestic lithium supply chain; stimulating the economy of nearby local communities through job creation and public revenue impacts; and facilitating the conservation of the endangered Tiehm’s Buckwheat plant as evidenced by the North and South OSF Alternative considered within the Draft EIS.	Comment noted.

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		For background, The NMEC is a grassroots coalition of individuals and small businesses who make up the exploration, research, and development segments of the mining industry. Our goal is to promote and preserve the natural resource exploration industry of Nevada and the Western US. NMEC members use state-of-the-art science and technology to search for and develop the natural resources in the areas where we work, and we generate jobs, economic activity and considerable tax revenues for local and state governments. We bring in new capital, commonly from out of the country, all of which is spent domestically. We find the mines of the future, ensuring the long-term economic well-being of Nevada and the Western US.	
173	173.3	**Rhyolite Ridge will Bolster the United States' Critical Mineral Supply Chains** Although the demand for lithium, a critical mineral used in the manufacturing of lithium-ion batteries, is set to increase 500% by 2050[1], the only current production of this commodity in North America is from Albemarle's Silver Peak brine operation in Esmeralda County, Nevada[2]. While domestic projects in the production pipeline have been beset by legal challenges and permitting delays, the United States remains a net importer of lithium2, posing a serious hurdle to the Biden administration's goals of curtailing carbon pollution and emerging as a global leader in clean vehicle manufacturing[1]. As the second lithium-producing operation in the United States and the first Boron producing operation in Nevada, the Rhyolite Ridge project will contribute greatly to strengthening domestic supply chains and facilitating the renewable energy transition. According to the U.S. Geological Survey's 2022 Mineral Commodity Summaries[2], the United States relied on imports for >25% of lithium consumption between 2017 and 2021, a dependency on foreign products that can only be expected to increase as the demand for lithium quintuples by 2050. Eight percent of lithium imports over this period came directly from China or Russia, and 91% came from Chile or Argentina, where the importance of Chinese trade and magnitude of Chinese investment have increased exponentially in recent decades[3]. Thus, virtually all lithium imports into the United States came from competing global superpowers or regions decidedly within their sphere of influence, constituting a serious supply chain concern that can only be resolved by advancing domestic lithium deposits, such as Rhyolite Ridge, into production. As one of the two known major lithium-boron deposits that exist on Earth[4], Rhyolite Ridge is a unique geological occurrence that affords a remarkable value proposition to the American people. Lithium-boron mineralization is hosted within ancient lake beds that were deposited in an enclosed basin within a tectonically active region, a set of conditions that is only preserved at specific times and locations within the geologic record, and very rarely results in the formation of economically valuable ore deposits. According to the Draft EIS Section 2.1.3.1 (Section 2-3), the Project will produce "approximately 26,800 tons per year (tpy) of lithium carbonate and 219,000 tons per year of boric acid." When viewed through a geological lens, such a deposit is a veritable needle in a haystack, and through a societal lens, a prolific natural resource capable of delivering the United States into an era of reduced carbon emissions. To mineral exploration geologists who truly appreciate the value and scarcity of deposits like Rhyolite Ridge, we believe it is imperative that the Project receive an affirmative Record of Decision. [1]https://www.whitehouse.gov/wp-content/uploads/2022/02/Capstone-Report-Biden.pdf [2]https://pubs.usgs.gov/periodicals/mcs2022/mcs2022.pdf [3]https://rb.gy/ewv9pw [4]https://www.sec.gov/Archives/edgar/data/1896084/000114036121040692/filename5.htm	Comment noted.
173	173.4	**Rhyolite Ridge will Create High-Wage Jobs and Substantial Public Revenues** Beyond strengthening American critical mineral supply chains, mining at Rhyolite Ridge will revitalize Esmeralda County and the surrounding communities by creating hundreds of quality, family-sustaining jobs, promoting local spending by Ioneer employees and fostering a rich environment for business start-ups. According to the Draft EIS the Project would generate a "construction workforce of 500 people for four years, plus 113 indirect and induced jobs, and there would a quarrying and processing workforce of 350 people for 14 years, plus 79 indirect and induced jobs." (Section ES-5).[5] According to the "Social and Economic Values Supplemental Environmental Report"i for the Rhyolite Ridge Lithium-Boron Project, Esmeralda County had a population of 729 in 2020. This number of new jobs will be a major contributor in revitalizing an area that has seen consistent population decreases and limited public revenues, and will thus benefit considerably from the uptick in economic activity resulting from the Project. This Environmental Report also correctly indicates that "average weekly mining wages are among the highest for any industry in the Nevada non-metro counties". Jobs within the mining industry produce family-supporting careers, and Esmeralda County's residents and their families will benefit considerably.[6] And as evidenced by letters of support approved by three Nevada County Boards of Commissioners (Mineral, Nye, Esmeralda), Ioneer has done an exemplary job to ensure that they are engaging and actively listening to the nearby local communities to ensure that the Project brings positive benefits to this area of Nevada and its citizens. [5]https://eplanning.blm.gov/public_projects/2012309/200540745/20108267/251008267/Rhyolite%20Ridge%20DEIS%20-%2020240415_508.pdf [6]https://eplanning.blm.gov/public_projects/2012309/200540745/20108276/251008276/11_rr_ser_social_economic_values_20240415_508.pdf	The EIS contains detailed analysis of impacts to social and economic values in Section 4.10.
173	173.5	**Mining at Rhyolite Ridge will Facilitate the Conservation of the Endangered Tiehm's Buckwheat Plant** Over the course of mineral exploration and development activities at the Rhyolite Ridge project, Ioneer has demonstrated great commitment to the responsible management of the Tiehm's buckwheat population, as well as flexibility in the wake of evolving government mandates surrounding it. As an indication of the Project's commitment to responsibly developing this important resource while simultaneously protecting the populations of Tiehm's buckwheat, the proposed quarry in the North and South OSF alternative, has been developed to ensure there will be no direct impacts to any of the plants on site. We commend Ioneer for working with experts and regulators to design their Project responsibly and are supportive of this alternative presented in the Draft EIS. Beyond these revisions to the Project's Plan of Operations, Ioneer has also demonstrated their commitment to ensuring the Tiehm's buckwheat is uplifted as evidenced by their construction of a dedicated greenhouse and the hiring of experts, including a full-time botanist, to oversee the operations which will continue to increase the numbers of plants and seeds to be banked to ensure that the species is protected in perpetuity. These efforts and required expenditures of resources would be unlikely to be replicated in a similar manner by any other party, and as such we believe that Ioneer's efforts will be invaluable and irreplaceable in the preservation of this species.	The EIS contains detailed analysis of the Proposed Action and North and South OSF Alternative and take into consideration the Buckwheat Protection Plans of each alternative.
173	173.6	**Conclusions**	Comment noted.

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		In closing, Rhyolite Ridge will provide significant benefits to the local population and the country, including: the strengthening of critical mineral supply chains by vastly increasing the domestic production of lithium, invigorating the local economy by creating jobs, and facilitating the conservation of Tiehm's buckwheat. Many of the vocal opponents to mine development, who are undoubtedly well-intentioned, view the situation in a purely environmental light without sufficiently considering the benefits Rhyolite Ridge will provide to citizens of the Fish Lake Valley region and the United States. It is clear to the members of the NMEC that the Rhyolite Ridge project will have a decidedly positive impact and that, for the benefit of the general public, its development is an important concern worthy of prioritization. Thank you for this opportunity to submit these comments on the Rhyolite Ridge project. Please do not hesitate to contact me if you have any questions. Sincerely yours, David R. Shaddrick NMEC President	
Fermina Stevens – June 3, 2024			
174	174.1	Please see the attached comments. Thank you, Fermina Stevens	Comment noted.
174	174.2	June 3, 2024 via BLM E-Planning Portal BLM_NV_BMDO_P&E_NEPA@blm.gov US Bureau of Land Management 50 Bastian Road Battle Mountain, NV 89820 RE: Comments on Rhyolite Ridge Draft Environmental Impact Statement Pursuant to BLM's public notice, 89 Fed. Reg. 28803-04 (April 19, 2024), please accept these comments on the Rhyolite Ridge Lithium-Boron Mine (Mine or Project) and BLM's Draft EIS (DEIS), from the Western Shoshone Defense Project (WSDP). The WSDP has been protecting and preserving Western Shoshone traditional land rights and treaty rights for the past thirty (30) years. Over the course of several decades, we have witnessed our once beautiful and plentiful lands depleted under the continued degradation of mineral extraction. Today's comments concern a lithium project near the California border which is within the treaty territory of the Western Shoshone Nation, this project is known as Rhyolite Ridge lithium-Boron project.	Comment noted.
174	174.3	*It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.* This "mission" by the BLM is contradicting and false as the Western Shoshone Defense Project will show in the following comments. The proposed Project violates many federal laws and implementing regulations, including the Endangered Species Act (ESA), the Federal Land Policy and Management Act (FLPMA), the National Environmental Policy Act (NEPA), and laws concerning the protection of Native American cultural and religious resources. The BLM violates international law between the United States Government and the Western Shoshone Nation because of the abuses committed through the denial of our right to property, due process of law and equality under the law. (See e.g. Dann v. U.S., Case 11.140, Inter-A. C.H.R., Report No. 75/02, OEA/Ser.L/V/II.117, doc. 1 rev. 1 (2002) and UN Comm. on the Elimination of Racial Discrimination (CERD), Decision 1 (68), UN Doc. CERD/C/USA/DEC/1 (April 11, 2006), et al). Moreover, the BLM violates Western Shoshone traditional laws that are in place to protect the Land, Air, Water and Spirituality (LAWS) along with the biodiversity, environment and all life for future generations. The BLM claims to sustain the health, diversity, and productivity of "public lands" for the use and enjoyment of present and future generations; however, this couldn't be further from the truth in this proposed project. The BLM has a mission that is in line to be a puppet for a foreign multinational company from Australia. The Western Shoshone have witnessed the blatant abuse and disregard for the rights of the Sogobia (Earthmother) through the negligence to allow the extinction of the flora and fauna through misguided management practices because of their support for multinational corporations that cause harm to the environment instead of protecting the American public, Indigenous Peoples, biodiversity and the environment for future generations. Section 3-8 of the DEIS and section 2.3 of the Native American Values Supplemental Environmental Report both reference a report by Steward 1933 - 1938 and another study by Steward 1938; Jamaldin et al. 2020. Steward has been controversial because of his Justice Department cases against the Paiute, Shoshone and the Ute Tribes' right to property and the reports that came from his fieldwork. Steward's views were and are disputed by Northern and Southern Paiute, Western Shoshone and Ute peoples due to his bias and racist colonial view. His view concerning property was derived from his employment by the justice department that Western Shoshone, Northern and Southern Paiute and Ute peoples didn't have a concept of property and became the basis for the Federal government's view that "these peoples" did not have a strong enough concept of land ownership to warrant calling their land "property". This racist and discriminatory denial of traditional indigenous property rights has been rejected by recognized standards of human rights. And yet again, we are faced with racial discrimination by the BLM because of our religion, the color of our skin and our ethnic origin through outdated reports by a person who developed his theoretical position on hunter-gatherers' property and property rights. Traditional boundaries and property are between the Western Shoshone Nation and Northern Paiute Nation, we have always had our own take on property and property rights. attached, Marc Pinkoski, Julian Steward, American Anthropology, and Colonialism, Histories of Anthropology Annual, Vol. 4, 2008, pp.172-2024. When Steward approached Shoshone, most wanted nothing to do with him for fear of his motives. The 1930s was a time when Indigenous peoples were barely recovering from horrific abuses that were still fresh in their minds - post traumatic stress disorder from extermination policies, rapes, theft of lands and theft of life sources, along with the ongoing kidnaping of their children by the federal government. And, on top of that, another non-indigenous person comes along to steal the soul and knowledge of the people.	The EIS is consistent with U.S. laws including NEPA, NHPA, and the ESA. Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts. The EIS contains detailed analysis of impacts to vegetation including Tiehm's buckwheat and Tecopa birdbeak, and wildlife species, including desert bighorn sheep and the Tui chub in Sections 3.12, 3.14, and 3.18. Several Indian Claims Commission and federal court cases have addressed alleged taking of land including territory described in the Treaty of Ruby Valley. Judgement on these cases found that a taking occurred and aboriginal title was extinguished. In response to these cases, Congress passed the Western Shoshone Claims Distribution Act to provide for distribution of the settlement funds. The DOE loan program has no effect on environmental impacts associated with the Proposed Action and alternatives and is not considered in the EIS. Man camps are not proposed as part of the Project. Impacts to social and economic values from increased population, are analyzed in Section 4.10 of the EIS.

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		If Steward's 1870 population numbers in Fish Lake Valley (of approximately 100 individuals) are close, that is mostly in line with what Shoshone elders passed down; and that Dyer and his band of murders may have committed approximately 2,900 killings of Western Shoshone men women and children. And the 5 families in Lida are about the right estimate after the introduction of smallpox by Europeans who wanted the water. As we know, colonial anthropologists like Mooney, Kroeber and Steward had a job to do for the American empire and that was to undercount the Indigenous population and give the impression that all indigenous Peoples of the North American continent north of the Rio Grande were wandering aimlessly in search of food. This nonsense has always been debated by Indigenous peoples and other scholars. Shoshone/Paiute Intermarriage Steward gave statements about the Fish Lake Valley, Silver Peak range, Deep Springs as if he really understood the dynamics of the Western Shoshone and Paiute Peoples in this area. He did not fully understand the concept of intermarriage (due to his biased colonial position) and how nationhood worked before the arrival of European trespassers. It is well known that a marriage between the two Peoples was common and it all depended on the marriage. Traditionally, a man went with the woman's family, so if a Shoshone man married a Paiute woman, he then became Paiute and vice versa if it were a Paiute man marrying a Shoshone woman. But it also depended on the traditional territorial boundary of the Western Shoshone and the Paiute. They had their own views of property, and it did not fit with Steward's colonial views. Language and Blood Quantum On the Shoshone and the Paiute territorial boundary and co-use areas, the people were sometimes bilingual, trilingual and even others like chief Kawich spoke seven or eight languages which was not uncommon in the southern region. It is said that Joe Kennedy, born in the late 1800s, spoke seven separate languages - two being Spanish and English. Also, it was reported that Southern Paiute had a similar number of languages. There is no telling how well they spoke these languages, but it is said that they could speak in their own tongue and converse with one another holding a perfect conversation without skipping a beat. However, conversing with Europeans was a bit tricky because most Europeans didn't have more than their own language. Only after the coming of Europeans and forced removal to concentration camps (referred to as reservations) did blood quantum become an issue. Blood quantum was derived by the U.S. government to cause division but was ultimately an attempt to eliminate Indigenous peoples as free, distinct Peoples among nations. Hunting Practices / Kidnapping The report goes into traditional practices about the men hunting deer, antelope and mountain sheep year-round. This started to take place because of Europeans hunting in this manner, the Shoshone and Paiute found themselves competing for meat. Their traditional seasonal hunting practices were being ignored and discouraged by Europeans by way of intimidation. Moreover, continuous moving and relocation was necessary to protect children from kidnappings. Timbisha member and highly respected elder, Pauline Esteves' grandparents, the Bolands, went high in the Panamint mountains in the dead of winter through the cold and snow to protect their children from U.S. government officials that were out to steal their children to incarcerate them in the boarding school institution. The family was mostly successful, however the youngest Boland child, Mimi, was captured when she was between the ages of 12-14. She was finally released and she returned back to her homelands with her family. Another instance, Johnny Kennedy and his sister Nellie Kennedy were kidnaped by U.S. government officials and put onto a train in Lone Pine, this was when Johnny was so young, he was unable to tie his shoes. The train traveled up through the Owens Valley stopping at Independence, Big Pine and Bishop snatching up Shoshone/Paiute children along the way. From Bishop the train ran through Mina and on to Carson City where the Stuart boarding school was located. Johnny was beaten every day for approximately a year because he could not speak English at that time. After a time in this institution, his father was able to take him back home and sent him with his grandmother who moved often to keep him protected. However, the authorities did capture him and he was sent to the Sherman boarding school institute where he spent a number of years. [the attached article is what Paiute and Shoshone parents were fearful of and in many instances, children that were taken by the federal government to these Boarding schools, never came home. Some died from disease, some by heartbreak and others from abuse and neglect] Hunting and Pine nuts This is where Steward is further incorrect in stating that hunting deer, antelope and mountain sheep year-round was a traditional practice. Shoshone and Paiute had hunting seasons that are well documented by traditional peoples. Deer were not taken year-round by Shoshone, the season started around July or later depending how far north or south they were located and/or until they began to mate and that's when they stopped allowing the deer to breed. However, during good years of a pine nut harvest, they would take bucks later in the season because of the excess fat that is put on when they consume pine nuts. Pine nuts are an important food source for Shoshone and shared with the animals as well. When gathering pine nuts, it is customary to knock them down for the deer and other critters. In the cave springs area and among any traditional harvesting area, the deer would follow the people around as they knocked the pine nuts down for critters and humans alike. Big horn sheep and Pronghorn or antelope (Steward reference) were not hunted year-round either, refer to scoping comments. Sage grouse The sage grouse is only hunted when they are mating, the reason is because the difference between the males and the females is easily distinguishable. We fear that this sage grouse habitat near cave springs will be further impacted and/or destroyed if the mining project were to go forward. Traditional stories tell us, before European contact, the sage grouse interacted with the people (almost domesticated but free to roam as they please) and the reason Europeans easily annihilated their population was because they were not used to being hunted out of season. The Europeans did not adhere to the Indigenous hunting season and they hunted both sexes. Quail were similarly fed and managed traditionally as well. Traditional Economy and Disease It is amazing that Steward could take such a biased approach especially during a time of suffering because the traditional economies, social and political infrastructure was destroyed by mass murders, rapes, kidnappings, theft of resources, theft of lands, and racial discrimination by Europeans. European diseases didn't come through just once, they came again and again depopulating the Great Basin of its Indigenous population. This was catastrophic for the economic, political and social framework of Paiute and Shoshones who passed information through word of mouth; many elders and keepers of knowledge were lost during those times. Foods	

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		However, Steward conveniently leaves out that 2/3 of the foods consumed by the world's population today come from Indigenous Americas agricultural systems and were grown in the Americas and nowhere else precontact by Europeans. We can go through a short list of agricultural foods that were grown in the Americas pre-European contact starting with corn, squash, many varieties of melons, chili, potatoes, tomatoes, pumpkins, many varieties of beans, artichokes, okra, pecan's, pineapples, passion fruit, cranberries, blueberries, chokecherries, blackberries, vanilla bean, peanuts, cashews, walnuts, sunflower seeds, and most everyone's favorite, chocolate and cocoa. What Steward conveniently ignores is that traditional economies were devastated and have never recovered from the annihilation of European trespassers. What Steward refers to as "Irrigation without achieving it" is only his point of view. Paiute and Shoshone have their own view on traditional agriculture, native plant-based foods, irrigation systems; and traditional economies that once thrived were taken over by Europeans who committed murder, rape and crimes of intimidation to acquire the best lands and life sources that Shoshone and Paiute peoples depended on. Refer to scoping comments about the pronghorn extermination and the disease that spread through Bighorn and pronghorn brought on by European cattle, sheep and goats. Irrigation systems and plants Irrigation systems were in place in the Owens Valley, Fish Lake, Ash meadows and Timbisha now known as Death Valley. In Timbisha, irrigation systems were in place to water the mesquite trees along with other traditional plants. Ponds were constructed to attract waterfowl and other aquatic life to come into the area, however, the Borax and later the National Park service now occupy traditional economic land bases that were once utilized by Shoshone. Fish Lake Valley's irrigation systems were taken over and replaced by European agricultural systems. The last wiyampi producing trees that were maintained by Shoshone on the Fish Lake Valley floor were eradicated by non-native farmers in the nineteen seventies (1970's) and many plants that were irrigated (that Steward considered "wild") have all disappeared and no longer can be found where they used to grow. Paiute and Shoshone have a different view when it comes to the flora and fauna, and nothing our ancestors utilized were considered "wild". They were maintained in a traditional way and talking to the plants and animals was part of that management, respect and religious practice. Elders from Pyramid Lake to Elko to the Owens Valley and beyond will tell you that plants they once gathered in abundance are now difficult to find and some have gone extinct. It has been told by elders that there used to be two (2) other pine nut birds besides the Blue jay, and from what our elders have said they have not been seen for 40 years or more. Plants are no different, a plant with medicinal value that was applied to cuts on humans and horses has disappeared completely and it was said when applied, you could feel the cut closing and after a day or two, the wound would pretty much be healed. Cultural Assessments / Ethnographic Studies First and foremost, the BLM has never given any consideration to incorporate systematic methods of compliance by determining the cultural and religious significance of the Rhyolite Ridge and surrounding area using Preliminary Cultural Assessments (PCA), systematic ethnographic studies and developing an understanding about the Rhyolite Ridge site and the connection to other areas. Ethnographic studies must take place for at least one year or longer if required for more information and data collection. These ethnographic studies would need to be done at all four seasons of the year if there is any chance of true consultation on a government-to-government relationship. Consultation between the BLM isn't supposed to be just about the BLM sending a letter checking off the box and/or a site visit with tribal representatives. Cave Springs is a traditional cultural Property (TCP), cultural landscape and an Area of Critical Environmental Concern (ACEC) for the Western Shoshone. As mentioned in the WSDP Scoping comments, Cave Springs is an important Traditional Cultural Property (TCP) and has been for thousands of years because of the traditional cultural and spiritual connection that Shoshone have to this Cultural Landscape. As stated, the traditional religious and spiritual connection will forever be diminished or destroyed if the project were to go forward. Religious and cultural practices will come to an end because the view and acoustics that the natural environment allows will be destroyed by loud machinery, explosives, dust, a pit and tailings. All of this combined negatively impacts our overall religious experience. Cave Springs has been an important cultural landscape for vision quests, and religious journeys and more and is an Area of Critical Environmental Concern (ACEC) for Shoshonean Peoples. The quality of the acoustics and view is highly important for religious practices, ceremonial use and for songs and prayers to travel to their intended place and/or supernatural beings. The Cave Springs TCP has been continuously used for spiritual and religious practices for thousands of years. Recommendation: No Action don't commit religious persecution against vulnerable Peoples that you, the BLM claim to have a "trust responsibility". And don't commit crimes against the Earthmother for financial gain and an idea that you have solutions to problems that were created out of arrogance and ignorance to only create more problems for the environment. Importance of the flora and fauna at Cave Springs and surrounding Cultural Landscape The flora and fauna have been utilized for thousands of years by Shoshonean Peoples for food, medicine and spiritual use. The Buckwheat Plant has been an important plant along with many others in the ACEC, however, we will discuss the Buckwheat because of its medicinal value and its endangered status. Just like above, religious, spiritual and ceremonial practices occurred with this plant. We cannot discuss the flora without the fauna, so we must mention the Bighorn sheep that water at Cave springs. The flora and fauna are connected to Shoshonean Peoples religion and spirituality (as mentioned above) because this has always been where our people came and come for religious journeys and one of those is talking with the flora and fauna at this site (Juanita Landas, relevant docs). Moreover, the caves around the area have and are used for vision quests, a spiritual journey where an individual does prayer and ceremony to receive life teaching and fulfillment by spending the night while spirits and visions of rattle snakes etc. try to scare the individual to leave the cave. Talking with the plants and animals is a part of the equation, you must give prayers to the environment and Shoshone LAWS which is the land, air, water and the spiritual. As mentioned in the scoping comments, the pinyon trees are of great importance and the mine will impact them forever, harming the food value of the nut and the medicinal and spiritual connection. Recommendation: No Action, don't put financial gain in front of extinction of a traditional cultural property, the Buck wheat, tui chub and the bird's beak. Not to mention the pine nut trees, bighorn sheep and other flora and fauna that our people have relied on for thousands of years before Europeans occupation of Shoshone lands. Western Shoshone and fish lake valley resident Joe Kenndey traveled to Cave Spring before the monitoring wells were put in and he saw close to a hundred bighorn sheep around this traditional cultural property. After the monitoring wells were put in, Cave Spring went dry. It is his opinion that the monitoring wells punched a hole in the seal causing the water to change its flow. Elders would say that they, Ioneer has disrespected the spring and now it has changed direction. What steps are to be taken because of this catastrophe? DOE $700 MILLION LOAN- DUE DILIGENCE	

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		In January of 2023 the DOE's Advanced Technology Vehicles Manufacturing (ATVM) loan program announced a conditional agreement to provide a loan of $700 million to Ioneer for the development of the Rhyolite Ridge Mine. The DOE reports that the loan comes with due diligence including environmental review, finances, and technical due diligence. • DOE as a cooperating agency should conduct Tribal consultation as part of their due diligence process. This mine would destroy cave springs, a nearby sacred site, and impact other cultural land values such as potentially denying water to pinyon trees. Pine nuts are an essential Indigenous food source and denying water to a local recovering Bighorn Sheep population. The project is sited with Western Shoshone treaty lands. The DOE was one of 17 agencies at Biden's second Tribal Nations Summit in November 2022 to approve new best practices of integrating treaty rights into decision making. • DOE should incorporate Western Shoshone Treaty Rights as enshrined in the Treaty of Ruby Valley 1863 into decision making relating to due diligence. To meet expected due diligence standards the DOE should follow the UN Guiding Principles (UNGP's). The inclusion of Indigenous Human Rights in due diligence is required to meet the UNGPs and OECD guidance which say companies should commit to respecting Human Rights. In the context of Rhyolite Ridge, it is within the Western Shoshone treaty lands detailed in the Treaty of Ruby Valley 1863. The United Nations CERD committee found in 2006 that Western Shoshone treaty rights and thus human rights were being violated by the US federal government. This was upheld in 2022 through inclusion in the concluding observations of CERD's August convening. • DOE should follow these international due diligence standards, and communicate through due diligence how the violation of treaty rights will be considered and mitigated through this due diligence process. Additional due diligence requirements to meet the standards set in UNGP and OECD are that the process is ongoing, and that there is public transparency. • Due diligence must be an ongoing process. • The public has access to information and transparency regarding due diligence. Furthermore, should the current Plan of Operations, dated May 2020, be found to provide undue risks to the Tiehm's Buckwheat or otherwise require updates to further avoid the endangered species, will DOE revisit due diligence in respect to the new plan or will the current conditional agreement carry over without additional approvals? <u>Missing and Murdered Indigenous Peoples and Gender Based Violence.</u> According to section 4.10 of the DEIS, the Rhyolite Ridge mine would require 500 workers for construction and 350 for operations. The project site is in Fish Lake Valley which is a small rural community. It is expected that a majority of workers will have to come from outside of the community Quarrying and processing would generate demand for 230 housing units from non-local labor (direct, indirect, and induced) from up to 402 new, non-local adults (includes single and married). It is expected that many of these workers will live in temporary housing such as trailer parks. This results in worker housing dynamics that are often referred to as man camps- where predominantly non-local temporary workers live. The construction of man camps and coordinating other forms of worker housing is a connected action that must be considered relevant to this NEPA analysis. The EIS must analyze the potential direct, indirect and cumulative effects of proposed man camps, including the potential increase of violence. In February of 2019, the Department of Justice published a report titled, Violent Victimization Known to Law Enforcement in the Bakken Oil-Producing Region of Montana and North Dakota, 2006-2012. This report analyzed increases in violent crime as a result of man camps, or worker housing, associated with extractive industry. The report found that, "From 2006 to 2012, the rate of violent victimization known to law enforcement in the Bakken oil-producing region of Montana and North Dakota increased, particularly the rate of aggravated assault, which increased 70%. There was no similar increase in rates of violent crime in the counties surrounding the Bakken oil region." There is clear documentation from federal sources that a drastic increase in violence is to be expected based on objective evidence. Moreover, it is well understood through the issue of Missing and Murdered Indigenous People (MMIP) that this type of violence provides greater impacts Indigenous people as well has increase gender-based violence, such as rape, human trafficking, murder, and domestic assault. Furthermore, it is the obligation of federal agencies to address environmental justice based on Executive Order 12898. It is the responsibility of federal agencies to mitigate undue and disproportionate environmental impacts affecting historically marginalized communities such as low-income, Black, Indigenous, or communities of color. It is part of the federal government's Trust Responsibility with Tribes to ensure the physical health and wellness of Indigenous Peoples. Therefore, given the available information, it is the role of the federal government to include an analysis of the effects of man camps (or worker housing) on the local community with a specific focus on impacts to Indigenous Peoples According to section 4.10 of the DEIS, Esmeralda county has 44% low-income residents, and Native American residents meeting environmental justice requirements, and that "Overall impacts to communities with environmental justice concerns within the area of analysis are anticipated to be moderate to major, long-term, and regional." Therefore, it is known that the Rhyolite Ridge project would require significant non-local labor in a community with limited existing housing. Research conducted by the federal government clearly shows a connection between worker housing and increases in violence. It is the obligation of the federal government to take a hard look while permitting in NEPA, and therefore the EIS must analyze this predictable increase in community violence with specificity in terms of impacts to Indigenous communities and along gendered lines. This region is known to currently lack adequate funding for basic community safety and this has already resulted in gender-based harm, "Some of the concerns include lacking sufficient medical care, access to legal materials, inmate safety, understaffing, and separation of inmates of different genders (Esmeralda County 2012).", Social and Economic Values Supplemental Environmental Report for the Rhyolite Ridge Lithium-Boron Project April 2024 ES-3. In regards to worker housing, Missing and Murdered Indigenous Peoples, and other forms of gender-based violence, the Federal Government has the following obligations that should be included in the EIS. • The BLM must take a hard look at the pattern of non-local worker housing resulting in increased localized violence and specifically along racial lines with Native Americans and gendered lines.	

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		• Using the best available research, the BLM must predict how their permitting actions for this project will increase violence inflicted upon specific communities which qualify for environmental justice screening. • The BLM must work to mitigate impacts to environmental justice communities. The EIS should analyze not only increases to law enforcement and incarceration which address violence after it happens, but also preventative mitigations. For example, these could be requiring cultural	
174	174.4	Native American Values supplemental report. p. ES-2: Supplemental Environmental Report Rhyolite Ridge Lithium-Boron Project: "Tribal consultation/coordination is ongoing and would continue through the life of the Project. Several areas of tribal concern have been identified including the Cave Springs sacred site and two additional areas that are culturally significant. If avoidance of the areas of tribal concern and sacred sites is not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation/coordination with the affected Tribes to reduce or eliminate impacts." The DEIS contains incomplete information. There was no attempt to consult with the Western Shoshone Defense Project regarding how adverse impacts for Cave Spring due to mining activities could be "reduced or eliminated." The "specific operating procedures, stipulations, or mitigation measures" need to be documented in the DEIS so that the full range of environmental and cultural impacts of the Project can be known before Project approval. Section 106 consultation regarding the Project's adverse effects should have been conducted before the DEIS was issued so that the involved tribes and the general public know the full range of impacts at the earliest possible time. The possibility--which is the actual reality--that the adverse impacts on Cave Spring due to mining activities isn't even mentioned. p. 3-3: Supplemental Environmental Report Rhyolite Ridge Lithium-Boron Project: "Since no sites have been determined to be TCPs, impacts to such cannot be determined at this point. Under the Proposed Action, potential impacts to properties of traditional religious and cultural importance, or sacred sites would be minor to moderate, long-term to permanent, and localized." An ethnographic study for the Project area needs to be conducted, and the Final Environmental Impact Statement can't be completed until this is done. An ethnographic study is a method for determining if a site or area is a Traditional Cultural Property (TCP). The BLM can't conclude that there are no TCPs in the Project area without complete government-to-government consultation, which would include interviews with knowledgeable tribal Elders. The sentence "potential impacts to properties of traditional religious and cultural importance, or sacred sites would be minor to moderate, long-term to permanent, and localized." This somewhat incoherent sentence was not written in consultation with the involved Tribes. p. ES-3: Under the cumulative Impacts section, regarding cultural Resources: "If avoidance is not possible, eligible and unevaluated sites would be mitigated as agreed upon by BLM and State Historic Preservation Office through the development and implementation of a Memorandum of Agreement and Historic Properties Treatment Plan." Where is the tribal involvement? What if there is no mitigation for the impacts of the Project, which is the case here? Although Section 106 consultation is supposed to be incorporated into the draft EIS for the Project, all substantive tribal consultation information is left unknown or incomplete. International / United Nations In its decision, issued in March 2006 under its early warning and urgent action procedure, the guarantee the right of everyone to equality before the law" was "not Committee expressed concern over the United States' treatment of the Western Shoshone and their ancestral lands. Specifically, the Committee found the United States' "obligation to expect" and urged the United States to "pay particular attention to the right to health and cultural rights of the Western Shoshone peoples". The Committee called on the United States to "take immediate action to initiate a dialogue" with the Western Shoshone and to freeze, desist and stop further harmful activities on Western Shoshone ancestral land until a final decision or settlement was reached. <u>Recommendations</u> for the Committee to make to the United States are as follows: a. That the United States review all laws and policies with respect to indigenous peoples to ensure compliance with recognized standards of human rights, in particular, a process to "decolonize" the underlying principles of federal Indian law and to honor and respect Treaties made with Indigenous Nations; b. To address ongoing actions in Western Shoshone territory and to initiate a high- level dialogue with traditional and tribal leadership; and/or c. To develop a process to formally review, under contemporary, non-discriminatory standards, the questions and concerns raised previously by this Committee and the Inter-American Commission on Human Rights (IACHR) in Case No. 11.140, Dann v. U.S., Report 75/02, Inter-Am. C.H.R., Doc. 5 rev. 1 at 860 (2002). These ongoing threats to Indigenous Peoples can be traced directly back to the fundamental principles upon which U.S. Indian law and policy are based. Current U.S. Indian law and policy is rooted in the Marshall Trilogy. The central premise of Justice Marshall's formulation of the doctrine of discovery is that Indigenous Peoples are divested of certain natural rights by the mere arrival of Europeans because of an assumed European superiority	Due to the nature of government to government consultation, it cannot be completed prior to public review of the Draft EIS. Section 106 consultation has been conducted and is ongoing in compliance with NHPA and applicable EOs. Potential impacts to Cave Spring are analyzed and disclosed in EIS Sections 4.5, 4.8, 4.16, and 4.17. The BLM has conducted government-to-government consultation with federally recognized tribal governments. Concerns and issues identified through this consultation are being coordinated between the BLM and Tribes. The effects definitions referenced are defined in Appendix D of the Draft EIS. Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process.
174	174.5	Conclusion: This mine brings a very scary reality, with the loss of biodiversity that has been ongoing since the arrival of Europeans and the threat continues with the possible loss of the Tiems Buckwheat, birds beak and the Tui chub. Indigenous agriculture, irrigation systems, lands and resources have given the world medicine, foods, clothing, fuel, and building material yet, the U.S. government has little respect for traditional knowledge and still commits crimes against the ecosystem and indigenous peoples. To go forward with this project would be desecration of a religious and cultural site that has prayers, songs and teachings of religious practices. The Creator put us here to share this life together in balance and harmony, it is time that this government quit being so arrogant. You do not have all of the answers to the problems that you yourself created. Tears from pain and agony fuel our hearts because you do not listen to the Creator. If you stop the chaos, watch and listen you can hear the earth telling you to stop. This project mine does not meet requirements and is not in line with federal law, policy and guideline. It cannot go forward without meaningful (emphasis added) government-government consultation between the tribes and traditional tribal organizations as recommended by United Nations International bodies. Respectfully,	Resource specific responses provided in responses to comments 174.3-174.5. The EIS has been prepared consistent with United States laws including NEPA, NHPA, and applicable regulations and EOs.

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		Fermina Stevens, Director Western Shoshone Defense Project	
174	174.6	20240603_RR_DEIS_FerminaStevens_WSDF_viaEmail_Attachment_1 20240603_RR_DEIS_FerminaStevens_WSDF_viaEmail_Attachment_2 20240603_RR_DEIS_FerminaStevens_WSDF_viaEmail_Attachment_3 20240603_RR_DEIS_FerminaStevens_WSDF_viaEmail_Attachment_5	Attachments noted.
Linda Williams – June 3, 2024			
176	176.1	Hello, Attached and submitted on June 3, 2024 at 6:33 am PST is my Public Comment regarding the RRLB Project. Thank You. Linda A Williams	Comment noted.
176	176.2	PUBLIC COMMENT RHYOLITE RIDGE LITHIUM-BORON PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT DOI-BLM-NV-B020-2021-0020-EIS JUNE 2, 2024 My comments below confirm and explain my UNEQUIVOCAL SUPPORT for the Rhyolite Ridge Lithium-Boron Project here in Fish Lake Valley, Dyer, Nevada. I encourage the BLM to allow Ioneer to move forward with the Proposed Action as outlined. This project led by and vested in by Ioneer has already proven to not only be worthy but vital to the survival and success of the local environment, this community and our County. I have lived in this valley 65 years. I am still a farmer, RV Park owner, museum owner and curator and for 42 years our family owned and operated the only grocery and gas station for 75 miles. I've witnessed the ebb and flow of economic fortunes in our communities and County. One example, several decades ago I was 1 of 4 who stepped up to create a local ambulance service-ultimately becoming a volunteer EMT. With a County developer agreement Ioneer would be a critical partner in all elements of our essential services. My story is always about what do we need to provide a diverse and positive impact to each community resident and our County, while addressing potential risks or impacts to the people, the wildlife and the lands. I won't repeat my past topics of water allocations and usage, endangered species, roads subjected to heavy use, etc. You know my thoughts, these have been well addressed and you can read my recent opinion piece in the **Las Vegas Review Journal, Sunday, June 2, 2024, Linda A Williams.** I have been dedicated to this valley and its growth most of my life serving on the Nye & Esmeralda Economic Development board. Since Ioneer arrived I've attended the Rhyolite Ridge in person and Zoom meetings, the BLM public meetings-recently in Dyer and Tonopah, spoke at the Tiehms Buckwheat hearings as a farmer experiencing destruction to my crops at the same time the Tiehms Buckwheat was being affected and have written an opinion and public comments regarding the positive impact and the minimal risk this project could have on our local environment, our existing infrastructure, our close community and the County. Upon reading the Draft Environmental Impact Statement, now my constant reference manual on this project, I know the involvement BLM and NDOW will have. I see how hard Ioneer has worked towards their honest dedication and commitment to plant life, wildlife and human life. I encourage skeptics to ask themselves if they know of other corporations so dedicated that they invest millions of dollars years before development of their project for the good of the environment and the people living in tiny, remote communities. Why wouldn't you, us, others want to partner with them! My support for this project has not faltered. The Rhyolite Ridge Project is critical to the economic survival of our community. The BLM and Ioneer have navigated the lengthy process. Now its time for the BLM to approve Ioneer to begin putting into action their 7 years of planning for this mining operation. Ioneer has shown that they are agreeable and ready. And at 75, I'm ready to watch this County flourish as it once did. Submitted by Linda A Williams PO Box 354 MM8 Hwy 264 Dyer, NV 89010 775-966-9009 dyerlaw49@gmail.com	Comment noted.
Bishop Paiute Tribe – June 3, 2024			
177	177.1	Dear Mr. Distel, Please find the attached comments on the Rhyolite Ridge Lithium-Boron Project Draft Environmental Impact Statement, submitted on behalf of the Bishop Paiute Tribe. Best regards,	Comment noted.
177	177.2	June 3, 2024 Bureau of Land Management Battle Mountain District Office Tonopah Field Office 1553 South Main Street	The EIS has been prepared consistent with applicable United States laws including NEPA, NHPA, and applicable regulations and EOs.

Comment Letter No.	Comment Number	Comment	Response
		Tonopah, Nevada 89049 Via email: BLM_ NV_BMDO _P&EC _NEPA@blm.gov Re: Comments of the Bishop Paiute Tribe on the Rhyolite Ridge Lithium-Boron Project Draft Environmental Impact Statement, DOI-BLM-NV-B020-2-21-0020-EIS Manahuu (Hello), I submit this letter on behalf of the Bishop Paiute Tribe ("Tribe[1]), a federally recognized tribe with 2,000 members and a land base of 875 acres at the base of the Eastern Sierra Nevada Mountains.[1] By this letter, the Tribe submits its formal written comments on the proposed Rhyolite Ridge Lithium-Boron Project Draft Environmental Impact Statement (DEIS. As discussed in greater detail below, these comments delineate the numerous material failings in the DEIS, including but not limited to its discussion of the project's cumulative impacts to water resources and the mitigation of impacts to cultural resources.[2] Notably, the BLM has fallen far short of its consultation obligations pursuant to Section 106 of the National Historic Preservation Act and as required by the federal trust responsibility to tribal nations.[3] Due to the deficiencies in the DEIS, the Tribe requests that the BLM go back to the drawing board to draft a DEIS that is complete and fully compliant with the National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA), and other controlling federal and international laws and regulations.[4] [1]In 1932, the United States unilaterally revoked 67,000 acres originally promised to the Tribe, and later traded it to the City of Los Angles for the current reservation. See About Us-History, BISHOP PAIUTE TRIBE, https://www.bishoppaiutetribe.com/about-us/#histoty (last visited May 29, 2024); Amanda Kapp, Bishop Paiute Tribe, NORTHERN ARIZONA UNIVERSITY (Sept. 2019), www7 .nau.edu/itep/main/tcc/Tribes/sw _ Bishop. [2]In an effort to limit redundancy among commenting parties, the Tribe expressly adopts and incorporates the attached DEIS comments filed by the Center for Biological Diversity on June 3, 2024 in their entirety, emphasizing its discussion of the shortcoming of the DEIS's compliance with the Endangered Species Act and management of impacts to Tiehms Buckwheat. [3]54 U.S.C. § 306018; see also BUREAU OF LAND MGMT., BLM MANUAL 1780 TRIBAL RELATIONS (P) 1-1 (Dec. 2016) (recognizing that "[t]he United States has a unique legal relationship with federally recognized Indian tribes established through and confirmed by the Constitution of the United States, treaties, statutes, Executive orders, and judicial decisions" abd that "the Bureau of Land Management (BLM) is charged with engaging in regular and meaningful consultation and collaboration with federally recognized tribes in the development of Federal policies and decisions that have tribal implications."). [4]"If a draft statement is so inadequate as to preclude meaningful analysis, the agency shall prepare and publish a supplemental draft of the appropriate portion." 40 C.F.R. § 1502.9(b).	
177	177.3	**I. Introduction** The Bishop Paiute Reservation is located in the Owens Valley, approximately 90 miles by car to the proposed Rhyolite Ridge Project location. Owens Valley, known to us as Payahuunadii, is and has forever been the homelands of the Bishop Paiute people, and our traditions and culture are intrinsically entwined with the lands and water of the Valley and our ancestral territories that extend throughout California and Nevada. The Tribe is greatly concerned about the impacts of the Rhyolite Ridge Project, as outlined below. The Tribe understands that this mine is proposed in part to support national efforts to transition to a renewable energy economy.[5] Indeed, our tribal members and ancestral lands are already being impacted by climate change.[6] However, the Tribe stands in opposition to any resource extraction project that perpetuates unjust and disproportionate costs to the health, welfare, and cultural continuity of tribal nations. The transition to renewable energy should not occur at the expense of tribal nations and local communities; in fact, such an approach is in violation of numerous federal policies[7] and the federal trust responsibility.[8] The urgency of the climate crisis cannot be reason to bypass the stringent application of federal law, and doing so will only perpetuate the same cycles of injustice experienced under a fossil fuel economy.[9] BLM must ensure that mining of critical minerals such as lithium is conducted in a sustainable, just, and equitable manner consistent with the law and the federal trust responsibility. Therefore, the Tribe presents the following concerns, and urges the BLM to revisit the DEIS and offer substantial revisions. [5]Notably, many of the critical mineral deposits in the U.S. are located near or within culturally or environmentally important areas to Indigenous Peoples. In fact, "97% of nickel, 89% of copper, 79% of lithium and 68% of cobalt reserves and resources in the U.S. are located within 35 miles of Native American reservation." Samuel Block, Mining Energy-Transition Metals: National Aims, Local Conflicts, MSCI (Jun. 3, 2021) https://www.msci.com/www/blogposts/mining-energy-transition-metals/025 3103 3 94 7. [6]BISHOP PAIUTE TRIBE, INDICATORS OF CLIMATE CHANGE IN CALIFORNIA, IMPACTS OF CLIMATE CHANGE ON THE BISHOPP AIUTE TRIBE (2022), https://oehha.ca.gov/media/epic/downloads/06bishoppaiute.pd[[7] Exec. Order No. 12,898, 32 C.F.R. § 651.17; Exec. Order No. 14,008, 86 Fed. Reg. 7,619 (Feb. 1, 2021). [8] Presidential Memorandum for the Heads of Executive Departments and Agencies on Tribal Consultation, 74 Fed. Reg. 57,881 (Nov. 5, 2009); Presidential Memorandum for the Heads of Executive Departments and Agencies, Tribal Consultation and Strengthening Nation-to-Nation Relationships, 86 Fed. Reg. 7491 (Jan. 26, 2021), hLLp ·://w" v .whitehou e.go / briefirnrroom/presidential-actions/?021/01 / 6/mcmorandum-on-tribal-consultation-and-strengthening-nation-to-nation relationships/; U.S. Dept. of lnterior & U.S. Dept. of Agriculture, Joint Secretarial Order on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters No. 3403 (Nov. 15, 2021). [9]See Ann M. Eisenberg, Just Transitions, 92 S. CAL. L. REV. 273, 280 (2019) ("[T]he shift to a low-carbon economy is an opportunity to rectify the injustices of the fossil fuel economy, and to not do so, or to allow inequalities to worsen, would itself effectuate injustice.").	Comment noted.
177	177.4	**II. Issues and Failures Under NEPA** The National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 et seq., requires review of "the environmental impacts of the proposed action and alternatives" with the goal of requiring agency decision-makers to make fully informed decisions. [10] Environmental Impact Statements are required to provide a "full and fair discussion of significant environmental impacts"; to "inform decision makers and the public of reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment"; and to "be supported by evidence that the agency has made the necessary environmental analyses."[11] Mere identification of other actions affecting the resources which would be affected by the proposed action is only the first step toward an actual analysis, as "[e]nvironmental impact statements shall not be encyclopedic."[12] Here, the DEIS fails to apply the requisite detail of analysis that is required by NEPA, instead cataloguing potential impacts in an encyclopedic manner. The BLM likewise failed to follow NEPA's requirement to take a "hard look" at the project's environmental impacts, including the cumulative impacts for the full life cycle of mining operations and climate impacts. Finally, as discussed in several sections below, the DEIS is incomplete, as several of the "plans" referenced throughout, including the Community Development Plan, Surface Water Monitoring and Contingency Mitigation	The EIS contains detailed analysis of potential impacts associated with the Proposed Action and alternatives. The EIS was initiated in 2020 and has been prepared per the 2020 CEQ. Several alternatives were considered based on input received from public scoping of the Project. Alternatives considered are discussed in the SIR. The EIS contains detailed descriptions of the Affected Environment for all resources carried forward for analysis. Environmental impacts are discussed in

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		Plan, and the Historic Properties Treatment Plan, have not yet been finalized nor included in the DEIS. This is a violation of NEPA's "hard look" standard, and unlawfully deprives the public of the opportunity to review and comment on these crucial plans. For these reasons and those discussed below, the DEIS violates NEPA and must be substantially revised. **A. The BLM should apply the 2024 NEPA regulations to this proiect.** As a preliminary matter, the Tribe urges BLM to apply the forthcoming 2024 NEPA regulations to the Rhyolite Ridge project. The Council on Environmental Quality (CEQ) promulgated implementing regulations for NEPA in 1978 ("1978 Regulations").[13] CEQ amended these regulations in 2020 ("2020 Regulations"), and they apply to actions commenced after September 14, 2020, including the proposed Rhyolite Ridge mine.[14] However, in April 2022, CEQ issued its "Phase 1" Rule, restoring a limited number of provisions from the 1978 Regulations.[15] On June 3, 2023 President Biden signed the Fiscal Responsibility Act into law, resulting in substantial amendments to NEPA. As such, on May 1, 2024, CEQ promulgated the Bipartisan Permitting Reform Implementation Rule, or "Phase 2" of the Biden Administration's NEPA revisions ("Revised Regulations").[17] These regulations will go into effect on July 1, 2024.[18] Agencies may apply the Revised Regulations to ongoing NEPA reviews that began prior to July 1, 2024. The Tribe urges BLM to do so for the Rhyolite Ridge project. The Revised Regulations represent the most comprehensive, updated, and scientifically sound efforts of our current Administration. The Revised Regulations contain enhanced requirements for public participation, directives for agencies to consider climate-related effects of the action, and expand the definition of "communities with environmental justice concerns,"[19] all of which are crucial considerations for this project. As an ongoing action, the BLM has the authority to apply these updated regulations to the Rhyolite Ridge project, which will certainly lead to a more complete NEPA process and achieve "better decisions" and "excellent action."[20] However, even under the 2020 Regulations, the DEIS is inadequate for the reasons explained below. **B. The No Action Alternative is the Onlv Option to Avoid Significant Harm to the Environment, Waters, Wildlife, Public Health, and Cultural Resources.** While these comments discuss the deficiencies in the DEIS, the Tribe's position is that due to the extreme impacts to the environment, water quality and quantity, air quality, cultural resources, and the health and welfare of surrounding communities, the no-action alternative is the only acceptable outcome.[21] While the alternatives address impacts to the Tiehms Buckwheat critical habitat, they do not address impacts to water resources.[22] The North and South OSF Alternative differs from the Proposed Action Alternative exclusively by decreasing impacts to the Tiehm's Buckwheat critical habitat (but not eliminating them). Other than this, the DEIS provides that "[a]ll other details and appendices included in the Plan would apply to the North and South OSF Alternative."[23] Therefore, the remainder of these comments apply to both the Proposed Action Alternative and the North and South OSF Alternative. **C. The "Affected Environment" and "Environmental Consequences" Analysis is .Inadequate and a Violation of NEPA.** CEQ's implementing regulations require the environmental impact statement to "succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration, including the reasonably foreseeable environmental trends and planned actions in the area(s)."[24] The Department of lnterior defines "reasonably foreseeable future actions" as: [F]ederal and non-federal activities not yet undertaken, but sufficiently likely to occur, that a Responsible Official of ordinary prudence would take such activities into account in reaching a decision. These federal and non-federal activities that must be taken into account in the analysis of cumulative impact include, but are not limited to, activities for which there are existing decisions, funding, or proposals identified by the bureau. "[25] Cumulative effects or impacts are defined as "effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. "[26] In addition, these effects "may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial."[27] As discussed below, the DEIS has failed to meet the level of detailed analysis mandated by NEPA in its discussion of the affected environment pursuant to 40 C.F.R. 1502.15, particularly its failure to adequately discuss the "reasonably foreseeable environmental trends," and in its analysis of the environmental consequences of alternatives as required by 40 C.F.R. §1502.16. In short, this DEIS fails to include meaningful discussion or detail regarding the cumulative impacts of the various aspects of this proposed project. This is a violation of NEPA. [10]COUNCIL ON ENVIRONMENTAL QUALITY EXECUTIVE OFFICE OF THE PRESIDENT, CITIZENS GUIDE To NEPA 17 (2021); 40 C.F.R. § 1508.9; 36 C.F.R. § 220.7(b)(2); 42 U.S.C. § 4332(2)(H). [11]40 C.F.R. § 1502.1; 42 U.S.C. § 4332. [12]40 C.F.R. § 1502.2(a). [13]40 C.F.R. §§ 1500-1508; The regulations' stated purpose is "to tell federal agencies what they must do to comply with the procedures and achieve the goals of [NEPA]," to "insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken," and, "[u]ltimately," to achieve "better decisions" and "excellent action." 40 C.F.R. § 1500.l(a)-(c). [14]40 C.F.R. § 1506.13 (2020). [15]See CEQ, National Environmental Policy Act Implementing Regulations Revisions, 87 Fed. Reg. 23470 (Apr. 20, 2022), http. ://www. fed ralre1!ister.uov/docum nt /2022/04/20/2022-08288/national-environrnental-policy-act-implementing-re!.!ulations-revisions. [16]Amending section 102(2)(C) and added sections 102(2)(D) through (F) and sections 106 through 111. 42 U.S.C. 4332(2)(C)-(D), 4336-4336e. [17]89 Fed. Reg. 35,442 (May 1, 2024). [18]Id. [19]Id. [20]40 C.F.R. § 1500.l(a)- (c) [21]Because "[e]nvironmental impact statements [ ] serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made," the No Action Alternative must be thoroughly considered. 40 C.F.R. 1502.2(g). [22]The only Water Use Alternative, "Pumping from Fish Lake Valley," was considered but dismissed from analysis in the DEIS. BUREAU OF LAND MGMT., RHYOLITE RIDGE LITHIUM BORON PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT at 2-22 (April 2024) [hereinafter DEIS]. [23]Id 2-19. [24]40 C.F.R. § 1502.15 (emphasis added). [25]43 C.F.R. § 46.30 (emphasis added); 43 C.F.R. § 46.115. [26]40 C.F.R. § 1508.l(g)(3).	detail in EIS Section 4.0. Additional detail for all resources is provided in the associated SERs.

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		[27]Id	
177	177.5	**1. Cultural Resources & Native American Traditional Values** As noted throughout the DEIS, several tribes have expressed a preference that the project "avoid prehistoric cultural resources."[28] While the Tribe appreciates the BLM's commitment to compliance with the American Indian Religious Freedom Act and Executive Order No. 13007, the DEIS offers incomplete information regarding what mitigation measures will be implemented "[w]here avoidance is not reasonably feasible."[29] Notably, the DEIS does not include the referenced "Memorandum of Agreement (MOA) between the BLM, Nevada State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation," but merely states that it is "currently in preparation."[30] Similarly, the DEIS does not include the "Historic Properties Treatment Plan," but notes that "Ioneer is working with the BLM and SHPO" to develop this plan, which purportedly will detail the process for "data recovery, archaeological and architectural documentation, and report preparation that would be based on the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation."[31] Expressing an intention to draft a plan that is not yet available for comment in the DEIS is not acceptable under NEPA's "hard look" doctrine.[32] CEQ's implementing regulations require that an agency consider mitigation measures within a single EIS.[33] It is unlawful for BLM to omit this crucial information from the DEIS, as it denies the public and impacted tribal nations an opportunity to fully consider and comment on proposed mitigation measures. [28]DEIS at 4-11. [29]Id. at 4-11. [30]Id. at 2-13. [31]Id. at 2-13. [32]See Klamath-Siskiyou Wild/ands Ctr. v. Bureau of Land Mgmt., 387 F.3d 989,993 (9th Cir. 2004) ("A proper consideration of the cumulative impacts of a project requires some quantified or detailed information; ... general statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." (internal quotations and citations omitted)). [33]40 C.F.R. § 1502.16(a)(8); 40 C.F.R. § 1502.16(a)(9); 40 C.F.R. § 1502.14(e).	The Bishop Paiute Tribe was sent the Draft MOA on April 18, 2024 and July 10, 2024. The BLM sent an email on May 1, 2024 following up with the Bishop Paiute Tribe regarding receipt of the MOA and review. The HPTP was mailed to Bishop Paiute Tribe on June 12, 2024. The BLM will continue to coordinate with the Bishop Paiute Tribe. Table 5-1 in the Final EIS has been updated with additional consultation and coordination conducted.
177	177.6	**2. Climate Change** The DEIS fails to adequately consider and mitigate the cumulative lifetime climate impacts of the proposed Rhyolite Ridge Lithium-Boron Mine Project, as required by NEPA. The impacts of climate change are not only felt locally, but also across jurisdictions, impacting state, tribal, local, private resources, and federally managed public lands.[34] The DEIS states that "the Proposed Action would result in approximately 471,589 tpy of direct GHG emissions and 24,429 tpy of indirect GHG emissions in terms of CO2e."[35] This "approximates the same amount of GHG emissions annually as that produced by 56,713 households (100,134 gasoline-powered passenger vehicles) annually due to energy consumption (USEPA 2022)."[36] Additionally, the proposed action "would result in maximum 8-hour modeled impact of 0.69 ppb of ozone."[37] These are individually significant environmental impacts that could also result in incremental cumulative increases of greenhouse gases globally.[38] Finally, the DEIS should have accounted for mitigation measures for the increased risks associated with climate change, including but not limited to wildfires, toxic spills that might occur due to extreme storms, and prolonged drought. [39] [34]Coordinated Federal Climate Networks to Enhance Adaptation and Resilience at the Regional Scale, U.S. CLIMATE RESILIENCE TOOLKIT, https://toolkit.climate.gov/content/federal-agency-coordination (last visited May 29, 2024). [35]DEIS at 4 -1 [36]Id. [37]Id. [38]According to the California Environmental Quality Act, "a project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to statewide, national or global emissions. 14 Cal. Code Regs. § 15064.4(b). [39]California is the most "climate-challenged" region of North America and is already being impacted with the adverse effects of climate change, including risks to public health, extreme wildfires, longer and frequent droughts, increased erosion of beaches, and a decline in traditional and cultural lifeways for Tribes. LOUISA BEDS WORTH, CAL. GOVERNORS OFF. OF PLAN. ANS RSCH., ET AL., CALIFORNIA'S FOURTH CLIMATE CHANGE ASSESSMENT: STATEWIDE SUMMARY REPORT (Aug. 2018), https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf; see also Anna M. Phillips et al, Extreme Heat Is One of The deadliest consequences of climate change, L.A. TIMES (Oct. 7, 2021), https://www.latimes.com/projects/california-extreme-heat-deaths-show-climate-change-risks/; Dorany Pineda & Gabrielle LeMee, Household Water Wells Are Drying Up in Record Numbers As California Drought Worsens, L.A. TIMES (Dec. 8, 2022), https://www.latimes.com/cal i fornia/story/2022-12-08/cal i fornia-water-wel ls-are-drying-up-inrecord-numbers; Hayley Smith, Wildfire Burn Areas In California Are Growing Ever Larger Due to Greenhouse Gas Emissions, L.A. TIMES (Jun. 14, 2023), https:/ /www.latimes.com/califomia/story /2023-06-14/wildfire-bum-areas-are-getting-bigger-dueto-climate-change; Dorany Pineda, Drought, Heat Waves Could Worsen Air Pollution For Vulnerable Communities, L.A. TIMES (Mar. 30, 2023), https ://www.latimes.com/california/story /2023-03-3 0/ drought-and-heat-waves-worsen-air-pollution.	Air quality impacts were modeled for the Project and results indicate that air quality standards, including those for ozone, would not be exceeded and that greenhouse gas contribution would be approximately one percent of the total for the state of Nevada. Based on the impact analysis, no impacts were identified that required mitigation.
177	177.7	**3. Water Resources** The DEIS failed to adequately consider and analyze the cumulative impacts to water quantity and quality.[40] The State of Nevada is divided into 256 Hydrographic Regions and Basins ("Regions"), many of which are over-appropriated; thirteen Regions fall within Esmeralda County, including the Fish Lake Valley Hydrographic Basin. Esmeralda County is already experiencing stress on its water resources, and the groundwater levels have been trending in decline. Notably, the DEIS claims that "Ioneer has acquired or leased all necessary water rights, for which the points of use and/or diversion would be transferred to the appropriate locations within the Plan boundary." However, it is the Tribe's understanding[41] that Ioneer submitted two applications "For Permission to Change Point of Diversion, Manner of Use and Place of Use of the Public Waters of the State of Nevada Heretofore Appropriated"[42] ("Change Applications") on June 2, 2023, pursuant to N.R.S. § 533.325, which requires that: > [A]ny person who wishes to appropriate any of the public waters, or to change the place of diversion, manner of use or place of use of water already appropriated, shall, before performing any work in connection with such appropriation, change in place of diversion or change in manner or place of use, apply to the State Engineer for a permit to do so.[43] The Change Applications No. 92731 and No. 92732 seek to transfer "1.35 cfs, not to exceed 400.05 acre-feet per year" and "0.590 cfs, not to exceed 176.14 acre-feet per year," from irrigation use to use for mining and milling, respectively. Both sources of water are listed as underground wells within the Fish Lake Valley Hydrographic Basin.[44] The Change Applications also state that the groundwater will "initially be used for the construction phase of the Project."	The EIS acknowledges that implementation of the Proposed Action would require authorizations from other federal, state, and local agencies with jurisdiction over certain aspects of the Project Approvals of water rights and change applications are identified as required approvals in Appendix B of the EIS. Water quality analysis is provided in EIS Section 4.16 and additional detail is found in the Water Resources and Geochemistry SER. The analysis includes consideration of potential impacts from the Spent Ore Storage Facility. As described in Section 2.1.3, processing is completed using a closed system that would contain the sulfuric acid. Impacts from hazardous materials are discussed in Section 4.5. The EIS contains detailed analysis of environmental impacts associated with the Proposed Action and alternatives. Anticipated impacts from mitigation activities

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		The DEIS is thus based on the incorrect and unsupportable assumption that Ioneer will be granted its water rights change applications currently pending before the Nevada State Engineer. Indeed, the DEIS states that "analysis of pumping for mine water supply assumes the use of active water rights."[45] BLM stated in the Scoping Meeting that it would not issue a permit for the project without water rights in hand.[46] The DEIS's assertion that it has already "acquired or leased all necessary water rights" for the project is misleading to the public and a misrepresentation of the status of its water resources. This is a violation of NEPA. Additionally, the Tribe is concerned that even with the acquisition of these water rights, the water required for the project will prove to be a greater quantity than currently described. In its Water Resource Impact Assessment prepared in May 2023, Ioneer states that "Operational Phase water demand is up to 5,000 acre-feet/year." Will Ioneer be permitted to continue to increase the quantity of water for necessary project actions, such as dust suppression, and where will this water be sourced from? In addition, the Tribe is concerned by the lack of information about mitigation measures included in the DEIS. In particular, the DEIS states that "[t]he mitigation would include the development and implementation of a surface water monitoring and contingency mitigation plan,"[47] however, the plan has not yet been completed and is not available for review and comment in the DEIS. Simply describing what the Plan "would include" is insufficient under NEPA's requirement that the agency take a "hard look" at environmental consequences.[48] The DEIS also fails to include further analysis of the impacts of actions that are listed, such as the construction of the 19-mile water delivery pipeline or the longer-term ecological consequences of the anticipated drawdown, including the destruction of wetlands and springs.[49] For example, the DEIS states that "[c]umulative impacts to groundwater drawdown, including at springs sites, would be a moderate to major, permanent, localized cumulative impact,"[50] but provides no further analysis or explanation. This is insufficient under NEPA. Finally, the DEIS does not sufficiently discuss potential impacts to water quality.[51] For Rhyolite Ridge's mining operations, sulfuric acid is going to be used in the processing of lithium.[52] Sulfuric acid dissolves in water and can leech into groundwater and surface waters if there is a leak, where it can then disrupt plant ecology and biodiversity and harm human health.[53] The DEIS should analyze the potential cumulative impacts to water quality from mining contamination and residue from the vat leach and evaporation processes,[54] rather than focusing solely on erosion and sedimentation.[55] [40]DEIS at 2-8 2-9 3-18 3-19 3-20 4-32 4-33 [41]Bureau of Land Management, Battle Mountain District Office, Tonopah Field Office, Rhyolite Ridge Lithium-Boron Project Draft Environmental Impact Statement Virtual Public Meeting, BUREAU OF LAND MANAGEMENT (May 9, 2024) 44:00-45:00), https://eplanning.blm.gov/public_projects/2012309/200540745/20110298/251010289/20240509_ RhyoliteRidge DEIS_ VirtualPublicMeeting_ Recording.mp4. 42 See Application Nos. 92732 and 92731 (Attachment 2). [43]N.R.S. § 533.325 (emphasis added). [44]Hydrographic Regions and Basins, STATE OF NEVADA DIVISION OF WATER RESOURCES, water.nv.!.wv/hydrograph icregions.a px?region=E ·mcralda (last visited May 30, 2024). [45]The DEIS also correctly recognizes that "[t]he BLM has no jurisdiction over State Engineer permitted water rights and regulations applicable to those water rights." DEIS at 4-33. [46] Bureau of Land Management, Battle Mountain District Office, Tonopah Field Office, Rhyolite Ridge Lithium-Boron Project Environmental Impact Statement Public Scoping Meeting, BUREAU OF LAND MANAGEMENT (Jan. 5, 2023) 39:30-40:45, https://eplanning. blm.gov/public projects/2012309/2005407 45/20072069/250078251/20230105_ RhyoliteRidge EIS_ PublicScoping_ VideoOfScopingMeeting2.mp4. [47]DEIS at 4-77. [48]See Kern v. US. Bureau of Land Mgmt., 284 F.3d 1062, 1066 (9th Cir. 2002) (noting that NEPA "establishes 'action-forcing' procedures that require agencies to take a 'hard look' at environmental consequences."). [49]The DEIS claims that "No springs or seeps would be covered by the proposed facilities. Therefore, impacts to springs and seeps from Project surface disturbance would not occur." Id at 4-33. However, this fails to analyze the potential cumulative impacts on seeps and springs from overall water use. [50]Id. at 4-71. [51]Id at 3-20, 4-33, 4-34, 4-35 [52]Id. at 2-4. [53] Sulfuric Acid, AUSTRALIAN GOVERNMENT, https://www.dcceew.gov.au/environmentlprotection/npi/substances/fact-shects/sulfuric-acid (last visited May 30, 2024); Reporters from the Howard Center for Investigative Journalism, Lithium Liabilities: The Untold Threat To Water In The Rush To Mine American Lithium, LITHIUM LIABILITIES (Jan. 25, 2024), https://cronkitenews.azpbs.org/howardcenter/lithiurn/stories/lithium-liabilities.html. [54]Residue includes spent ore, sulfate salts, and filter cake, all of which will be dewatered at the Processing Plant area and then transported by truck to the on-site Spent Ore Storage Facility. [55]DEIS at 4-70.	associated with the surface water monitoring and contingency mitigation plan are discussed in EIS Section 4.21.
177	177.8	**4. Air Quality & Environmental Justice** As directed by Executive Order 12898, "each Federal agency shall make achieving Environmental Justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."[56] Similarly, Executive Order 14008 requires agencies "to make achieving environmental justice part of their missions by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as accompanying economic challenges of such impacts."[57] For Tribes, self-determination is a crucial component of environmental justice.[58] The DEIS fails to adequately consider the environmental justice impacts of the project. NEPA requires an analysis of the cumulative effects of a federal action, defined as "the impact on the environment which results from the incremental impact of the action when added with other past, present, and reasonably foreseeable future actions, regardless of what agency ... or person undertakes such other action."[59] Accordingly, BLM must consider the impacts of the proposed Rhyolite Ridge Lithium-Boron Mine on the existing baseline condition of the Bishop Paiute Tribe and environment nearby.[60] Potential cumulative public health impacts and environmental impacts need to be adequately identified, communicated, and mitigated. The DEIS fails to adequately consider the environmental and potential public health impacts to environmental justice communities near the proposed Rhyolite Ridge Lithium-Boron Mine.[61] In particular, the DEIS fails to adequately discuss the disproportionate impacts of the proposed Rhyolite Ridge Lithium-Boron Mine Project on the Bishop Paiute Tribe. The DEIS states that, "data was gathered for all sources within the 50-km radius which included Esmeralda, Mineral, Nye, and Mono counties."[62] However, data should have also been gathered beyond this range to include the community of Bishop, particularly given that "it is anticipated that most of the work force would live in these [Census Block Groups listed in footnote 67] and commute to the OPA due to the proximity to the Project, availability of commercial and public facilities, services, and housing. "[63]	The air quality area of analysis includes the local airshed (a 50-kilometer buffer of the OPA) which is the area that may be subject to potential impacts of the Proposed Action and alternatives. The EIS contains detailed discussions of environmental justice populations in the area of analysis and discusses air quality impacts. As noted in the air quality analysis, the area of maximum impact near the OPA would be in compliance with air quality standards and impacts would decrease with distance. Because of the distance of the Bishop Paiute Tribe to the OPA, no air quality impacts are anticipated and, therefore, no discussion was included in the environmental justice analysis.

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		As defined under California law, "disadvantage community" ("DACs") (see Figure 1 below) is defined as those that reside in areas disproportionately affected by environmental pollution and other hazards that can lead to negative public health effect, exposure, or environmental degradation.[64] The California Environmental Protection Agency uses the OEHHA CalEnviroScreen 4.0 Tool to identify and rank all census tracts in the state using 21 statewide indicators, such as air quality, that measures communities' exposure burden to pollution and population characteristics.[65] Even though the proposed Rhyolite Ridge Lithium-Boron Project is located in Nevada, approximately 90 miles away by car, the potential impacts associated with the project will extend beyond the Project's immediate area- and will further expose and exacerbate public health risks in the Bishop Paiute community, which is already designated as a disadvantaged community. The areas in Figure 1 represent the DACs (Bishop Paiute) as designated by the California Environmental Protection Agency for the purposes of SB 5 3 5.[66] The potential health effects associated with the projects should be fully considered by the DEIS, especially where many residents in Bishop Paiute community already experience the higher rates of asthma,[67] low birth weight,[68] and cardiovascular disease[69] than 74, 90, and 61 percent of California, respectively.[70] Therefore, the DEIS must take into account the potential health impacts on the Bishop Paiute Tribe and outline measures to mitigate these impacts. [56]Exec. Order No. 12,898, 32 C.F.R. § 651.17. [57]Exec. Order No. 14,008, 86 Fed. Reg. 7,619 (Feb. 1, 2021) at Sec.219. [58]Rebecca Tsosie, Indigenous People and Environmental Justice: The Impact of Climate Change, 78 U. COLO. L. REV. 1625, 1631 (2007). [59]40 C.F.R. § 1508.1 (g)(3). [60]See Council on Environmental Quality, Considering Cumulative Effects Under the National Environmental Policy Act, 1977. 61 In the DEIS, "the area of analysis for environmental justice includes Census Block Groups 320099501001 (Esmeralda County, Nevada), 320219707001, 320219707002, 320219707003, 320219708001, 320219708002 (Mineral County, Nevada), 320239601001, 320239602001, 320239602002 (Nye County, Nevada), 60270001001, 60270001002, 60270002001, 60270002002,60270003001,60270003002,60270004001,60270004002,60270004003, 60270005001 (Inyo County, California), and 60510001011 (Mono County, California)." [62]DEIS at 4-49 [63]Id at 3-4. [64]Cal. Health & Safety Code§ 39711 [65]LAUREN ZEISE, OFF. OF ENV'T HEALTH HAZARD ASSESSMENT, & JARED BLUMENFELD, CAL. ENV'TPROT. AGENCY, CALENVIROSCREEN 4.0 (Oct. 2021), https://oehha.ca.gov/media/downloads/calenviroscreen/report/calenviroscreen40reportf20? 1.pdf [66]See SB 535 Disadvantaged Communities, OEHHA, https://oehha.ca.gov/calenviroscreen/sb535 (last visited May 30, 2024). [67]See Asthma, OEHHA, https://oehha.c,U!.OV/l:alenviro creen/ indicaL r/asthma (last visited May 30, 2024). The causes of asthma are unknown but genetic and environmental factors can be involved. Outdoor air pollution can trigger asthma attacks, make asthma worse, or make people with asthma more susceptible to pneumonia, flu and other illnesses. [68]See Low Birth Weight Infants, OEHHA, https://oehha.ca.gov/calenviroscreen/indicator/lowbirth-weight-infants (last visited May 30, 2024). Low birth weights are linked to exposure to pollution from traffic, industry or agriculture, and low weight babies are more likely to die as infants or develop asthma or other chronic diseases later in life when compared to babies who weigh more. [69]See Cardiovascular Disease, OEHHA, http·://(ehha.ca.gov/calen ·iro creen/indicator/cardiovascular-cl.i ea e (last visited May 30, 2024). Cardiovascular disease is linked to exposure to air pollution, and the effects of air pollution may also be greater in elderly and people with other preexisting health conditions. [70]OEHHA, CalEnviroScreen 4.0 Tool (Census Tract No: 6027000400).	
177	177.9	**III. The Project's Closure Plans Must Include Sufficient Funding for Remediation.** The DEIS describes how toxic byproducts produced by the leaching and mineral extraction process such as "spent ore, sulfate salts, and neutralization filter cake" will be permanently stored on-site at the spent ore storage facility.[71] The DEIS also states that final reclamation of the site "would occur over a minimum of six years of phased reclamation after Project facilities are closed, or until the reclamation of the site or component has been accepted by the BLM and NDEP" and that "[a]dditional environmental monitoring (including the quarry lake) is expected to extend beyond the date of revegetation release, as guided by final closure plans."[72] The Tribe is concerned about this plan for the waste to remain on-site, and by the lack of analysis of thecumulative impacts of this reclamation plan. Additionally, the closure plans should be available for review and public comment and should include funding set aside that is sufficient for a thorough site reclamation and ongoing monitoring. [71]DEIS at 2-4. [72]DEIS at 2-10, 2-11.	The EIS contains analysis of the spent ore storage facility during operation and after closure. The direct, indirect, and cumulative effects analysis in the EIS considers impacts associated with reclamation. A reclamation bond will be in place as required by federal and state law and regulations. The closure plans for specific facilities will be prepared in accordance with applicable agency regulations.
177	177.10	**IV. There are inadequate housing resources and a lack of planning and support for the necessary public infrastructure to support the influx of workers to this rural area.** The DEIS failed to analyze the cumulative impacts of an influx of hundreds of workers to the communities of Bishop, California, Hawthorne, Nevada, and Tonopah, Nevada. **A. The BLM Did Not Adequately Evaluate Potential Impacts of Housing Stock Availability and Affordability for Rural Communities Surrounding the Proiect.** The DEIS fails to clearly mention, evaluate, or analyze the impact that bringing hundreds of employees into the Dyer/Rhyolite Ridge area as required by NEPA. In most areas surrounding the project site, the housing is already limited. An influx of hundreds of mine workers will only aggravate the issue of housing stock availability and affordability for local communities. The lack of analysis is a violation of NEPA because the DEIS does not properly inform or identify cumulative risks to the residents of the communities surrounding the Rhyolite Ridge Lithium-Boron Project. The DEIS states that "Ioneer would work with local communities to develop temporary and long-term housing accommodations for the construction and quarrying and processing phases," and "Ioneer is reviewing various housing options on private land, including use of recreational vehicle parks, local hotels, and home rentals."[73] However, there is no attempt to discuss the potential impacts of these "housing options" for the Project's 350 plus work force over the 23 years Rhyolite Ridge proposes to be in operation. During the DEIS virtual public meeting on May 9, 2024, a member of the public asked where the potential employees of the Rhyolite Ridge Project were going to live.[74] The representative answered that it was expected that project workers would live in Tonopah, NV, Hawthorne, NV, and Bishop, CA, but that no housing would be provided for them. [75] The Tribe is extremely concerned about the impacts to these communities, particularly Bishop, and the lack of analysis included in the DEIS. The potential for population increase combined with a limited number of available homes could lead to the current residents being priced out of their homes or unable to acquire housing in their own communities. The omission is analysis a violation of NEPA. **1. Bishop, California**	Impacts on housing availability and pricing are described in EIS Section 4.10. The potential for disproportionate impacts to environmental justice communities, including those in Bishop, Hawthorne, and Tonopah, are disclosed in EIS Section 4.3.

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		Bishop, California, is home to the Bishop Paiute Tribe Reservation, and about two hours by driving from the proposed Rhyolite Ridge Lithium Boron Mine. During the public DEIS meeting, it was proposed as a place where employees for the Rhyolite Ridge Lithium Boron Mine would be housed.[76] Bishop, as of 2020, has a population of 3,821.[77] The population of Bishop has increased by 7.8% in the past 20 years, with an even smaller growth of housing stock.[78] If 3 50 workers, just a portion of the 500 workers necessary during the construction and quarrying phase of the mining project, moved to Bishop, the city would see a 9% increase in population. There is not enough housing stock available to serve this increase in population. According to a survey from the City of Bishop asking citizens what their largest housing concerns were,[79] 78.9% ofresidents were concerned about insufficient affordable housing and 77.5% were concerned with the potential for existing residents to be displaced by rising costs of housing.[80] There was a 7% decrease in housing stock between 2018 and 2020, with an available housing stock of 2,080 dwellings as of2018 and a decrease to 1,938 dwellings in 2020.[81] There was only an increase of 12 newly built housing units between 2010 and 2020.[82] Bishop has a housing vacancy rate of 6.96%.[83] With the low housing stock available for those who already live in Bishop, the potential increase in population brought about by Rhyolite Ridge employees would further stress available housing stock, potentially leading to a housing shortage.[84] Additionally, the Tribe is concerned about the potential for displacement of current residents due to Rhyolite Ridge Lithium Boron Project employees moving to Bishop. As of 2020, 48% of renters in Bishop were overburdened, or putting more than 25% of their income towards housing.[85] For homeowners, 22% suffer from an overburden in housing expenses.[86] This overburden disproportionately effects low-income and extremely low-income communities in Bishop, where 100% of low income and extremely low-income people overpay for housing.[87] Finally, employees from the Project may contribute to rental market saturation in Bishop, increasing housing prices and pricing out low-income residents and other renters who are already paying more than 25% of their income towards housing expenses. The DEIS fails to discuss or analyze these impacts of the Rhyolite Ridge Lithium Boron Project on the City of Bishop, California. Moving hundreds of people to Bishop, California could have large impacts on the community by adding stressors onto an already impacted and limited housing market. The DEIS is incomplete without this analysis. **2. Hawthorne, Nevada** Hawthorne, Nevada is located two hours by driving from the proposed Rhyolite Ridge Lithium Boron Project site in Mineral County, NV. Ioneer proposed Hawthorne as a place where Rhyolite Ridge employees would be housed.[88] The DEIS did not analyze the potential impacts of an increased population on the city of Hawthorne. Hawthorne has a population of 4,686 and 2,176 households.[89] Currently, 23.98% ofresidents in Hawthorne rent their homes,[90] and 51.7% of residents own their homes outright.[91] There is an average vacancy rate in Mineral County of 28.1 %.[92] It is in the 49th percentile of low-income communities for adults.[93] The median home price is $99,900, and the median rent is $582.[94] The area, notably, is also in the 92nd percentile for cancer in adults.[95] Hawthorne, Nevada is in the 98th percentile nationally for housing vulnerability.[96] The area faced a higher rate of foreclosures before the 2008 housing crisis than the rest of the country, according to the Climate Vulnerability Index. This is pertinent because, as an economically disenfranchised community, it could face higher rates of gentrification, and higher competition for rental homes or homes for sale. Higher home prices could displace low-income communities in Hawthorne. Located within the largest food desert in Nevada, Hawthorne residents have limited access to healthy food and grocery stores.[97] There is only one grocery store in Hawthorne to support its population of 4,686.[98] Lack of access to healthy food can lead to higher rates of obesity, diabetes, cardiovascular disease, and micronutrient deficiencies.[99] These resources could be further strained by the population increase proposed by the Rhyolite Ridge Project. Overall, the local housing market and economy of Hawthorne is not sufficiently discussed or analyzed in the DEIS. **3. Tonopah, Nevada** Tonopah is an hour and fifteen minutes from Rhyolite Ridge Lithium Boron Mine in Nye County, NV. It is the final community that the representatives of BLM/ioneer highlighted during the May 9th public meeting as a potential housing site for its 350-500 employees over the lifetime of the mine.[100] The DEIS did not sufficiently discuss the potential impacts of a rapid growth in population from an influx of employees from Rhyolite Ridge in the DEIS. The current population of Tonopah is 1,777 as of 2022.[101] There are a total of 1,058 housing units in Tonopah.[102] Of all housing units, 52.4% are owner occupied, while 47.6% are renter occupied.[103] In Tonopah, 32.3% of renters are overburdened, while 9.4% of homeowners are overburdened.[104] The median income of Nye County is $39,420.105 Over the past ten years, housing stock in Tonopah has only increased by twelve units.[106] The vacancy rate of Tonopah is 21. 7%.[107] The median home price is $90,700, and the median rent cost is $709.[108] [73]DEIS 2.1. 7 (pg 2-7); In the "Social and Economic Values" section, there is a brief discussion of the current housing climate in surrounding areas of the proposed mine. DEIS at 3-10. [74]Bureau of Land Management, Battle Mountain District Office, Tonopah Field Office, Rhyolite Ridge Lithium-Boron Project Draft Environmental Impact Statement Virtual Public Meeting, BUREAU OF LAND MANAGEMENT (May 9, 2024) 56:00-56:30, https://eplanning.blm.gov/public _projects/2012309/200540745/20110298/251010289/20240509_ RhyoliteRidge DEIS_ VirtualPublicMeeting_ Recording.mp4. [75]Id. [76] Id [77] CITY OF BISHOP CALIFORNIA, GENERAL PLAN HOUSING ELEMENT, CITY OF BISHOP GENERAL PLAN (2021-2029) at 25. [78] Id. at 8 [79] The survey had a 2% response rate. [80] CITY OF BISHOP CALIFORNIA, GENERAL PLAN HOUSING ELEMENT, CITY OF BISHOP GENERAL PLAN (2021-2029) at 9-10. [81] Id at 31. [82] Id. at 25. [83] Id. [84] The U.S. Department of Housing and Urban Development defines a housing shortage as housing availability with a 3% or less vacancy rate. Id. at 32. [85] Id. at 28. [86] Id. [87] Id.; The Bishop Paiute Tribe reservation, which borders the City of Bishop to the east, had 519 households as of2014 and a median income of $22,362. Of the 519, 34% were below poverty rate set by the Health and Human Services Poverty Guidelines, with 81 % below the HUD Low Income Guideline. Bishop Paiute Tribe CULTURE Project Application, 2, https:/ /imls.gov/sites/default/files/project-proposals/ng-03-17-0245-17-proj ect-proposal. pdf.	

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		[88] Bureau of Land Management, Battle Mountain District Office, Tonopah Field Office, Rhyolite Ridge Lithium-Boron Project Draft Environmental Impact Statement Virtual Public Meeting, BUREAU OF LAND MANAGEMENT (May 9, 2024) 56:00-56:30, https://eplanning.blm.gov/public projects/2012309/200540745/20110298/251010289/20240509_ RhyoliteRidge DEIS_ VirtualPublicMeeting_ Recording.mp4. [89] Mineral, NEVADA RURAL HOUSING AUTHORITY, https://nevadaruralhousingstudies.org/county/mineral/ (last visited May 30, 2024). [90] Hawthorne, NV Housing Data, BEST NEIGHBORHOOD, https://bestneighborhood.org/housingdata-in-hawthorne-nv/ (last visited May 24, 2024). [91] Id. [92] Mineral County, Nevada, UNITED STATES CENSUS BUREAU, https://data.census.gov/table/ ACSDP5Y2020.DP04 ?q=DP04&g=050:XX00US32023 ,06027 ,32009 ,32021 _ 160:XX00US3273600 040:XX00US32&tid=ACSDP5Y2020.DP04 (last visited May 26, 2024). [93] EJScreen, EPA, https://ejscreen.epa.gov/mapper/ (last visited May 24, 2024) [94] Mineral County, Nevada, UNITED STATES CENSUS BUREAU, https://data.census.gov/table/ ACSDP5Y2020.DP04 ?q=DP04&g=050XX00US32023,06027 ,32009,32021 _ 160:XX00US3273600 040XX00US32&tid=ACSDP5Y2020.DP04 (last visited May 26, 2024). [95] Id. [96] Tract 32021970700, Hawthorne, NV, U.S. CLIMATE VULNERABILITY INDEX, https: /map.climatevulnerabilityindex.org/report/social_ economic_ housing_ type_ transportation/tract-32021970700-hawthorne- [97] Id. [98] Grocery Hwy 95, SAFEWAY, https://local.safeway.com/safeway/nv/hawthorne/1095-hwy-95.html?utm_source=G&utm_medium=Maps&utm_campaign=G+Places (last visited May 26, 2024). [99] Marie Lorraine Johnson, What Are Food Deserts, and How Do They Impact Heath?, MEDICALNEWSTODAY (Mar. 8, 2024), https://www.medicalnewstoday.com/articles/what-arefood-deserts. [100] Rhyolite Ridge Lithium Boron Project Draft Environmental Impact Statement Virtual Public Meeting (May 9, 2024), 56:00-56:30, https://eplanning.blm.gov/public projects/2012309/200540745/20110298/251010289/20240509_ RhyoliteRidge DEIS_ VirtualPublicMeeting_ Recording.mp4. [101] Tonopah, DATA COMMONS, https://datacommons.org/place/geoid/3273600 (last visited May 24, 2024). [102] Nye, NEVADA RURAL HOUSING AUTHORITY, https://nevadaruralhousingstudies.org/county/nye/ (last updated Apr. 5, 2023). [103] Id. [104] Id. [105] Id. [106] Tonopah, DATA COMMONS, https://datacommons.org/place/geold/3273600 (last visited May 24, 2024). [107] Tonopah CDP, Nevada, UNITED STATES CENSUS BUREAU, HTTPS://DATA.CENSUS.GOVITABLE/ACSDP5Y2020.DP04?Q=DP04&o=050XX00US32023,06027,32009,32021 160XX00US3273600040XX00US32&no=ACSDP5Y2020.DP04. [108] Id.	
177	177.11	**B. The DEIS Did Not Take into Account The Public Safety Concerns For Populations Living Near The Project.** The DEIS does not properly evaluate the impacts of on public safety that could arise during the construction, quarrying, and remediation processes. **1. Missing and Murdered Indigenous Women** The DEIS and Social and Economic Supplement touch on impacts to local law enforcement due to the increased population of 358 non-local people and 574 new non-local adults to the area.[109] The analysis of impact on law enforcement discusses only economic ramifications of an increased population and impacts for Esmerelda County.[110] It does not discuss the risk of transient non-community members entering the area. By omitting an analysis of potential increases in crime, such as violence against Indigenous people, the DEIS fails to meet NEPA standards. Relatedly, the DEIS fails to discuss the potential impacts of the Rhyolite Ridge Lithium Boron Project on rates of violence against Indigenous people, particularly Indigenous women. The only risk to public safety discussed in the DEIS was the overall increase in population in Esmerelda County.[111] During the DEIS Public Meeting held by BLM on May 9, 2024, a member of the public asked about how Rhyolite Ridge Lithium Boron Mine plans to address the crisis of Missing and Murdered Indigenous Women (MMIW). The representative, Steve Morton, answered, stating it would all be found in the DEIS and in the Social and Economic Values Supplement for the Rhyolite Ridge Lithium Boron Project.[112] Nowhere in the DEIS or in the Supplement is this crisis discussed. The MMIW crisis is a foreseeable impact that should have been analyzed in the DEIS. There is a recognized link between extractive industries and violence against Indigenous people; the U.S. State Department has acknowledged this risk, stating extractive industries near or on Tribal lands have "triggered violent conflicts, degraded the environment, worsened gender and other inequalities, displaced communities, and undermined democratic governance."[113] According to one case study of the Bakken oil region of Montana and North Dakota, Indigenous communities in the area experienced a 70% increase in violent crimes and a 30% increase in sexual assault over six year after the introduction of extractive industry based "man camps," or the influx of predominately male industry workers, as is proposed for Rhyolite Ridge.[114] Moreover, Indigenous women are murdered at a rate more than ten times higher than the national average, and female survivors of violence overwhelmingly experience that violence at the hands of a non-Indigenous perpetrator.[115] These rates of violence in extractive industries are not limited to the Bakken region but have been catalogued nationally and globally. In Canada, this violence has been experienced all around the Yukon and northern British Columbia.[116] In a report cultivated by the Liard Aboriginal Women's Society states that 73% of respondents (all of whom were Indigenous women living around and working on extractive operations) have experienced sexual and racial harassment, discrimination, and violence. Further, in 2019 a report titled "National Inquiry into Missing and Murdered Indigenous Women and Girls" found similar outcomes to the Bakken case study. It found that man camps developed from the extraction industry are "implicated" in higher rates of violence against Indigenous women both in communities neighboring the camps and at the camps. [117] These risks posed to Indigenous people should have been analyzed as a cumulative impact of the mine under NEPA. [109] DEIS at 4-16; Social and Economic Values Supplemental Environmental Report for Rhyolite Ridge Lithium Boron Project, BLM (Apr. 2024), 3-9. [110] Id. [111] DEIS at 4-16; Social and Economic Values Supplemental Environmental Report for Rhyolite Ridge Lithium Boron Project, BLM (Apr. 2024). [112] Rhyolite Ridge Lithium Boron Project Draft Environmental Impact Statement Virtual Public Meeting (May 9, 2024), 50:36-51 :45. [113] OFF. TO MONITOR AND COMBAT TRAFFICKING IN PERSONS, The Link Between Extractive Industries and Sex Trafficking, U.S. DEP'T OF JUST. (June 2017) https://www.state.gov/wpcontent/uploads/2019/02/272964.pdf	Workers would be required to comply with all State and Federal laws. No Man Camps are proposed under this Project.

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		[114] Violence Against Indigenous Women and the Extractive Industry, PAVE, https :/ /www.shatteringthesilence.org/blog/violence-against-indigenous-women-and-theextractive-industry, (last visited May 26, 2024) [115] Id. [116] Julien Gignac, Reporting Documents 'Degrading ' Treatment of Indigenous Women at Yukon and B.C. Mines, CBC (Aug. 4, 2021), https://www.cbc.ca/news/canada/north/yukon-minesindigenous-women-l .6128059. [117] Brett Forester, Hold Resource Sector Accountable for Violence Against Indigenous Women, MPs Urge Feds, CBC (Dec. 14, 2022), https://www.cbc.ca/news/indigenous/committee-resourceextraction-mmiwg-report-1.6685802.	
177	177.12	**2. Traffic Increases** The DEIS and Social and Economic Values Supplemental both mention traffic increases as a potential public safety concern.[118] The focus surrounds the rerouting of Cave Springs Road and Argentine Canyon Road around the Project.[119] The remainder of the traffic section discusses the projected increase traffic patterns on U.S. 6 and U.S. 95, which would be the primary routes around the Project. The DEIS does not discuss the impacts of the traffic on potential air pollution or on the potential for an increased rate of crashes. The DEIS also fails to identify areas outside of Esmerelda County that would be impacted by commuters, such as Bishop. Under the proposed action, traffic would increase by 230-280 vehicle trips per day during the quarrying phase and 186-248 trips during the quarrying phase.[120] The DEIS does not take into account increase traffic running between the Project site and the communities that workers would be commuting from, and the impacts those commuters would have on the day-to-day transportation of local community members. Comparing average daily traffic from 2022 with a prospective increase in traffic by 100 vehicles to Bishop, CA, Hawthorne, NV and Tonopah NV shows a drastic traffic increase in some areas. Typical traffic, for example, on U.S. 6 to Bishop averaged 480 cars on the most direct route through Esmerelda County.[121] The increase of 100 cars would lead to a 20.8% increase in traffic on U.S. 6. This is not a negligible increase. This would likely cause increased travel times for anyone seeking to travel from Bishop through Esmerelda County. The lowest calculated impact would be in Nye County on U.S. 95 in Nye County to Tonopah, where the average daily travel was 6700 in 2022. [122] One prospective impact outside of travel times would be an increase in traffic accidents. On average, half of fatal car accidents happen on rural roads. [123] A 2020 study found that crashes on rural roads had a 62% increased likelihood of death. [124] With the prospective travel increase on these rural roads such as U.S. 6 and U.S. 95, there will inevitably be more crashes. Overall, the DEIS fails to take into account the safety risks posed by the increased traffic. [118] DEIS at 4-25 - 4-27, Supplement at 3-9. [119] DEIS at 4-25. [120] Id at 4-26. [121] Annual Average Daily Traffic Count Stations: Esmerelda County, State of Nevada Department of Transportation (2022), https://www.dot.nv.gov/home/showpublisheddocument/21762/638206014113 700000. [122] Annual Average Daily Traffic Count Stations: Nye County, State of Nevada Department of Transportation (2022), https:/ /www.dot.nv.gov/home/showpublisheddocument/21778/638206015074870000. [123] Rural Road Are Disproportionately Deadly, New GHSA Study Finds, GOVERNORS HIGHWAY SAFETY ASSOCIATION (Sept. 1, 2022).	Impacts from increased traffic on transportation systems is described in EIS Section 4.13. Air quality impacts from increased vehicle emissions associated with the Project were modeled and analyzed Section 4.1.
177	177.13	**3. Hospitals** The DEIS briefly addresses which hospitals would serve Rhyolite Ridge workers in case of medical emergencies: Northern Inyo Hospital in Bishop, California and Mt. Grant General Hospital in Hawthorne, Nevada. [125] Northern Inyo Hospital has twenty-five inpatient beds, three operating rooms, eleven preoperative and post operative beds, and eight emergency room beds. [126] Mt. Grant General Hospital has eleven licensed acute beds and twenty-four long term care beds. [127] Mt. Grant states it serves the Hawthorne residential area of 4500 citizens. Concerns about overburdening an already overburdened hospital system should have been considered in the DEIS. Reflecting patterns across the country, Nevada is suffering from a lack of medical professionals. [128] As of 2023, Nevada would need 4,000 more registered nurses to meet the medical needs of residents, and two out of every three Nevadans live in an area that suffer from medical care shortage. [129] The shortage is only expected to worsen as older nurses retire from the profession without new nurses filling their roles. [130] Extractive industries like lithium mining poses health risks to workers that could further overburden the medical system in Nevada. Extractive industries have been linked to health risks such as silicosis from dust inhalation, musculoskeletal disorders, overexertion, and trauma, hearing loss from noise, heat stroke due to extreme temperature and humidity, and death from a variety of workplace accidents. [131] This means that the 350-500 people working for the Rhyolite Ridge Lithium Mine may have an increased risk of poor health from the workplace, and need to seek medical care. The DEIS inadequately considered the potential effects of the project on an already overburdened hospital system. [125] DEIS at 3-12. [126] Northern Inyo Hospital, NORTHERN INYO HEALTHCARE DISTRICT, https://www.nih.org/locations/northern-inyo-hospital/ (last visited May 26, 2024). [127] About Us, MGGH, https://mgghnv.org/one-page-express/about-us/ (last visited May 26, 2024). [128] Jacob Solis, Tabitha Mueller, Nevada Needs More Nurses and More Physicians, But What Will Make That Happen?, #NVLEG (Feb. 24, 2023), https :/ /thenevadaindependent.com/article/nevada-needs-more-nurses-and-more-physicians-butwhat-will-it-take-to-make-it-happen. [129] Id. [130] Id. [131] Franklin W. Schwartz, Sangsuk Lee, Thomas Darrah, A Review of the Scope of Artisanal and Small-Scale Mining Worldwide, Poverty, and the Associated Health Impacts, AGU (Jan. 15, 2021), https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2020GH000325.	The EIS describes the existing healthcare systems available in the area of analysis and potential impacts associated with increased population in Sections 3.10 and 4.10. Additional information is provided in the Social and Economic Values SER.
177	177.14	**V. Tribal Consultation has been Inadequate.** The DEIS states that the BLM sent a letter to the Tribe dated January 27, 2023, and that the BLM then "carried out follow up consultation ... from February 3, 2023, through April 26, 2023," and that prior to this, the BLM "met on different occasions" with the Bishop Paiute Tribe "to discuss this Project as well as others."[132] In addition, below is a synthesized table of the BLM's purported tribal consultation actions with regard to the Bishop Paiute Tribe. **Date** | **DEIS Table 5-1 Language**	Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is not feasible, specific

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4/26/2022	BLM met with the Bishop Paiute Council on April 26, 2022 to present on the BMDO and why the District is expanding its sphere of influence with respect to both the Rhyolite Ridge and Esmeralda 7 Solar proposals
12/19/2022	Scoping Letter from BLM. Correspondent included a link to the project's ePlanning website, direct links to register for the Zoom meetings, and a copy of the news release
1/27/2023	Letters and consultation emails from BLM to all affected tribes regarding the updated Rhvolite Ridge POO and request for tribal consultation and inout.
4/27/2023	Coordination email/Outlook invitations to all affected Tribes for implementation of a field meeting for consultation/communication with Ioneer and the BLM TFO Field Manager held on April 27, 2023.
5/17/2023	Letters sent by the BLM to all affected Tribes for an invitation request for additional opportunity to communicate/consult in proposed Microsoft Teams or Zoom on a monthly basis
8/08/2023	Meeting between Scott Distel (BLM) and Brian Adkins (Environmental Director at Bishop Paiute Tribe) regarding cooperating agency status and government to government coordination and consultation. Follow up discussion via email between Brian and Scott on January 30, 2024 regarding Project update and status.

While the actions described above may be described as outreach, they fall far below the standard required to engage in meaningful tribal consultation, by the Department of lnterior's own definition:

> A Tribal consultation is a formal, two-way, government-to-government dialogue between official representatives of Tribes and Federal agencies to discuss Federal proposals before the Federal agency makes decisions on those proposals. The Federal agency provides sufficient advance notice to appropriate Tribal leaders of upcoming consultation sessions and, following the consultation sessions, explains to those Tribal leaders how the final agency decision incorporates Tribal input.[133]

As sovereign nations, tribes have a role and a relationship with the federal government that makes them distinct from other other stakeholder groups throughout the NEPA process, as the "[fJederal government and Indian tribal relationships reflect the political and historical development of the Nation."[134] Here, the BLM failed to conduct outreach to the Tribe until the DEIS was already being drafted; it has made no attempts to host separate meetings for tribal nations, instead inviting tribes to public meetings; and, the BLM has also provided no information regarding how tribal input has been and will continue to be incorporated into their decision-making process. Further, tribes must have the opportunity to shape their own forms of engagement; what works for one tribe may not work for another.[135] For these reasons, and for those discussed in detail below, BLM has failed to meet its burden under the "good faith" government-to-government consultation standard, its burden pursuant to the requirements of the National Historic Preservation Act, and its burden under international law.

A. Government-to-Government Consultation

Government-to-government consultation by the BLM is mandated by its own governing documents.[136] This consultation responsibility is also affirmed by Executive Order No.13175 (Consultation and Coordination with Indian Tribal Governments dated November 6, 2000, which requires all agencies, bureaus, and offices within the Federal Government to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications). In addition, Presidential Memorandum for the Heads of Executive Departments and Agencies on Tribal Consultation dated November 5, 2009 (74 Fed. Reg. 57881), Presidential Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships dated January 26, 2021 (86 Fed. Reg. 7491),[137] and Joint Secretarial Order on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters No. 3403 dated November 15, 2021,[138] serve to strengthen and supplement Executive Order No. 13175.

In short, the BLM failed to follow its own policies for tribal consultation. Pursuant to the BLM's own Tribal Relations Manual, the following eleven principles should be applied to "all tribal consultation situations"[139]:

1. The BLM formally engages federally recognized Indian tribes on a government to-government basis. These formal interactions are complemented by informal working relationships between BLM managers and tribal officials, and between BLM and tribal staffs.
2. The BLM conducts government-to-government consultation with Indian tribes to improve collaborative and informed Federal decisionmaking. The BLM understands government-to-government consultation to be an ongoing relationship between BLM officials and elected tribal officials that educates both parties and results in the best informed BLM land use decisions.
3. The BLM intends government-to-government consultation to be an open and ongoing dialogue between BLM line officers and elected tribal officials regarding both specific projects and general issues related to policy, planning, and other long-term concerns.
4. Information, opinions, or recommendations may be provided to the BLM from individual tribal members or traditional tribal religious leaders. In cases where such comments conflict with positions taken by official tribal representatives, the BLM will defer to the opinions and positions adopted by the tribal government. Should this occur, the comments will be treated as those received from the public. They will be handled accordingly by the BLM and tribal members notified. Only where specified in particular statutes (e.g., NAGPRA gives legal precedence to MS-1780 - TRIBAL RELATIONS (P) 1-15 BLM MANUAL Rel. No. 1-1780 Supersedes Rel. 8-74 12/15/16 lineal descendants) will the BLM consult with and give precedence to individuals other than official tribal government representatives.
5. Only BLM line officers are authorized to speak for the agency and will exercise their delegated authority in the conduct of government-to-government consultation and decision-making.
6. The BLM consults with tribes for all actions where consultation is specifically required by statute, regulation, or policy and for any additional action that will have a substantial direct effect on tribal planning issues, including regulations, rulemaking, policy, guidance, or operational activities.
7. The BLM understands that project-specific consultation between the BLM and tribal technical staff should be established early in the planning cycle and continues during project implementation and afterward during long-term monitoring and reclamation.
8. When amending and revising land use plans the BLM seeks to be consistent with tribal land use and resource allocation plans (including Alaska Native village or regional corporation plans, as applicable) and other tribal resource planning documents to the extent consistent with the laws governing the administration of the public lands per 43 CFR 1610.3-2.
9. The BLM recognizes that it has a broad trust responsibility that in some cases includes a fiduciary duty related to Indian trust assets and property or interests reserved by or granted to Indian tribes or Indian individuals by treaty, statute, and Executive orders. The BLM also recognizes that Indian tribes may have reserved rights granted by treaties or authorized by specific legislation that applies to water, fish, wildlife, or vegetative resources.
10. The BLM recognizes that Indian tribes are knowledgeable sources and experts concerning their own cultures. They can provide unique insight and explanation of tribal history and land uses. When provided with such information, the BLM will take this into account when making decisions related to the identification, evaluation, treatment, and management of natural and heritage resources.

operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts.

The Bishop Paiute Tribe was sent the Draft MOA on April 18, 2024 and July 10, 2024. The BLM sent an email on May 1, 2024 following up with the Bishop Paiute Tribe regarding receipt of the MOA and review. The HPTP was mailed to Bishop Paiute Tribe on June 12, 2024. The BLM will continue to coordinate with the Bishop Paiute Tribe. Table 5-1 in the Final EIS has been updated with additional consultation and coordination conducted.

The NEPA process has been conducted in accordance with applicable United States laws including NEPA, NHPA, and FLPMA, CEQ regulations, and BLM regulations. The process includes Tribal consultation and public involvement throughout development of the EIS. The EIS is compliant with plain language requirements in the CEQ regulations.

While the United States government supports UNDRIP, the declaration is not legally binding but is an inspirational international instrument that includes a broad range of provisions regarding the relationship between nations, organizations and indigenous peoples and individuals.

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		11. The BLM recognizes Indian religious and cultural values as an important, living part of our Nation's heritage. The BLM commits to addressing and, where practicable, minimizing potential disruption of the traditional expression or maintenance of these values that might result from BLM land use decisions. Sending notification letters and providing baseline information about the NEPA process does not constitute tribal consultation and does not accomplish the goal of educating both parties to achieve the best-informed management decision. The BLM should therefore go back to the drawing board to revise the DEIS to incorporate thorough and meaningful input from tribal nations, in accordance with its own policies. **B. NHPA Section 106 Consultation** Pursuant to Section 106 of the National Historic Preservation Act, federal agencies are required to consider the effects of an undertaking on historic properties.[140] Agency officials should plan consultations appropriate to the scale of the undertaking and scope of federal involvement. Section 106 Consultation begins with a formal letter from the agency official to the Tribal leader with a copy also sent to the Tribal Historic Preservation Officer (THPO). Consultation must occur with any Tribe that attaches religious and cultural significance to historic properties that may be affected by an undertaking.[141] The agency is required to make area reasonable and good-faith effort to identify Tribes that might attach religious and cultural significance to these properties.[142] Importantly, the consultation process applies to ancestral and ceded lands outside of reservation boundaries. The following are the general principles of the Section 106 NHPAprocess[143] : 1. Agencies must ensure the Section 106 process is "initiated early in the undertaking's planning, so that a broad range of alternatives may be considered during the planning process for the undertaking." 2. Consultation on these historic properties of significance to Native American Tribes should start early in the process to identify and discuss relevant preservation issues and resolve concerns about the confidentiality of information. 3. The consultation shall provide Tribes a "reasonable opportunity" to: 1. identify their concerns about historic properties 11. advise on identification and evaluation of historic properties, including those of traditional religious and cultural importance 111. articulate its views on the undertaking's effects on such properties IV. participate in resolution of adverse effects 4. The process must respect Tribal sovereignty and represent the government-to-government relationship between Tribes and the federal government.[144] 5. Tribes may enter into an agreement with the agency regarding any aspect of Tribal participation in the review process.[145] 6. Finally, the agency is required to consult with the Tribal Historic Preservation Officer (THPO), "as appropriate," and provide the THPO or Tribe with the opportunity to review and concur with or object to the federal agency's findings and determinations.[146] The project should be paused until the BLM can satisfy its obligations under Section 106 to consult with all affected tribes, and the Memorandum of Agreement (MOA) between the BLM, Nevada State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation has been completed and is available for review. **C. Free, Prior, and Informed Consent[147]** As a procedural mechanism, mere consultation does not adequately equate with meaningful consent by Tribal Nations. International law is instructive where the laws of the United States fail to secure the rights of lndigenous Peoples and Tribes. The Supremacy Clause of the U.S. Constitution, Article VI, Clause 2 states: "This Constitution, and the Laws of the United States ... and all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby ... " Accordingly, international treaties that have been signed and ratified by the United States, such as the International Convention on the Elimination of All Forms of Racial Discrimination ("ICERD") (1994) and the International Covenant on Civil and Political Rights ("ICCPR") (1992), are binding law on the United States and carry the same weight as the Constitution itself. International law states that Indigenous Peoples have the right to Free, Prior and Informed Consent ("FPIC") concerning projects, laws, regulations, and other State actions that would affect them. FPIC is defined as a "framework for ensuring that the rights of Indigenous Peoples are guaranteed in any decision that may affect their lands, territories or livelihoods." FPIC "recognizes [I]ndigenous [P]eoples' inherent and prior rights to their lands and resources and respects their legitimate authority to require that third parties enter into an equaland respectful relationship with them based on the principle of informed consent. Procedurally, [FPIC] requires processes that allow and support meaningful choices by indigenous peoples about their development path." FPIC is intrinsically tied to the concept of self-determination: that "human beings, individually and as groups, are equally entitled to be in control of their own destinies." As stated in the Charter of the United Nations (United Nations 1945) (treaty ratified by the United States in 1945) and in Article 1 of the ICCPR, self-determination is to be provided to "all peoples." The Committee on the Elimination of Racial Discrimination ("CERD"), the monitoring body of the ICERD, issued General Recommendation 23 in 1997, noted that State parties should "ensure [that] Indigenous Peoples have equal rights in respect of effective participation in public life and that no decisions directly relating to their rights and interests are taken without their informed consent." The United Nations Declaration on the Rights of lndigenous Peoples ("UNDRIP"), adopted by the United Nations General Assembly in 2007 and recognized by the U.S. State Department as having both moral and political force, recognizes, is the clearest and most widely adopted articulation of FPIC. The U.N. Declaration speaks to the rights Indigenous Peoples hold via their unique status and the obligations country States must uphold those rights. Articles 19 and 32(2) state clearly that country States must engage in good faith and engage in these processes before projects are undertaken: **Art. 19** - States shall consult and cooperate in good faith with the Indigenous Peoples concerned through their own representative institutions in order to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them.	

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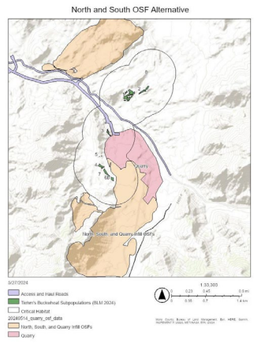
		Art. 32 - States shall consult and cooperate in good faith with the Indigenous Peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources. Most recently, in November 2023, the Human Rights Committee ("CCPR"), the monitoring body of the ICCPR, renewed its support and recommendations to the United States to facilitate and ensure the free, prior and informed consent of Indigenous Peoples in its concluding observations and stated: [The State party] should also ensure meaningful and good faith consultation with Indigenous Peoples, ensuring their active and effective participation, in order to obtain their free, prior and informed consent before adopting and implementing any measures that may substantially affect their rights, way of life and culture, including in related to infrastructure or development projects. Free, Prior and Informed Consent demands an ongoing exchange between a governing body-here, the United States-and directly impacted Indigenous Peoples and communities. This form of cooperation goes beyond Tribal consultation and must begin at the outset at the planning stages .. .Information provided to Indigenous Peoples and Tribal Nations must be done in a manner that is accessible with plain language that is commonly spoken by the Peoples in question and devoid of technical jargon. Indigenous Peoples have the right to withhold their consent for extractive projects such as the Rhyolite Ridge project. The United States and the BLM have not engaged in the free, prior and informed consent as they are obligated to under international law. [132] DEIS at 5-1. [133] What is Tribal Consultation, U.S. DEPARTMENT OF THE INTERIOR INDIAN AFFAIRS, https://www.bia.gov/service/tribal-consultations/what-tribal-consultation#what-defines-a-tribalconsulLa.lion- (last visited May 30, 2024). [134] BUREAU OF LAND MGMT., BLM MANUAL 1780 TRIBAL RELATIONS (P) (Dec. 2016) at 1-3 (hereinafter "Tribal Relations Manual"). [135] The BLM Tribal Relations Manual at 1-3 states that the BLM "recognizes each tribal government is unique in its views, concerns, and capacities," and that "[t]he BLM will endeavor to establish government-to-government relationships with each tribe that are responsive to the unique nature of each tribal government." [136] See id.; BUREAU OF LAND MGMT., BLM HANDBOOK (H) 1780-1, IMPROVING AND SUSTAINING BLM-TRIBAL RELATIONS (Dec. 15, 2016), https://www.bim.gov/sites/bim.gov/fiies/upioads/H-1780-1 0.pdf. [137] Presidential Memorandum for the Heads of Executive Departments and Agencies, Tribal Consultation and Strengthening Nation-to-Nation Relationships, 86 Fed. Reg. 7491 (Jan. 26, 2021), https ://www.federairegister.gov/documents/202 l/O 1 /29/2021-02075/tribal-consultationand-strenutJ1enim.?.-nalion-Lo-- nation -re la1ion hip [138] U.S. Dept. oflnterior & U.S. Dept. of Agriculture, Joint Secretarial Order on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters No. 3403 (Nov. 15, 2021), https://www.doi.gove/sites/doi.gov/files/elips/documents/so-3403-joint-secretarial-order-on-fulfilling-the-trust-responsibility-to-indian-tribes-in-the-stewardship-of-federal-lands-and-waters.pdf. [139] BLM Tribal Relations Manual at 1-14, 1-15. [140] 54 u.s.c. § 306108. [141] 36 C.F.R. § 800.2(c)(2)(ii). [142] ADVISORY COUNCIL ON HISTOR. PRES., CONSULTATION WITH INDIAN TRIBES IN THE SECTION 106 REVIEW PROCESS: THE HANDBOOK (2021). [143] 36 C.F.R. § 800.l(c). [144] 36 C.F.R. § 800.2(c)(2)(ii). [145] 36 C.F.R. § 800.2(c)(2)(ii)(E) (This agreement may specify a Tribe's geographic area of interest, types of projects they wish to be consulted on, or provide the Tribe with additional participation or concurrence in agency decisions under Section 106.) [146] 36 C.F.R. § 800.3(c)(3). [147] Language in this section was taken verbatim, with permission, from the comments submitted by the Water Protector Legal Collective on the Dakota Access Pipeline Lake Oahe Crossing Draft EIS - Reg. No. FRL OP-OFA-085.	
177	177.15	**VI. Conclusion** The Bishop Paiute Tribe appreciates this opportunity to provide comments to the BLM on the Draft Environmental Impact Statement. In short, the DEIS failed to apply the requisite detail that is required by NEPA. Due to the numerous failures and inadequacies, the Tribe recommends that the BLM make substantial revisions and additions to produce a proper DEIS which fully complies with the requirements of NEPA, the NHPA and other applicable federal and international laws. The Tribe specifically requests an opportunity to review and provide comment on the currently in-development "Memorandum of Agreement (MOA) between the BLM, Nevada State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation," and the "Historic Properties Treatment Plan." Meryl Picard Tribal Chairwoman Bishop Paiute Tribe CC: Honorary Tribal Council, Bishop Paiute Tribe Kody Jaeger, Chief Operations Officer, Bishop Paiute Tribe Brian Adkins, Environmental Director, Bishop Paiute Tribe Tribal Environmental Protection Agency, Bishop Paiute Tribe Darren Delgado, Tribal Historic Preservation Officer (THPO), Bishop Paiute Tribe Mia Montoya Hammersley, Director, Vermont Law & Graduate School Environmental Justice Clinic Attachment 1 – Application for Permission to Change Point of Diversion, Manner of Use and Place of Use of the Public Waters of the State of Nevada Heretofore Appropriated. Application No.'s 92732 and 92731	The Bishop Paiute Tribe was sent the Draft MOA on April 18, 2024 and July 10, 2024. The BLM sent an email on May 1, 2024 following up with the Bishop Paiute Tribe regarding receipt of the MOA and review. The HPTP was mailed to Bishop Paiute Tribe on June 12, 2024. The BLM will continue to coordinate with the Bishop Paiute Tribe. Table 5-1 in the Final EIS has been updated with additional consultation and coordination conducted.
Naomi Fraga – June 3, 2024			

Comment Letter No.	Comment Number	Comment	Response
178	178.1	To whom it may concern, On behalf of 100 scientists, I am submitting a letter regarding the Rhyolite Ridge Lithium-Boron Project draft EIS and associated impacts to Tiehm's buckwheat. Thank you for the opportunity to comment. Sincerely, Naomi Fraga	Comment noted.
178	178.2	June 3, 2024 U.S. Bureau of Land Management (BLM) 50 Bastian Road Battle Mountain, NV 89820 BLM_NV_BMDO_P&EC_NEPA@blm.gov Re: Rhyolite Ridge Lithium-Boron Mine EIS and Impacts to Tiehm's buckwheat To BLM Officials: We, the undersigned scientists, are writing to express our deep concern regarding the Draft Environmental Impact Statement (DEIS) for the Rhyolite Ridge Mine, proposed by Australian mining company Ioneer. The Mine will cause significant impacts up to and including the potential extinction of Tiehm's buckwheat (*Eriogonum tiehmii*), a rare plant species endemic to the Silver Peak Range in Esmeralda County Nevada. No mitigation measures will sufficiently address these impacts to appreciably reduce the risk of extinction. We are opposed to this mine moving forward within or directly adjacent to the designated critical habitat of this rare and endangered plant. The BLM must select the No Action Alternative to prevent its extinction. *Eriogonum tiehmii* is a single-site endemic that occurs on just 10 acres of public land. It has one of the most restricted ranges and specific habitats of any plant in Nevada. The entirety of E. tiehmii habitat lies within the project area for Rhyolite Ridge Mine. On December 16, 2022, the U.S. Fish and Wildlife Service listed E. tiehmii as endangered under the U.S. Endangered Species Act and 910 acres of critical habitat was designated to protect it. The critical habitat is defined as areas with physical or biological features essential to the conservation of the species. The primary threat identified is the curtailment of its habitat and range from mineral exploration and development due to the Rhyolite Ridge Mine. The agency preferred alternative in the Rhyolite Ridge Mine DEIS, also called the North and South OSF Alternative, includes the construction of a 200-acre, 960-foot deep open pit; over 1,200 acres of waste rock dumps; a sulfuric acid processing plant; a dewatering well field; and extensive ancillary facilities and infrastructure. A haul road would have over 1,000 one-way truck trips per day moving material out of the pit. All of this activity would be within a few dozen to a few hundred feet of five of the eight subpopulations of Eriogonum tiehmii that constitute over 60% of the global population (Figure 1). The pit, haul road, and waste rock dump would directly and irreparably destroy 22% of the designated critical habitat for Eriogonum tiehmii. This would result in a significant loss of pollinator habitat, which is essential for the conservation of E. tiehmii. However, the preferred alternative would in all actuality degrade the entirety of the critical habitat to the point that it would no longer support the conservation of E. tiehmii. The haul road and the wall of the open pit come within 15 feet of E. tiehmii populations. Putting mine infrastructure in such close proximity to the plant is putting it on a path to extinction.  **Figure 1**: Tiehm's buckwheat and proposed mine plan elements in the agency preferred alternative from the DEIS. Map credit: Naomi Fraga; data courtesy of BLM. Dust deposition is a major concern. Over 1,000 truck trips per day on the haul road, and numerous other vehicle and machinery trips around the mine site which were not documented in the DEIS, will produce substantial dust. Ioneer's dust control techniques are speculative and will cause adverse impacts to the native habitat – they propose to deposit up to 400 inches of water per year on the haul road, sending a water truck every 25 minutes. This will provide a substantial vector for invasive plant species, and potentially destabilize the slope. And if the dust control measures fail to be as effective, E. tiehmii and its pollinator habitat would be coated in a thick layer of mine dust that would impact plant health by limiting reproduction, reducing light availability, CO_2 uptake, and photosynthetic capacity.	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat in Section 4.12 and 4.20.12.3. The impact analysis includes consideration of dust deposition and proximity to the pit and other facilities. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the Endangered Species Act, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.

Comment Letter No.	Comment Number	Comment	Response
		The stability of the pit wall is also a significant concern. Eriogonum tiehmii populations are perched within a few dozen feet of the lip of the open pit, but experience at other mines shows that pit wall failure and erosion rates often result in areas hundreds of feet from a pit wall eventually eroding into the pit. Whether in just a few years or whether across the centuries, the preferred alternative will inevitably result in E. tiehmii ending up at the bottom of an open pit. In general, proximity to a large industrial open-pit mining operation will cause detrimental impacts to a highly specialized and narrowly endemic species like Eriogonum tiehmii. Studies have found that geographic range size may play an outsized role in determining extinction risk, suggesting that reductions in geographic range size and available habitat can lead to pronounced increases in extinction risk even if local populations are relatively large. This magnitude of impact would compromise and fundamentally alter habitat integrity, pollination, and dispersal which is further exacerbated by the species' limited habitat availability (e.g. suitable soil) and inherent poor dispersal capabilities, ultimately affecting the long-term survival of the species. The Endangered Species Act requires that BLM not take any actions which jeopardize the continued existence of a listed species, nor adversely modify its critical habitat (50 CFR §402). The best available science demonstrates that the agency preferred alternative mine plan, through direct destruction of 22% of the critical habitat and complete degradation of the remaining 78% of the critical habitat, will both jeopardize the continued existence of Eriogonum tiehmii and adversely modify its critical habitat. On behalf of the many people who study, work with, and love plants everywhere we urge the BLM to use the best available science and to select the No Action Alternative and not to allow this mine to move forward as proposed to ensure that Tiehm's buckwheat is not adversely impacted and can continue to survive and thrive in its habitat where it has lived for millenia. Sincerely, Naomi Fraga, Ph.D., California Botanic Garden, Claremont, CA; Peter H. Raven, Ph.D, Missouri Botanical Garden, St. Louis, MO; Ben Grady, Ph.D., Ripon College President, Eriogonum Society Ripon, WI; Mary O'Brien, Ph.D., Project Eleven Hundred, Castle Valley, Utah; Amanda Fisher, Ph.D., California State University, Long Beach, Long Beach, CA; Peter Breslin, Ph.D., University of Arizona, Tucson, AZ; Kristen Hasenstab-Lehman, Ph.D., Santa Barbara Botanic Garden, Santa Barbara, CA; Katherine Waselkov, Ph.D., California State University, Fresno, Fresno, CA; Seema Sheth, Ph.D., North Carolina State University, Raleigh, NC; Joan Dudney, Ph.D., University of California, Santa Barbara, Santa Barbara, CA Carrie Kiel, Ph.D., California Botanic Garden, Claremont, CA; Thomas J. Rosatti, Ph.D., University of California, Berkeley, Berkeley, CA; Susan Fawcett, Ph.D., University of California, Berkeley, Berkeley, CA; Colin Hoag, Ph.D., Smith College, Northampton, MA; Rosa Cerros-Tlatilpa, Ph.D., Universidad Autónoma del Estado de Morelos, Cuernavaca, Morelos, Mexico; Guy Nesom, Ph.D., Academy of Natural Sciences, Philadelphia, Philadelphia, PA; Rachel Martin, Ph.D., University of California, Irvine, Irvine, CA; Barbara Brydolf, Ph.D., California Native Plant Society, Springville, CA; James Ojascastro, Ph.D., Missouri Botanical Garden, St. Louis, MO; Ingrid Jordon-Thaden, Ph.D., University of Wisconsin Madison, Madison, WI; Christopher Moore, Ph.D., Colby College, Waterville, ME; Leif Richardson, Ph.D., The Xerces Society for Invertebrate Conservation, Riverside, CA; Clarissa Rodriguez, Ph.D., San Diego State University Research Foundation, La Mesa, CA; Grant Godden, Ph.D., University of Florida, Gainesville, FL; Hollis Woodard, Ph.D., University of California, Riverside, Riverside, CA; Laura Foster Huenneke, Ph.D., Northern Arizona University (emeritus), Flagstaff, AZ; Loraine K. Washburn, Ph.D., Colby College, Waterville, ME; Jessamine Finch, Ph.D., Native Plant Trust, Wayland, MA; Brent Mishler, Ph.D., University of California, Berkeley, Berkeley, CA; Bruce MacBryde, Ph.D., BioConservation Support, Drake, CO; Erika Moore-Pollard, Ph.D., University of Memphis, Memphis, TN; Marc Baker, Ph.D., Arizona State University, Tempe, AZ; Dylan Cohen, Ph.D., Chicago Botanic Garden, Chicago, IL; Steven Crum, Ph.D., Rogue Community College, Grants Pass, OR; Marion Andrews Holmes, Ph.D., Chatham University, Pittsburgh, PA; Dr. Patricia Holmgren, Ph.D., New York Botanical Garden, retired, Logan, Utah; Denise Knapp, Ph.D., Santa Barbara Botanic Garden, Santa Barbara, CA; C. Matt Guilliams, Ph.D., Santa Barbara Botanic Garden, Santa Barbara, CA; Isaac Lichter Marck, Ph.D., California Academy of the Sciences, San Francisco, CA; Isabela Lima Borges, Ph.D., Santa Barbara Botanic Garden, Santa Barbara, CA; Heather Schneider, Ph.D., Santa Barbara Botanic Garden, Santa Barbara, CA; Erika Moore-Pollard, Ph.D., University of Memphis, Memphis, TN; Lea Richardson, Ph.D., California State University Northridge, Glendale, CA; Jacqualine Grant, Ph.D., Utah Native Plant Society, Salt Lake City, Utah; Emily Roberson, Ph.D., Native Plant Conservation Campaign, San Francisco, CA; Robert Douglas Stone, Ph.D., Consulting botanist, Sacramento, CA; David Zaber, Ph.D., Homewood, IL; Cheryl Crowder, Ph.D., Los Angeles, CA; Sula Vanderplank, Ph.D., San Diego, CA; Nick Jensen, Ph.D., Sacramento, CA; Kristina Gill, Ph.D., Cambria, CA; Trevor Faske, Ph.D., Flagstaff, AZ; Marko Spasojevic, Ph.D., Riverside, CA; Robert Steers, Ph.D., Corte Madera, CA; Jared Meek, M.S., Columbia University, New York, NY; Kristen Nelson, M.S., California Native Plant Society, San Luis Obispo, CA; Evan Frost, M.S., Wildwood Consulting LLC, Bishop, CA; GT Wharton, M.S. Johns Hopkins University, Baltimore, MD; Diana Cosand, M.A., Chaffey College, Rancho Cucamonga CA; Steve Schoenig, M.S., University of California – Davis, Davis, CA; Alexandra Seglias, M.S., Denver Botanic Gardens, Denver, Colorado; Maria Jesus, M.S., California Botanic Garden, Bishop, CA; Ileene Anderson, M.S., Center for Biological Diversity, Los Angeles, CA; Sheryl Creer, M.S., San Francisco State University, San Francisco, CA; Matt Wang, M.S., Santa Barbara Botanic Garden, Santa Barbara, CA; Margriet Wetherwax, M.S., UC/Jepson Herbarium, Berkeley, CA; Joy England, M.S., California Botanic Garden, Claremont, CA; Laura K Hollister, M.S., Turlock Unified School District, Turlock, CA; Sonia Nosratinia, M.S., University of California, Berkeley, Berkeley, CA; Barbara Keller, M.S., University of California, Berkeley, retired, Berkeley, CA; Michelle Balk, M.S., San Diego Botanic Garden, Encinitas, CA; Sophia Warsh, M.S., University of California Botanical Garden at Berkeley, Berkeley, CA; Morgan A. Stickrod, M.S., San Francisco State University, San Francisco, CA; Kevin Alison, M.S., Catalina Island Conservancy, Avalon, CA; Brianna Collis, M.L.A., Consulting botanist, British Columbia, Canada; Lyell Buttermore, M.S., Consulting biologist, Oceanside, CA; Nina House, M.S., Berkeley, CA; Saskia Raether, M.S., Berkeley, CA; Selena Vengco, M.S., San Jose, CA; Nathaniel Raizen, M.S., Dublin, CA; Sarah Ratay, M.S., Silver Lake, OR; Imeña Valdes, M.S., Chicago, IL; Sarah Canham, M.S., Bend, Oregon; Christina Feng, M.S., Carbondale, IL; Eli Balderas, M.S., San Luis Obispo, CA; Jane Cipra, M.S., Eureka, CA; Frances Grace Stark, Ph.D. candidate, University of California – Berkeley, Berkeley, CA; Duncan S. Bell, B.S., California Botanic Garden, Claremont, CA; Holly Forbes, B.A., University of California, Berkeley Botanic Garden, Berkeley, CA; Michelle Cloud-Hughes, B.S., Desert Solitaire Botany and Ecological Restoration, San Diego, CA; David Greenberger, B.S., California Native Plant Society, Oakland, CA; Daniel R. Patterson, B.S., US Department of Interior, retired, Boulder City, NV; Jeremy Bugarchich, B.S., San Diego Botanic Garden, San Diego, CA; Annie Ayers, B.S., Santa Barbara Botanic Garden, Santa Barbara, CA; Aaron Sims, B.S., California Native Plant Society, Weaverville, CA; Hannah Swarthout, B.S., Consulting biologist, Encinitas, CA; Marina Lavender, B.A., Consulting biologist, San Diego, CA; Michael Heine, B.S., Field botanist, Felton, CA; Tristan Ray, B.S., Consulting biologist, San Juan Capistrano, CA; Dylan Neubauer, B.S., Santa Cruz, CA.	
State of Nevada Assembly, District 40 – June 3, 2024			
179	179.1	May 31, 2024 Bureau of Land Management Scott Distel, BLM Project Manager 50 Bastian Road Battle Mountain, Nevada 89820	The EIS contains detailed analysis of environmental impacts associated with the Project and considers the implementation of ACEPMs to reduce impacts. Economic impacts are described in Section 4.10.

Comment Letter No.	Comment Number	Comment	Response
		RE: Rhyolite Ridge Lithium-Boron Mine Project Dear Bureau of Land Management, I am writing to express my strong support for the Rhyolite Ridge Lithium-Boron Project in Esmeralda County, Nevada, being developed by Rhyolite Ridge LLC. This project presents a significant opportunity for sustainable development and economic growth, not only for the local community but also for the broader region and the nation. The Rhyolite Ridge project is particularly important due to its potential to supply a substantial amount of lithium, a critical element in the production of batteries for electric vehicles and renewable energy storage systems. As the world transitions to cleaner energy sources, the demand for lithium is projected to increase significantly. This project positions the United States as a key player in the global lithium supply chain, reducing dependency on foreign sources and enhancing national security. Moreover, the inclusion of boron extraction in this project adds further value, as boron is essential in various industrial applications, including agriculture, glass production, and advanced materials. The dual extraction approach maximizes the resource utilization and minimizes waste, aligning with principles of environmental stewardship. Rhyolite Ridge LLC has demonstrated a commitment to responsible mining practices, incorporating comprehensive environmental management plans to mitigate potential impacts. The use of advanced technologies and sustainable practices in the project design ensures minimal disruption to the surrounding ecosystem and water resources. Additionally, the company's engagement with local communities and stakeholders highlights its dedication to social responsibility and economic development in Esmeralda County. The economic benefits of the Rhyolite Ridge project are significant. It is expected to create numerous job opportunities during both the construction and operational phases, providing a much-needed boost to the local economy. Furthermore, the infrastructure improvements and ancillary businesses stimulated by this project will have long-lasting positive effects on the region's development. In conclusion, the Rhyolite Ridge Lithium-Boron Project is a forward-thinking initiative that aligns with national priorities for sustainable energy and economic resilience. I urge the Bureau of Land Management to approve and support this project, recognizing its potential to contribute substantially to both local and national interests. Thank you for considering my comments. I look forward to the successful advancement of this vital project. Sincerely Philip "PK" O'Neill Nevada Assembly, District 40	
Nevada State Clearinghouse – June 3, 2024			
186	186.1	Attached please find a copy of the comments received through the Nevada State Clearinghouse for BLM EIS Rhyolite Ridge Lithium-Boron Mine Project - Esmeralda County (Clearinghouse ID: E2024- 290). If you have any questions or need any additional information about these comments please feel free to contact me. Thank You Kevin Wichman Nevada State Clearinghouse Department of Conservation and Natural Resources	Comment noted.
186	186.2	Comment # 1 From: Brendon Grant Agency: Nevada Division of Environmental Protection NDEP Title: Phone: 7756879524 Email: bgrant@ndep.nv.gov Date Received: 05/14/2024 If this mine will serve at lease 25 of the same persons six months out of the year, it will need to be permitted as a Non-Transient Non-Community (NTNC) public water system by the Bureau of Safe Drinking Water (BSDW). Prior to construction of any water system infrastructure, plans and specification shall be reviewed and approved by BSDW. Please contact Brendon Grant at 775 6879524 or bgrant@ndep.nv.gov regarding any public water system questions.	The NTNC permit has been added to the list of required permits in EIS Appendix B.
186	186.3	Comment # 2 From: AJ Jensby Agency: Nevada Division of Water Resources Title: Supervisor III Associate Engineer Phone: 7756842887 Email: ajjensby@water.nv.gov Date Received: 05/24/2024 *See Attached*	Comment noted. The EIS acknowledges that implementation of the Proposed Action would require authorizations from other federal, state, and local agencies with jurisdiction over certain aspects of the Project. Approvals of water rights, change applications, and permits to construct dams are identified as required approvals in Appendix B of the EIS.

Comment Letter No.	Comment Number	Comment	Response
		DATE: 5/24/2024 Division of Water Resources **Nevada SAI # E2024-[290]** Project: BLM EIS Rhyolite Ridge Lithium-Boron Mine Project - Esmeralda County ☐No comment on this project ☒Proposal supported with comments AGENCY COMMENTS: **NRS – Nevada Revised Statutes** **NAC – Nevada Administrative Code** **General:** Compliance with Nevada water law is required. All waters of the State belong to the public and may be appropriated for beneficial use pursuant to the provisions of NRS Chapters 533 and 534 and not otherwise. Water shall not be used from any source unless the use of that water is authorized through a permit issued by the State Engineer. For underground sources, certain uses of water may be authorized through the issuance of a waiver pursuant to NRS Chapter 534 and NAC Chapter 534. Any surface or underground water developments constructed and utilized for a beneficial use must be done so in compliance with the referenced chapters of the NRS. The basin in which the project is located is a designated basin pursuant to NRS 534.030. The State Engineer is authorized to make rules, regulations, and orders when groundwater is being depleted in the designated area. Orders 704, 1220, 1221, and 1223 were issued establishing rules for the Fish Lake Valley Hydrographic Basin 117. **Water for Construction Projects:** Any water used on the described lands for the project for any manner of use shall be provided by an established utility or under permit or temporary change application or waiver issued by the State Engineer's Office with a manner of use acceptable for suggested project's water needs. **Water Rights Ownership:** Any ownership transfer of water rights shall be sufficiently documented through a chain of title and a report of conveyance submitted to the State Engineer's Office as provided by NRS 533.384. The State Engineer is authorized and is responsible for maintaining water right files and accompanying documents as per NRS Chapters 111, 240, 375, 532, 533 and 534. **Wells:** All wells must be noticed, drilled, constructed, and plugged in accordance with NRS Chapter 534 and NAC Chapter 534, and the work must be completed by a licensed well driller as provided by NRS Chapter 534. Pursuant to NRS Chapter 534 and NAC Chapter 534A, a water right or waiver is required prior to drilling a well in a designated basin. A waiver to drill a well must comply with the provisions of NRS Chapter 534 and NAC Chapter 534 and the terms of the waiver approval. The use of water issued under a waiver must comply with the provisions of NRS Chapter 534 and NAC Chapter 534 and the terms of the waiver approval. (oil, gas, geothermal, or mineral exploration other than dissolved mineral exploration). Monitoring wells require a waiver from the State Engineer's Office pursuant to NRS Chapter 534 and NAC Chapter 534 and must comply with the provisions of NAC Chapter 534. All replacement wells shall comply with NRS Chapter 534 and NAC Chapter 534. The replaced well must be plugged and abandoned as required in NAC Chapter 534. Any unauthorized or unpermitted drill holes/wells (water wells, monitor wells or geotechnical soil borings) that may be located on existing, acquired or transferred lands, are ultimately the responsibility of the owner of the property and must be plugged and abandoned as required in NAC Chapter 534. Abandoned wells need to be reported to the State Engineer's Office and must be plugged in accordance with NAC Chapter 534. If artesian conditions are encountered in any well or borehole it shall be controlled as required by NRS Chapter 534 and NAC Chapter 534 and plugged in accordance with NAC Chapter 534. **Geotechnical Soil Borings:** All geotechnical soil borings must be drilled, constructed, plugged, and reported in accordance with NRS Chapter 534 and NAC Chapter 534; borings must be plugged within sixty (60) days after being drilled. **Dewatering:** Dewatering for alleviation of hazards caused by the rise of ground water from secondary recharge is provided by the provisions of NRS 534.025, NRS 534.050(2), and NAC 534.448.	

Comment Letter No.	Comment Number	Comment	Response
		Dams: Any impoundments, dams, or diversion structures must comply with the provisions of NRS Chapter 535 and NAC Chapter 535. Any person proposing to construct, reconstruct, or alter in any way any dam must comply with the provisions of NRS Chapter 535 and NAC Chapter 535. The removal or decommissioning of a dam requires approval of an application and plans for the decommissioning of the dam pursuant to NAC 535. **Mining:** If the mining process encounters a water source, whether that source is spring water or groundwater, any and all necessary permits to account for the water loss shall be applied for and issued by the State Engineer for the duration of the project and after the life of the mine. This includes but is not limited to evaporative losses related to pit lakes. Dissolved mineral resource exploration must comply with NAC Chapter 534B.	
Michael Ketterer – June 4, 2024			
187 and 188	187.1 and 188.1	Comments of Michael E. Ketterer, PhD on the proposed Rhyolite Ridge Lithium-Boron Project DOI-BLM-NV-B20-2021-0020-EIS I have reviewed the EIS for this proposed project in Esmeralda County, NV. The project will entail disturbance of 7166 acres (more than 10 square miles) near SR 264. The document estimates the following annual particulate matter emissions: PMtotal = 2900 tons per year; PM10 = 1278 tons per year; PM2.5 = 228 tons per year. My remarks concern the anticipated particulate emissions and their impact upon air quality in western Nevada and in particular, on the lands of the Western Bands of the Shoshone Nation of Indians. US Government research and that conducted by additional parties all indicates that this location, near the Nevada Test Site, will contain elevated activities of radionuclides in the surface soil from 1951-1962 above ground tests conducted at NTS. The radionuclides include plutonium-239, plutonium-240, cesium-137, and strontium-90. Each of these radionuclides is dangerous to humans for very long periods of time. The plutonium isotopes are most dangerous when inhaled, and this will be the exposure route to humans, owing to the enormous land surface disturbances. The proposal involves development of 7166 acres of presently undisturbed desert land; much of the NTS fallout contained on the disturbed areas will become entrained into the air and dispersed regionally, affecting population living in the region. Examples of how fallout radionuclides from the NTS were dispersed throughout the southwest are given in the following papers: Cizdziel et al., 1998, Plutonium anomalies in attic dusts and soils at locations surrounding the Nevada Test Site, https://doi.org/10.1016/S0045-6535(98)00107-6. Cizdziel et al., 1999, Resolving Nevada Test Site and global fallout plutonium in attic dust and soils using 137Cs/239+240Pu activity ratios, Health Physics 77(1): p 67-75, July 1999. Cizdziel et al., 2007, 239,240,241Pu fingerprinting of plutonium in western US soils using ICPMS: solution and laser ablation measurements, https://doi.org/10.1007/s00216-007-1741-x. Simon et al., 2004, The geographic distribution of radionuclide deposition across the continental US from atmospheric nuclear testing, https://doi.org/10.1016/j.jenvrad.2004.01.023. The maps shown in the Simon et al. (2004) study clearly show that the Rhyolite Ridge project is located well within the NTS-affected zone. Disturbance of this land will generate dust clouds that will impact local communities. The quantities of PM released into the air are not small, and their impacts on regional residences needs to be reconsidered.	The surface disturbance under the Proposed Action (2,306 acres) and North and South OSF Alternative (2,271 acres) is detailed in EIS Sections 2.1 and 2.2. According to the EPA (https://www.epa.gov/radtown/radioactive-fallout-nuclear-weapons-testing#about-radioactive-fallout-from-nuclear-weapons-testing), "fallout typically contains hundreds of different radionuclides… Very little radioactivity from weapons testing in the 1950s and 1960s can still be detected in the environment now… The EPA maintains a system of radiation monitors throughout the United States. These monitors were originally designed to detect radionuclides that were released after a nuclear weapon detonation… Since the end of aboveground nuclear weapons testing, the day-to-day radiation in air readings from monitoring sites has fallen. For many years, analysis of air samples has shown risk levels far below regulatory limits. In fact, results are now generally below levels that instruments can detect." Section 2.1.13.2 of the EIS includes commitments of Ioneer for managing dust, including implementation of fugitive dust control per Bureau of Air Control. Additionally, fugitive dust would be controlled on roadways and other areas of disturbance with water or NDEP/BLM-approved dust suppressants, where appropriate. Fugitive emissions at the crusher and material drop points would be minimized through application of water sprays or other dust control measures as per accepted industry practice and permit stipulation. Disturbed areas would be seeded with an interim seed mix developed in conjunction with the BLM to minimize fugitive dust emissions from exposed, unvegetated surfaces.
Ken Moss – May 18, 2024			
190	190.1	Good Evening, I would like to add to the public comment on Ioneer's project in Nevada, i do make disclosure that i am an active investor in this area .Firstly i am very impressed by Ioneer's work with BLM to protect Tiems Buckwheat , to firstly propagate and protect it they have done a first class job .This project and it's location is critical to the USA in it's fight to detach itself from reliance on China , the wealth and growth it will bring to Nevada should not be understated .I would urge BLM not to be swayed by activist groups that are anti mining rather than pro conservation, if this project does not go ahead what will they do to protect it? I look foward to the coming record of decision. Yours Sincerely Ken Moss	Comment noted.
Jack Hamm – April 22, 2024			
191	191.1	Sirs: This is to voice support for the Rhyolite Ridge project. America needs lithium and boron (and many other elements such as copper, iron, nickel, aluminum, gravel etc.) in order to supplement, continue and improve our society and related standard of living. We cannot depend on foreign sources to supply our needs, if that is even possible. The Rhyolite Ridge mining and all attendant recovery facilities must be allowed to be developed. Thank you for this opportunity to comment. Jack C. Hamm	Comment noted.
Chris Earle – May 24, 2024			
192	192.1	BLM should deny the permit for the Rhyolite Ridge Lithium-Boron Project. This permit denial is necessary due to an inadequate and conclusory environmental analysis, presented in the project's draft Environmental Impact Statement (DEIS) that misrepresents impacts to the Tiehm's Buckwheat (Eriogonum tiehmii),	The EIS includes detailed analysis of effects to Tiehm's buckwheat and designated critical habitat in Section 4.12 and 4.20.12.3. The effects analysis considers impacts from surface disturbance, changes to soil characteristics, invasive plants, herbivory, impacts to pollinators, and herbicide drift. Additional

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		a plant listed as endangered under the Endangered Species Act (ESA). Impacts would occur affecting both individual plants (incidental take), and its designated critical habitat. Moreover, due to the inadequacy of the DEIS, neither impacts nor mitigation have been specified with sufficient detail to substantiate the DEIS conclusion that the project the avoids and minimizes impacts to buckwheat and its designated critical habitat. Impacts affecting individual plants are treated in the "Threatened and Endangered Species Supplemental Environmental Report Rhyolite Ridge Lithium-Boron Project" and its appendices, presented at https://eplanning.blm.gov/public_projects/2012309/200540745/20108286/251008286/13_rr_ser_tes_20240415_508.pdf. As not all parts of this document are paginated, page references in these comments refer to the PDF file page numbering. The proposed alternative described in the project's draft Environmental Impact Statement would directly affect over 354 acres designated critical habitat for the Tiehm's Buckwheat (page 38). Although a portion of this area would eventually be "reclaimed", over 257 acres of impacts would last for an extended period of time, during which that habitat would be unavailable for colonization by the species. Such habitat availability is necessary if the species is to recover from its Endangered status. Moreover, the "reclaimed" habitat would not resemble the impacted habitat and no evidence is presented that it would remain suitable for the species. On the contrary, the alterations to the habitat (pages 38-39) would include conversion from a shrub to an herb community, decimation of soil microbial populations, introduction of saline and alkaline materials, introduction of new plant species not currently found on the site, changed patterns of herbivory (a known factor in the species' health), altered pollinator relationships, and incidental effects of herbicide applications targeted to invasive species. None of these impacts are discussed in the analysis, which simply leaps to a conclusory determination that impacts would be negligible to major, long-term to permanent, and localized. The potential for major, permanent impacts is especially concerning given that the entire extent of Tiehm's buckwheat is localized, occurring within the project vicinity, and that the project would substantially reduce connectivity between the extant populations, and thereby reduce the potential for seed dispersal to either maintain existing populations or establish new ones. This indicates a substantial risk that the project would jeopardize the continued existence of Tiehm's buckwheat, leading to its extinction. These concerns and many others have been cited by the U.S. Fish and Wildlife Service (USFWS) in their prior communications with BLM and the permit applicants, noting that many of their comments on draft DEIS text have not been addressed, including (page 89) inadequate discussion of how the project will minimize and mitigate grounddisturbing activities in critical habitat; statement of specific threshold criteria to trigger specific actions to reduce impacts; monitoring methods to assess exceedance of threshold criterial; reclamation and restoration plans are vague; and impact minimization measures are vague. USFWS (page 89) also notes that important available information is not used, thus the project is not meeting the NEPA standard of using "best available science", further evidence that the environmental analysis is conclusory and actions based upon this analysis are arbitrary and capricious. Sincerely, Christopher J. Earle	details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
Derick Unger – May 23, 2024			
193	193.1	All, I strongly support the development of the Rhyolite Ridge Project. Developing domestic supplies of metals, rather than relying on foreign suppliers, is critical to national security and transitioning to green energy. Denying a project such as this is simply exporting pollution to a foreign country with weaker environmental standards and supplying money to foreign countries that may be hostile toward the US and our interests. Regards, Derick -- Derick Unger, CPG Geologist	Comment noted.
Edward Wells – May 22, 2024			
194	194.1	Statement in Support of the Rhyolite Ridge Mine Development May 22, 2024 Whereas: The Rhyolite Ridge mine would be an important and sustained boost to the local and regional economy, help lessen the nation's dependence on imported minerals and oil and would probably encourage and lead to other similar developments, I am strongly in favour of the project. It also appears that mitigation of the impact on the endangered Tiehm's buckwheat plant and habitat is already underway and that it will be an effective solution to the problem. Cordially Yours, Edward Wells	Comment noted.
Ken Brook – May 22, 2024			
195	195.1	Please consider this message a very POSITIVE vote for letting Rhyolite Ridge go into production. They have shown AMAZING patience in dealing with all of the obstacles and the bureaucracy of permitting. The have also shown a great willingness to protect the plant everyone is so concerned about. regards Ken Brook	Comment noted.

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Jeanne Goss – May 22, 2024			
196	196.1	I am excited to hear that the BLM is moving forward with this “green” mining project in my home state! We should be proud to be responsibly mining resources on our soil instead of relying on other countries to fill our needs. Cheers, Jeanne	Comment noted.
Mac Jackson – May 22, 2024			
197	197.1	Ioneer’s Rhyolite Ridge Lithium-Boron Project should be supported and fast tracked through the permitting process. It is an important resource for energy transition, local and national economy. On the local level, it will be a huge boost to a depressed area. Regards, Mac Jackson Mac Jackson Jackson Exploration Series LLC	Comment noted.
Foster Wilson – May 21, 2024			
198	198.1	boron and lithium are critical elements, let's quit the hand wringing and get this site permitted thanks Foster Wilson	Comment noted.
Robert Schafer – May 21, 2024			
199	199.1	It would be the height of government hypocrisy if this project is not permitted to go to production. Nevada and the US need a mine like this. Robert W. Schafer Salt Lake City, UT	Comment noted.
Jade Roubideaux – May 17, 2024			
200	200.1	Hello In 4.2 Cultural Resources, section 4.2.1 Proposed Action, towards the end of the section, it states that there will be 100 sites destroyed during the process of this operation. What sites does this entail? The document wasn't exactly clear about which 100 sites out of those described would be destroyed. The North and South OSF Alternative doesn't have a much better plan and still proposes that a majority of the sites would be destroyed. The No Action Alternative sounds much better overall, as we prefer that cultural sites be left alone and not disturbed. So, again, out of the sites described in this section, what sites are to be destroyed? The non-disturbance preference is noted throughout the other sections of Cultural Resources and Native American Traditional Values. But the above noted section did not follow the other sections. Sincerely, Jade Roubideaux Cultural Preservation Director Shoshone-Paiute Tribes	The specific details of cultural sites is intentionally excluded from the EIS and supporting documents to avoid illegal collection or vandalism. The 100 sites referenced are those that were determined not eligible for the NRHP.
Mike Neumann – May 13, 2024			
201	201.1	As a biologist who has spent 40 years helping mining companies plan and permit mineral projects throughout the west I know that modern mines can be and are operated in ways that minimize environmental impacts. Unlike mines in many other countries, all mines on federal lands in the US are subject to a comprehensive umbrella of environmental laws and reviews that protect ecological resources to the extent possible. My opinion is that the Rhyolite Ridge project as described in the DEIS can help reduce American dependence on foreign suppliers of critical materials essential to modern life and a healthy economy in the US. For those reasons I advocate expeditious completion of the NEPA review for this project. Sincerely, Michael Neumann	Comment noted.
Edward Gates – May 26, 2024			
203	203.1	To Whom It May Concern, I am completely behind the Rhyolite Ridge Lithium-Boron Project. I grew up in Mina, Nevada, just a few miles north of the project. I believe that this will be an important asset for the region, state and country. Good-paying jobs will always be a great benefit. We need to bolster the domestic production of battery metals, and this is a perfect place to do it. Sincerely, Edward E. Gates Professional Geologist	Comment noted.
Acid Piping Technology – May 7, 2024			
205 and 206	205.1 and 206.1	To Whom it May Concern: We here at Acid Piping Technology in Arnold, Missouri - USA - are in full support of the Rhyolite Ridge Lithium-Boron Project for a variety of reasons.	Comment noted.

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		The United States of America as a country has learned recently that we can no longer depend on foreign sources of supply for our basic needs. We learned this during COVID, and with all of the conflicts currently going on around the world, it is now more important than ever that the United States of America has our own domestic sources of critical items such as computer chips and essential chemicals required for our needs. The mining of lithium and boron in the United States will be critical for us in the development of lithium batteries for the emerging electric vehicle market coming in the near future. The Rhyolite Ridge Lithium-Boron Project will be absolutely essential in our efforts to obtain self-sufficiency in regards to the lithium battery requirements that our nation will be experiencing very soon. As a result, we are 100% in favor and in support of this Rhyolite Ridge Lithium- Boron endeavor! Best Regards, Chuck Lindley	
Douglas McGibbon – June 7, 2024			
208	208.1	Douglas H. McGibbon 5075 Weikel Drive Winnemuccca NV 89445 Mr. Scott Distel Project Manager US Bureau of Land Management Battle Mountain District 50 Bastian Road Battle Mountain, NV 89820 Dear Mr. Distel, This letter is written in support of permitting loneer's Rhyolite Ridge Lithium-Boron Project in Esmeralda Co. NV. I am a consulting Economic Geologist and a resident of Nevada from 1979-present. I am familiar with lithium deposits in general and have reviewed the DEIS and news related to the project since development activities were initiated. I support development of the mine for the following reasons: • loneer has committed to mining in an environmentally responsible manner, with little impact on the land, ground water and the endangered Tiehm's buckwheat plant. • The unique characteristics of the Rhyolite Ridge deposit will allow for extraction of lithium using much less water when compared with other lithium deposits and most other metal mines. • The recovery of lithium from the mineralized rock will be by a vat-leaching process with no leach pads, tailings ponds or tailings dams, and therefore ground water contamination is minimized. • A weak sulfuric acid solution, that is required to dissolve lithium from the ore will be produced on site. The heat produced as a by-product of sulfuric acid production will supply more than enough energy to power the entire operation for the life of the mine, making it independent of Nevada's power grid. • Currently, the US depends almost entirely on importing lithium, mainly from Argentina, Chile, China and Russia, making our country dependent on imports from generally unreliable nations, thus creating a supply chain which can be interrupted at any time. Production of the lithium and boron from the Rhyolite Ridge deposit will provide a reliable domestic supply chain for materials needed to boost domestic production of batteries for a cleaner, more energy efficient future. • The European Union, Canada, Australia and China have all listed lithium as critical to energy needs of their own nations, resulting in a reduction of their exports of lithium, and an increase in worldwide competition for this critical mineral. • Once the project is in production, it will increase domestic lithium production by 400% and provide enough lithium to power approximately 370,000 vehicles per year for at least 20 years. • The Boron produced from this project will be used in items such as touch screens for smart phones and computers and in the production of semiconductors, medicinal grade glass vials, abrasives, cleaning products, insecticides, and insulation. • The financial impact on Nevada and Esmeralda County will be significant. The project will employ up to 500 people during the construction phase, and then 350 people throughout the life of production. The median annual income of loneer's employees, including a generous benefits package, will be approximately $141,000. • Financial benefits to Esmeralda County from sales taxes, property taxes and it has been estimated that Net Proceeds of Mines revenues will range from approximately $600,000 in the first year of construction to between $5.2 and $11.6 million during the estimated 26 years of planned lithium-boron production. This is a very significant amount for a small-population rural county. In summary, this project is an opportunity to capitalize on Nevada's mineral wealth to the benefit of the county, state, and our national security with minimal environmental impact. Thank you for your consideration of my comments. Regards, Douglas H. McGibbon	Comment noted.
31 Letters from everyactioncustom.com with additional comments regarding Alternatives			

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209-239	209-239	Letters include request to select No Action Alternative due to impacts to Tiehm's buckwheat, groundwater and wildlife, as well as request obtaining lithium from alternative sources, finding new alternatives, or using new technology to reduce impacts.	EIS Section 1.2 describes the purpose and need for the action which is to respond to the Plan of Operations submitted by Ioneer to develop a mineral resource on public lands. The Project proposes development of a locatable mineral resource. Relocating the Project is not possible because the proposed activities must occur on the mining claims held by the proponent where the resource deposit is located. The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat, including impacts from dust, in Sections 4.12 and 4.20.12. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Effects to groundwater and wildlife are discussed in Sections 4.16 and 4.18 respectively. As described in Section 2.1.3, processing is completed using a closed system that would contain the sulfuric acid. Impacts from hazardous materials are discussed in Section 4.5.
6 Letters from everyaction.com with additional comments regarding Climate Change			
240-245	240-245	Letters include request to select No Action Alternative due to impacts to Tiehm's buckwheat, groundwater, and wildlife, as well as requesting that climate change be addressed.	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat, including impacts from dust, in Sections 4.12 and 4.20.12. ACEPMs have been designed to reduce impacts to Tiehm's buckwheat and additional mitigation measures are described in Section 4.21. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. The Project's impact on climate change and the impacts of climate change on the surrounding area are discussed in the EIS in Sections 4.1 and 4.20.1. Additional information is available in the Air Quality including Climate Change SER.
4 Letters from everyactioncustom.com with additional comments regarding Human Health and Safety			
246-249	246.1-249.1	Letters include request to select No Action Alternative due to impacts to Tiehm's buckwheat, groundwater, and wildlife, as well as concerns regarding generation of toxic waste, poisoning, and health impacts.	The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat, including impacts from dust, in Sections 4.12 and 4.20.12. ACEPMs have been designed to reduce impacts to Tiehm's buckwheat and additional mitigation measures are described in Section 4.21. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Effects to groundwater and wildlife are discussed in Sections 4.16 and 4.18 respectively. As described in Section 2.1.3, processing is completed using a closed system that would contain the sulfuric acid. A description of hazardous substances used for the Project and ACEPMs to reduce impacts are discussed in Section 4.5 and the Hazardous Materials and Solid Waste SER.
2 Letters from everyactioncustom.com with additional comments regarding Native American Traditional Values			
250-251	250.1-251.1	Letters include request to select No Action Alternative due to impacts to Tiehm's buckwheat, groundwater, and wildlife, as well as concerns regarding input and consent from Tribes.	Section 4.8 of the EIS contains the analysis as related to Native American Traditional Values. Government-to-government consultation and coordination for the Project was initiated in 2020 and is described in Section 5.0. Sections 3.8, 4.8, 4.20.8, and the Native American Traditional Values SER discuss the consultation process. During consultation, the Project was redesigned to avoid impacts to culturally significant areas. Tribal consultation is ongoing and will continue through the life of the Project. If avoidance of areas of tribal concern is

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			not feasible, specific operating procedures, stipulations, or mitigation measures would be developed in consultation with the affected Tribes to reduce or eliminate impacts. The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat, including impacts from dust, in Sections 4.12 and 4.20.12. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Effects to groundwater and wildlife are discussed in Sections 4.16 and 4.18 respectively.
20 Letters from everyactioncustom.com with additional comments regarding Regulations and Reclamation			
252-271	252.1-271.1	Letters include request to select No Action Alternative due to impacts to Tiehm's buckwheat, groundwater, and wildlife, as well as requests for the BLM to adhere to regulations and concerns on reclamation.	The EIS was prepared in accordance with NEPA, FLPMA, NHPA, CEQ regulations, and BLM NEPA regulations. The Project is consistent with United States mining laws and BLM surface management regulations. In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Proposed reclamation activities are described in Section 2.1.11. Effects to Tiehm's buckwheat, groundwater and wildlife are discussed in Sections 4.12, 4.16, and 4.18 respectively.
2 Letters from everyactioncustom.com with additional comments regarding Soils			
272-273	272.1-273.1	Letters include request to select No Action Alternative due to impacts to Tiehm's buckwheat, groundwater, and wildlife, as well as concerns about native soil impacts and erosion.	As described in EIS Section 2.0, no direct disturbance of Tiehm's buckwheat subpopulations or the soils it relies upon is proposed. ACEPMs described in Section 2.1.13 to limit erosion. EIS Section 3.12 and the Threatened and Endangered Species SER present a comprehensive discussion of Tiehm's buckwheat, its habitat, and relationships with pollinators and other fauna. The current available scientific data does not show that Tiehm's buckwheat has a unique association with any fungus. The analysis for Tiehm's buckwheat in Section 4.12 includes a discussion of its habitat including the unique soils it requires. The North and South OSF Alternative includes a Buckwheat Protection Plan that has an in-depth description of reclamation activities that would provide pollinator habitat in reclaimed areas. As part of the analysis, a pit stability analysis was conducted that used a conservative approach which ensures that the safety factors used are robust and account for any potential variability in the quarry. Effects to groundwater and wildlife are discussed in Sections 4.16 and 4.18 respectively.
1 Letter from everyactioncustom.com with additional comments regarding Visual Resources			
274	274.1	Letters include request to select No Action Alternative due to impacts to Tiehm's buckwheat, groundwater, and wildlife, as well as concerns about impacts to the area aesthetics.	The BLM manages public land in accordance with applicable laws and regulations including FLPMA. Visual resources are one aspect of public land management that BLM considers during the planning process. EIS Sections 3.15 and 4.15 describe the visual resource management classes for the Project and anticipated impacts. Effects to Tiehm's buckwheat, groundwater and wildlife are discussed in Sections 4.12, 4.16, and 4.18 respectively.
17 Letters from everyactioncustom.com with additional comments regarding Water Resources			
275-291	275.1-291.1	Letters include request to select No Action Alternative due to impacts to Tiehm's buckwheat, groundwater, and wildlife, as well as concerns regarding water use and water quality impacts.	The air quality impacts were modeled for the Project and no pollutants are projected to exceed national or state standards. Section 4.1 of the EIS includes additional air quality information and impacts analysis. A numerical groundwater flow model was used for assessing potential impacts due to proposed dewatering activities. Detailed analysis of water quality and

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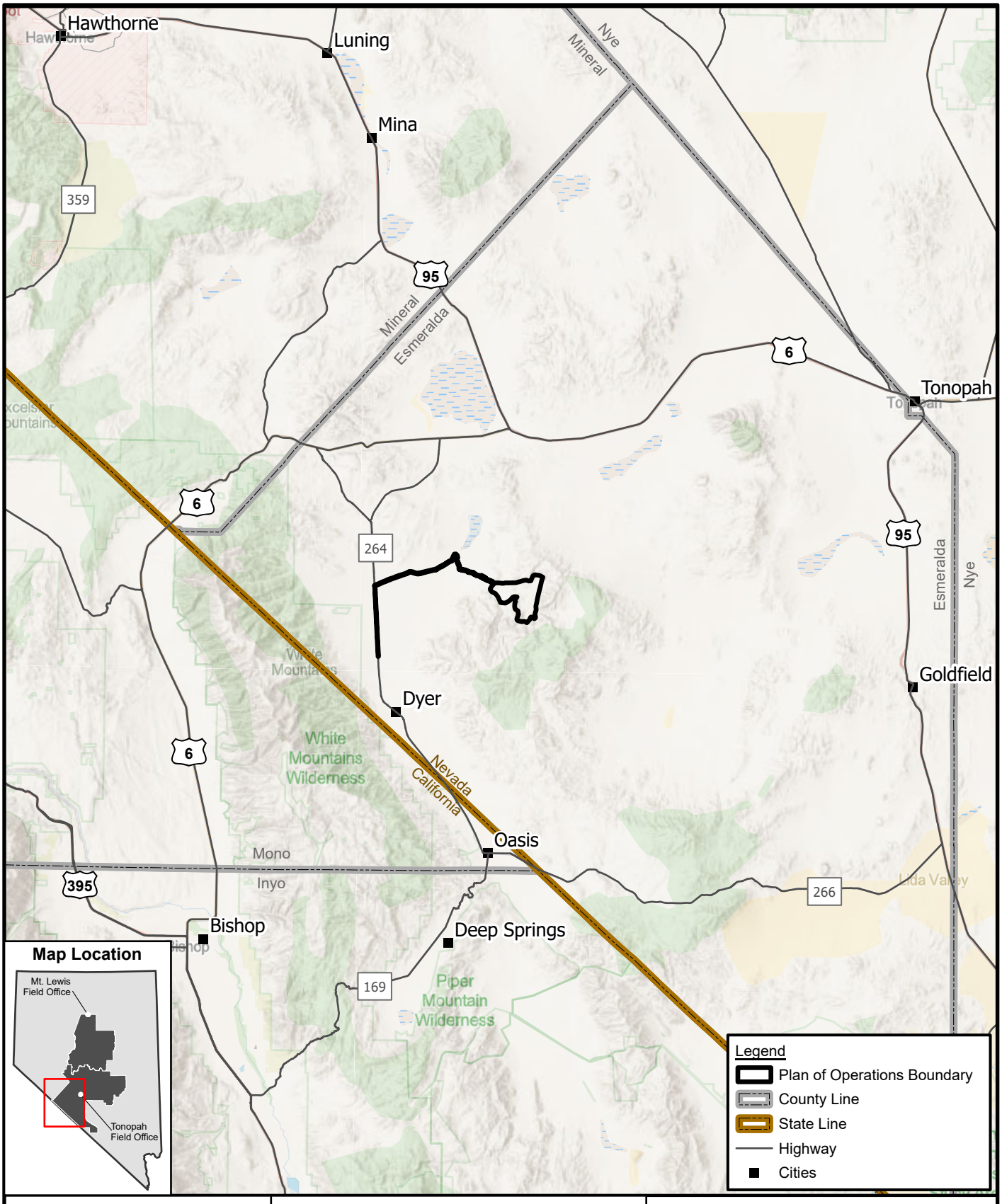
			groundwater drawdown impacts is presented in EIS Sections 4.16 and the Water Resources SER. Mitigation measures are included in Section 4.21 to address surface water and groundwater impacts. The EIS evaluates effects to Tiehm's buckwheat and designated critical habitat, including impacts from dust, in Sections 4.12 and 4.20.12. Additional details are provided in the Threatened and Endangered Species SER. In accordance with the ESA, BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Effects to wildlife are discussed in Section 4.18. Effects to the transportation system from increased traffic is discussed in Section 4.13.
1 Letter from everyactioncustom.com with additional comments regarding Wild Horses and Burros			
292	292.1	Letters include request to select No Action Alternative due to impacts to Tiehm's buckwheat, groundwater, and wildlife, as well as concerns about wild horse and burro management by the BLM.	The EIS contains detailed analysis of impacts for air quality, hazardous materials, Tiehm's buckwheat, water resources, and wildlife in Sections 4.1, 4.5, 4.12, 4.16, and 4.18 respectively. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat. Wild horse and burro management is outside the scope of the analysis for this Project. The BLM does not slaughter wild horses or burros.
2 Letters from everyactioncustom.com with additional comments regarding Wilderness Areas			
293-294	293.1-294.1	Letters include request to select No Action Alternative due to impacts to Tiehm's buckwheat, groundwater, and wildlife, as well as concerns about management of wilderness and remote areas.	The EIS describes the location of the Silver Peak Wilderness Study Area (WSA) in relation to the Project in Section 3.9. There are no proposed activities that would occur within the WSA. Potential impacts to WSA visitors are described in Section 4.9. The EIS contains detailed analysis of impacts for air quality, hazardous materials, Tiehm's buckwheat, water resources, and wildlife in Sections 4.1, 4.5, 4.12, 4.16, and 4.18 respectively. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
6 Letters from everyactioncustom.com with additional comments regarding Wildlife Resources			
295-300	295.1-300.1	Letters include request to select No Action Alternative due to impacts to Tiehm's buckwheat, groundwater, and wildlife, as well as additional concerns regarding birds, pollinators, insects, reptiles, habitat, and extinction.	The EIS contains detailed analysis of impacts for plants and wildlife in Sections 4.14 and 4.18. The analysis includes consideration of impacts to birds, insects and pollinators, reptiles, and wildlife habitats and discloses the anticipated impacts. The Project is not anticipated to lead to extinction of any species. The EIS contains detailed analysis of impacts for air quality, hazardous materials, Tiehm's buckwheat, water resources, and wildlife in Sections 4.1, 4.5, 4.12, 4.16, and 4.18, respectively. In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
15,322 Letters from everyactioncustom.com			
301-15,622	301.1-15,622.1	Dear Bureau of Land Management, I urge the U.S. Bureau of Land Management to select the no-action alternative for the Rhyolite Ridge lithium-boron mine environmental impact statement. The mine would result in the extinction of the rare wildflower Tiehm's buckwheat, or Eriogonum tiehmii, and shouldn't be allowed to proceed.	The effects analysis anticipates negligible to major impacts to Tiehm's buckwheat but does not predict a trend toward extinction. As required by the ESA, the BLM has initiated formal consultation with the USFWS for Tiehm's buckwheat.
301-15,622	301.2-15,622.2	Tiehm's buckwheat is protected by the Endangered Species Act. The BLM isn't permitted to take actions that would jeopardize the species' existence or cause adverse modification to its critical habitat — and the proposed Rhyolite Ridge mine will clearly do both those things. The mine — and the heavy industrialization of the site — will outright destroy 22% of the plant's critical habitat and severely degrade the rest.	In accordance with the ESA, the BLM has initiated formal consultation with the USFWS through preparation and submittal of a Biological Assessment that evaluates the potential effects on Tiehm's buckwheat and its designated critical habitat.
301-15,622	301.3-15,622.3	It will pollute the environment with toxic mining dust and sulfuric acid mist, interrupt the movement of pollinators and wildlife, and drain precious Nevada groundwater, significantly harming Tiehm's buckwheat over the long term.	As described in Section 2.1.3, processing is completed using a closed system that would contain the sulfuric acid. A description of hazardous substances used for the Project and ACEPMs to reduce impacts are discussed in Section 4.5 and the Hazardous Materials and Solid Waste SER.

Comment Letter No.	Comment Number	Comment	Response
			Impacts from dust are analyzed in the air quality analysis, and analyses for other resource areas that could be impacted by dust generation. A numerical groundwater flow model was used for assessing potential impacts due to proposed dewatering activities. Detailed analysis of groundwater drawdown impacts is presented in EIS Sections 4.16 and the Water Resources SER. Mitigation measures are included in Section 4.21 to address surface water and groundwater impacts. Dewatering is not anticipated to affect Tiehm's buckwheat because it is not dependent on groundwater for water.
301-15,622	301.4-15,622.4	The mine will put this rare wildflower on a trajectory toward extinction, and the proposed mitigation measures do nothing to change that. Tiehm's buckwheat is a fragile species. Transplanting it and growing new populations elsewhere almost certainly won't work. And even if it did, it wouldn't make up for destroying the species' native range. Tiehm's buckwheat is one of a kind. We need to protect native wildlife — not eliminate it. I urge the Battle Mountain District Office to comply with the Endangered Species Act and protect Tiehm's buckwheat by choosing the no-action alternative for the Rhyolite Ridge mine environmental impact statement.	The analysis presented in EIS Section 4.12 considers the implementation of ACEPMs and the Buckwheat Protection Plans to reduce impacts to Tiehm's buckwheat and its critical habitat. The effects analysis anticipates negligible to major impacts to Tiehm's buckwheat but does not predict a trend toward extinction. As required by the ESA, the BLM has initiated formal consultation with the USFWS for Tiehm's buckwheat.

Appendix B: Figures



Battle Mountain
BLM District
Tonopah Field Office

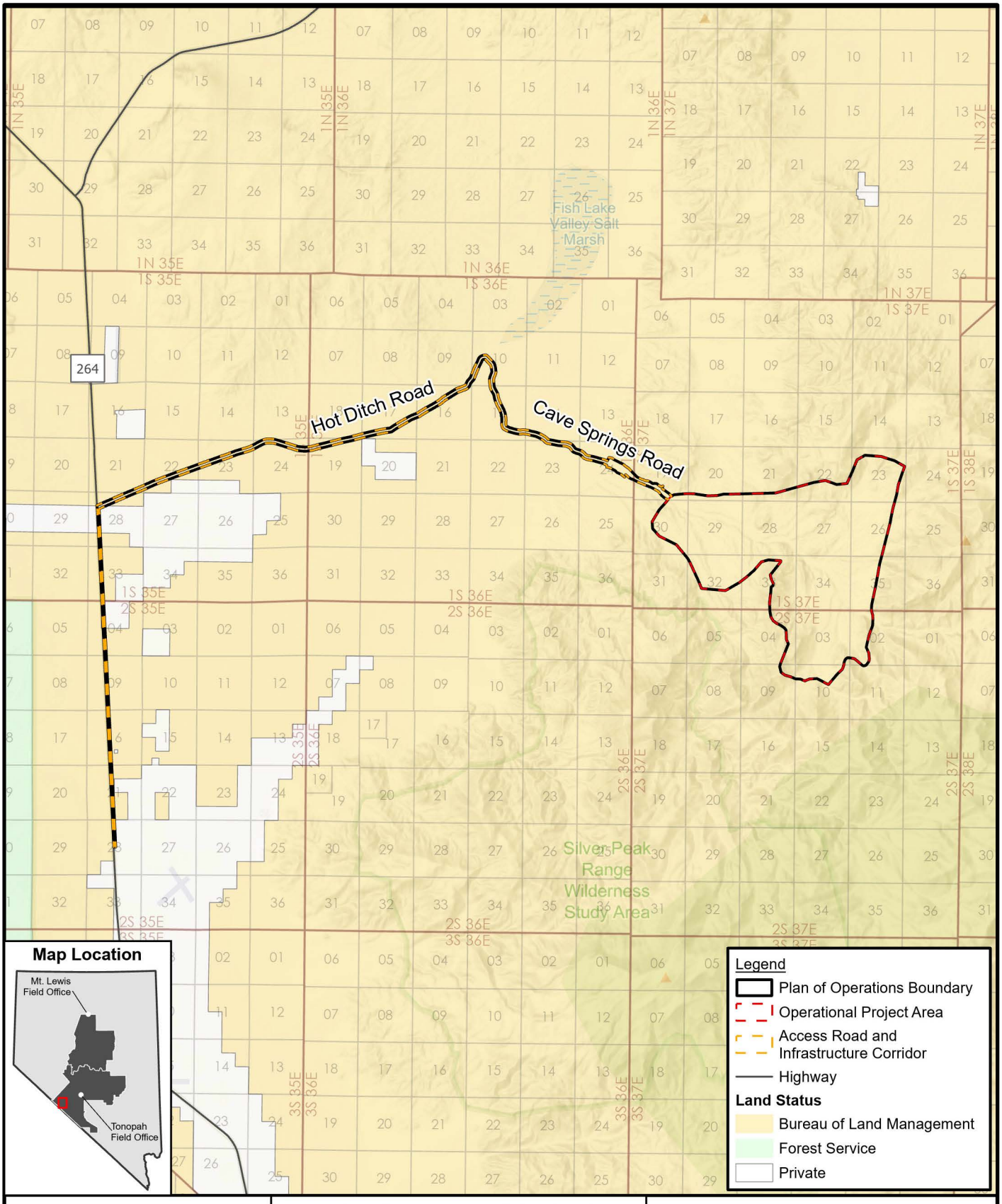
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 12 24 Miles
1 in = 12 miles
N

PROJECT LOCATION

FIGURE 1-1

2024-06-14



Battle Mountain BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

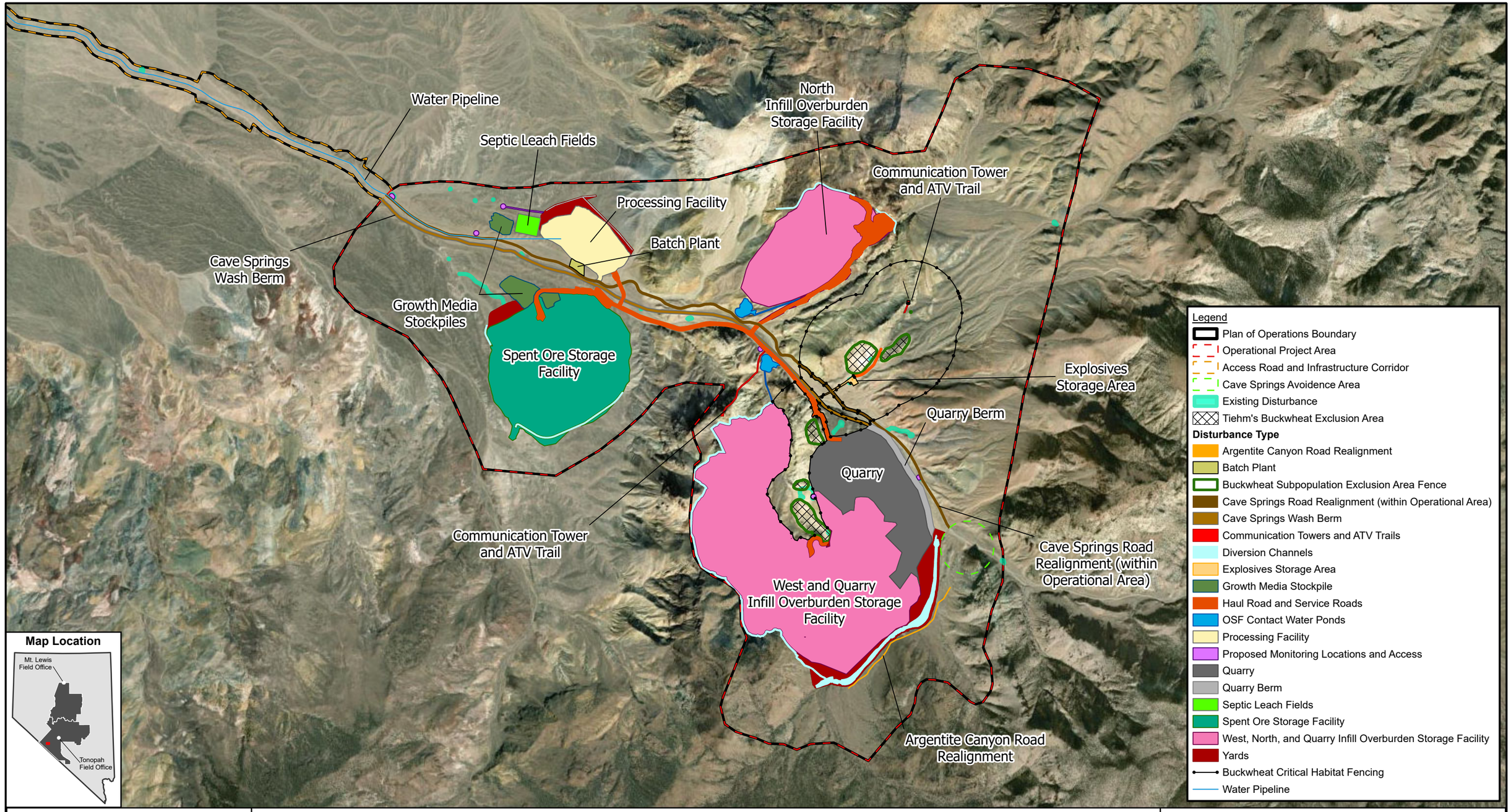
0 2.5 5 Miles
1 in = 2.5 miles

N

PLAN OF OPERATIONS BOUNDARY

FIGURE 2-1

2024-08-14



Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 3,000 6,000 Feet

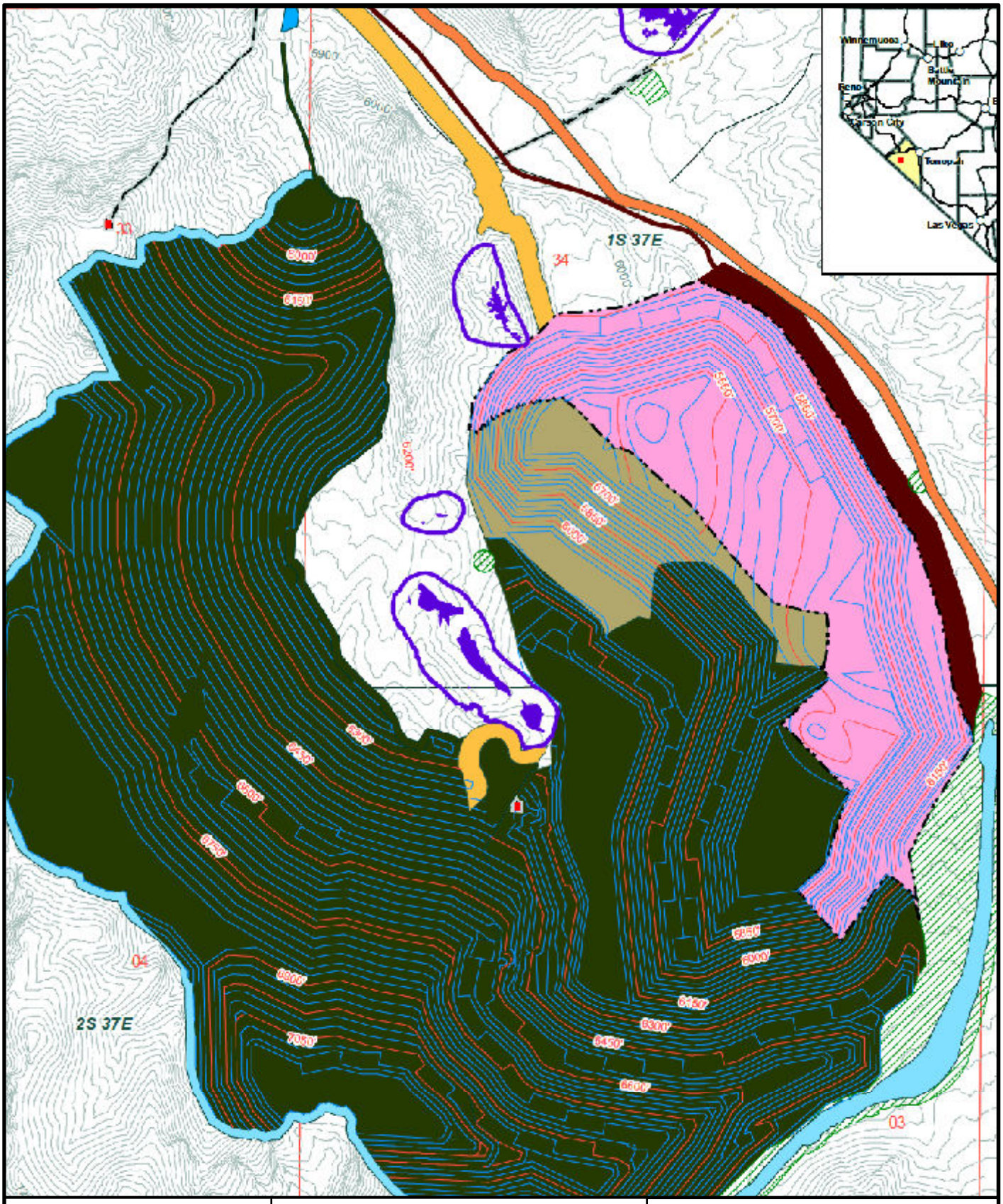
1 in = 3,000 feet

N

PROPOSED ACTION PROJECT FACILITIES

FIGURE 2-2

2024-06-14



Battle Mountain
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Tonopah Field Office

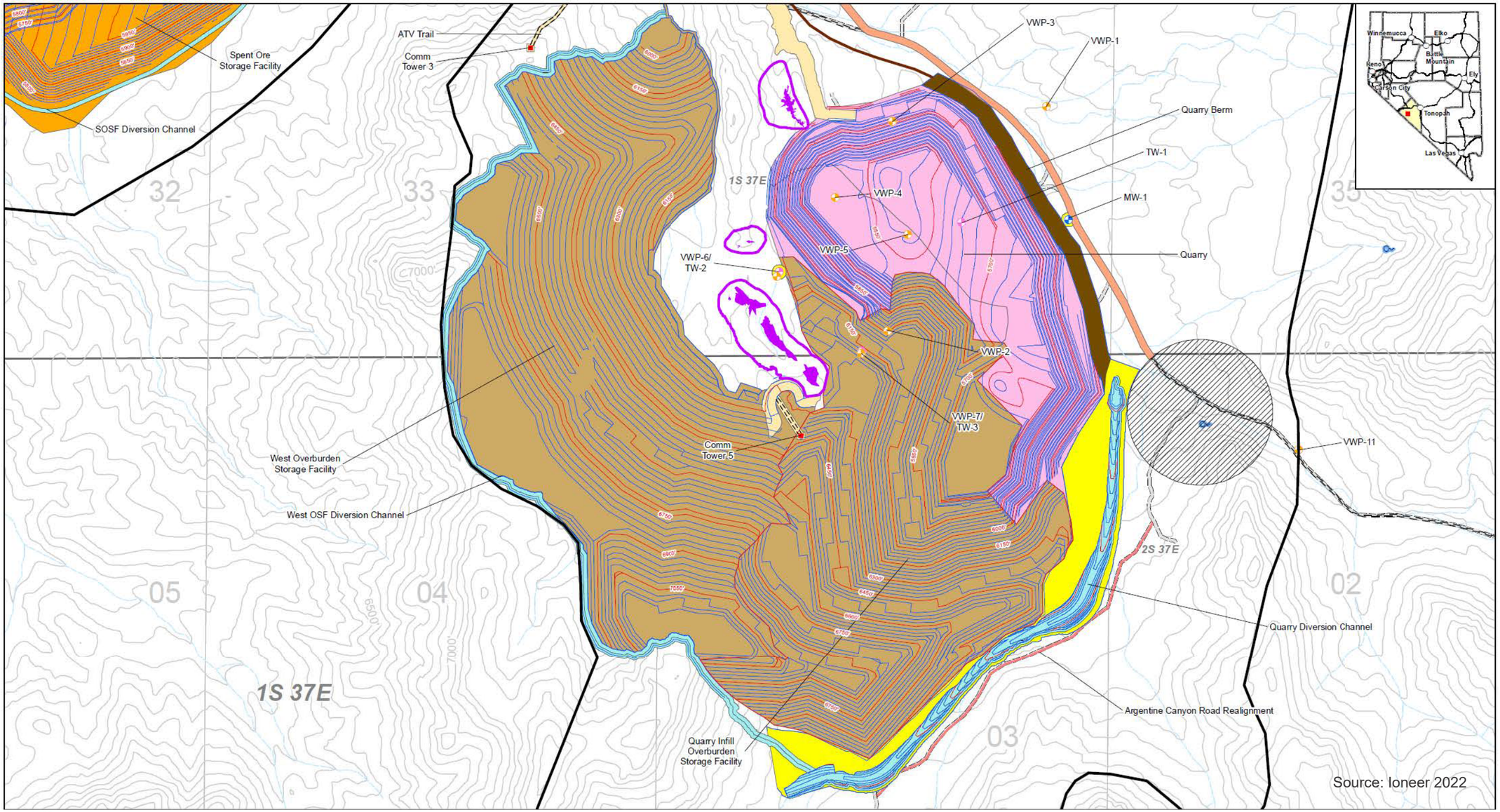
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

N

PROPOSED ACTION QUARRY

FIGURE 2-3

2024-06-14



Explanation

- Plan of Operations Boundary
- Avoidance Area
- Buckwheat Populations
- Buckwheat Exclusion Area
- Existing Monitoring Well
- Vibrating Wire Piezometer
- Test Well
- Spring/Seep
- Existing Road
- Argentite Canyon Road Realignment
- ATV Trails
- Drainage

Mine Features

- Quarry
- Overburden Storage Facility
- Spent Ore Storage Facility
- Diversion Channel
- Yard
- County Road (Realigned)
- Mine Road
- Berm
- Communication Towers

Contours

- Existing
- Proposed Major
- Proposed Minor

0 1,000 2,000 Feet

Battle Mountain
BLM District
Tonopah Field Office

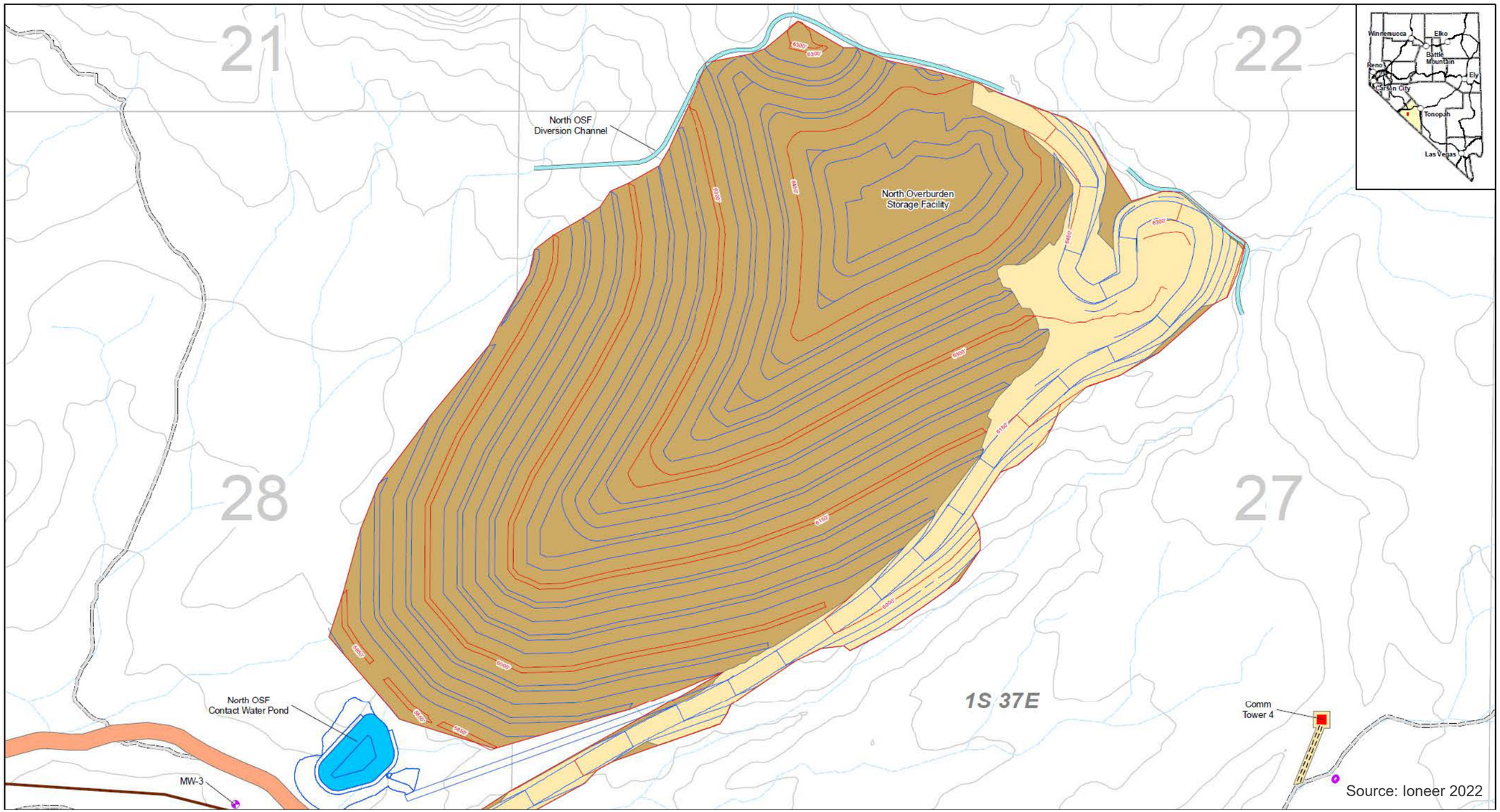
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

N

PROPOSED ACTION WEST OVERBURDEN STORAGE FACILITY

FIGURE 2-4

2022-12-21



Explanation

- Plan of Operations Boundary
- Buckwheat Populations
- Buckwheat Exclusion Area
- Proposed Monitoring Well
- Existing Road
- ATV Trails
- Drainage

Mine Features

- Overburden Storage Facility
- Pond
- Diversion Channel
- County Road (Realigned)
- Mine Road
- Communication Towers

Contours

- Existing
- Proposed Major
- Proposed Minor

0 500 1,000 Feet

Battle Mountain
BLM District
Tonopah Field Office

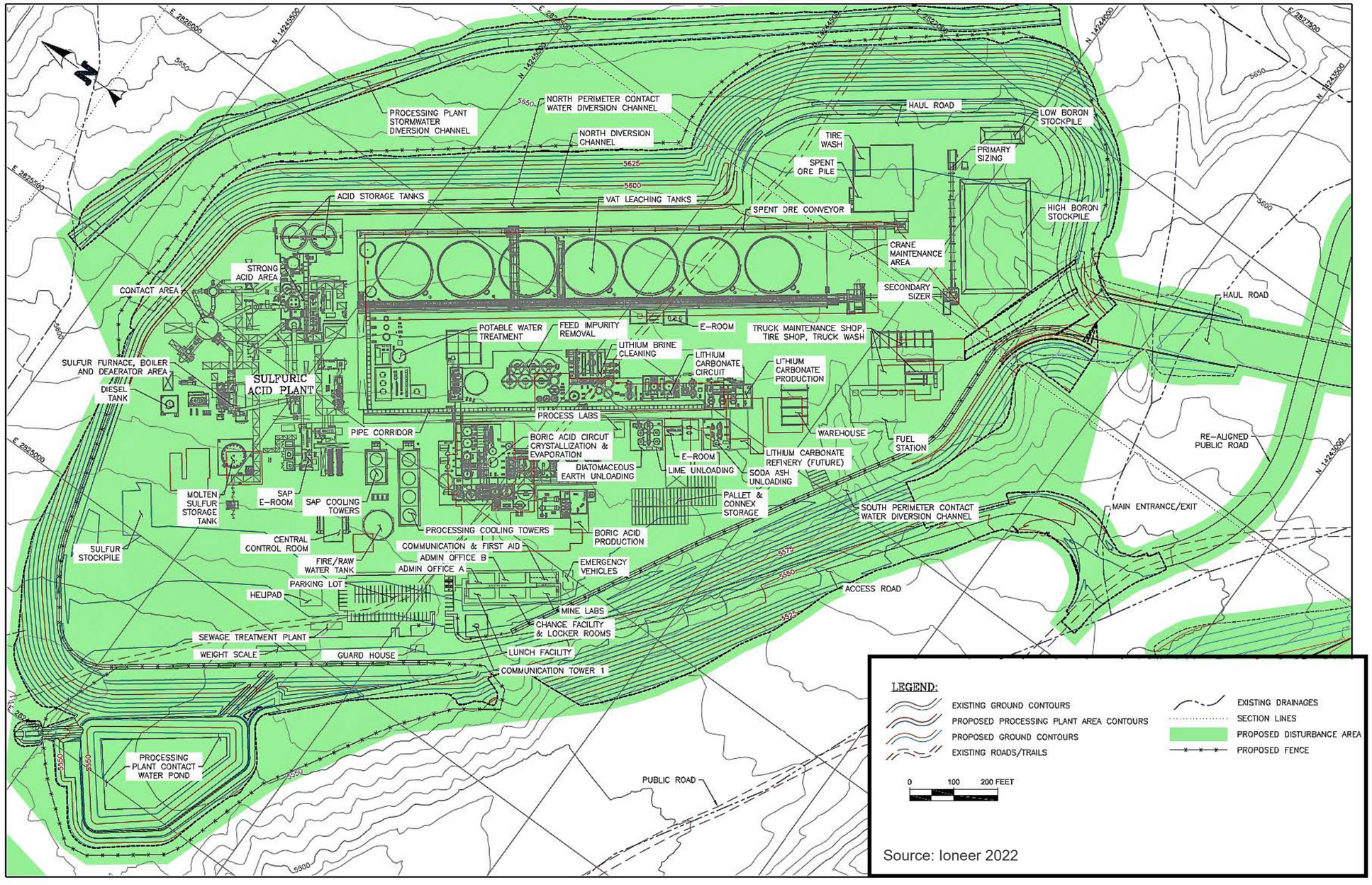
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

N

PROPOSED ACTION NORTH OVERBURDEN STORAGE FACILITY

FIGURE 2-5

2022-12-21



Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

PROCESSING FACILITY

FIGURE 2-6

2022-12-21

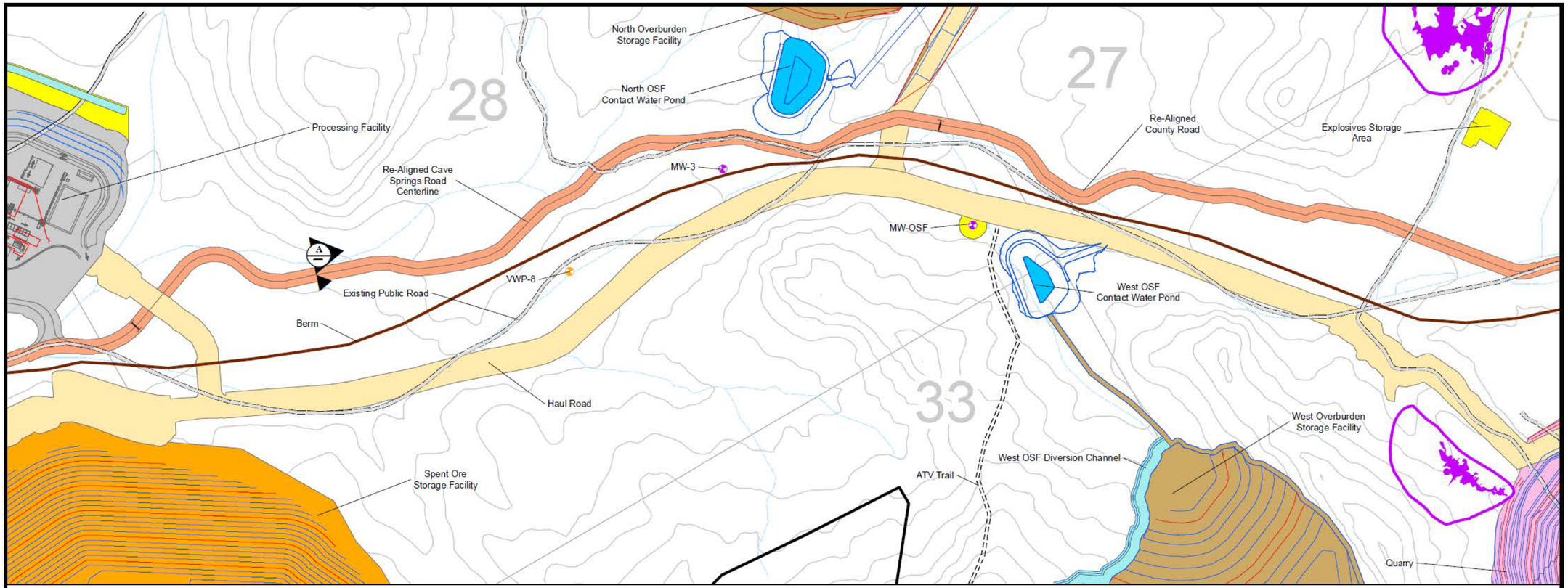
Battle Mountain
BLM District
Tonopah Field Office

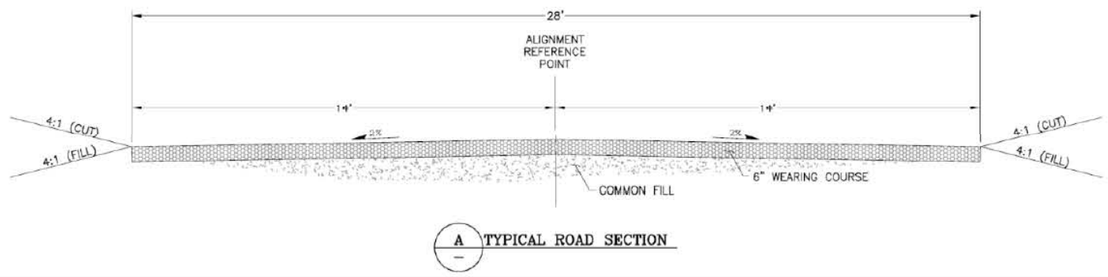
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

SPENT ORE STORAGE FACILITY

FIGURE 2-7

2022-12-21





Source: Ioneer 2022

Explanation

- Plan of Operations Boundary
- Buckwheat Populations
- Buckwheat Exclusion Area
- Control Gate
- Proposed Monitoring Well
- Vibrating Wire Piezometer
- Existing Road
- Buckwheat Exclusion Area Road Reroute
- ATV Trails
- Drainage

Mine Features

- Quarry
- Overburden Storage Facility
- Spent Ore Storage Facility
- Processing Facility
- Diversion Channel
- Pond
- Yard
- County Road (Realigned)
- Mine Road

Contours

- Existing
- Proposed Major
- Proposed Minor

0 500 1,000 Feet

Battle Mountain
BLM District
Tonopah Field Office

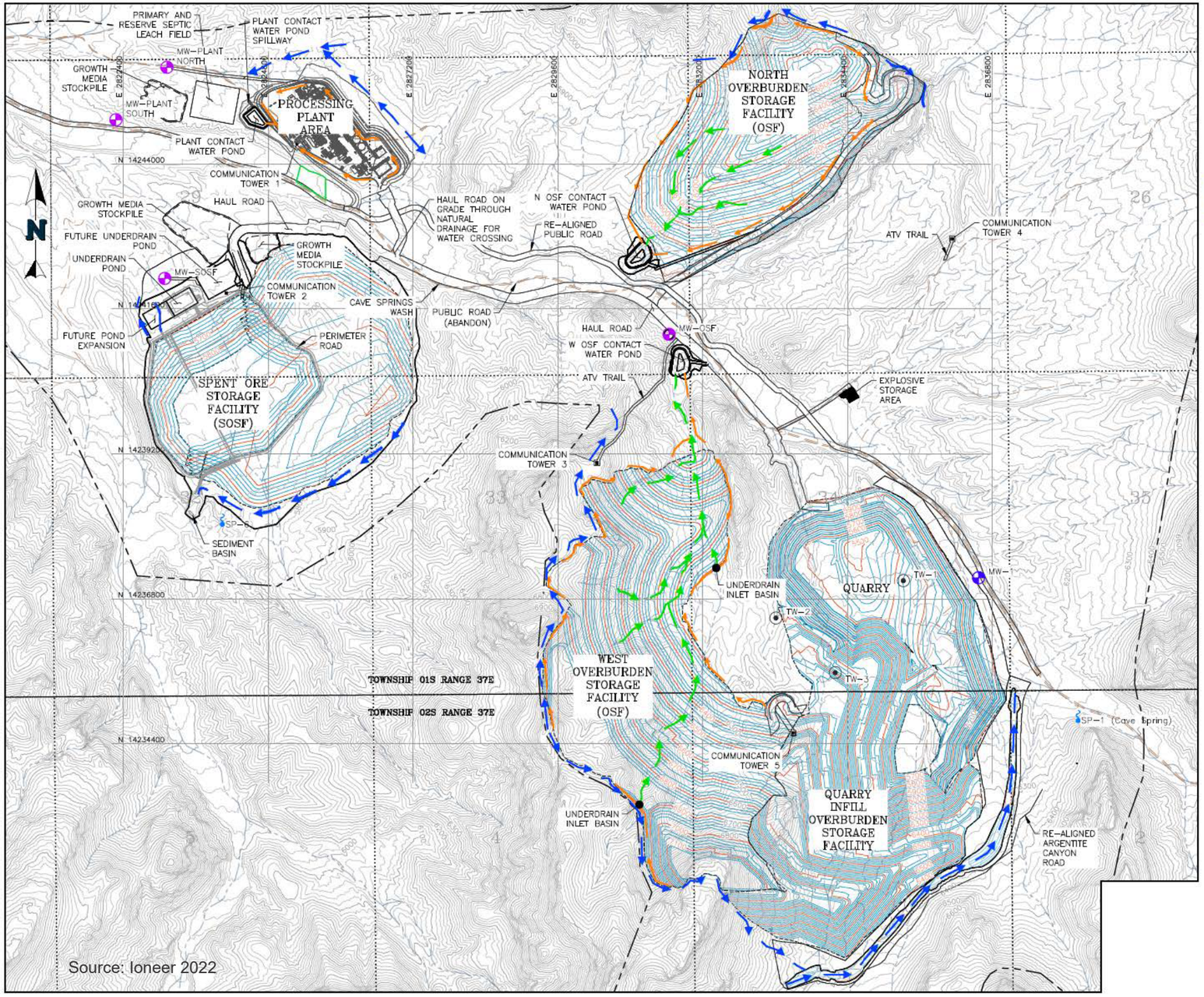
IONEER RHYOITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

N

PROPOSED ACTION CAVE SPRINGS ROAD REALIGNMENT

FIGURE 2-8

2022-12-21



Source: Ioneer 2022

LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED GROUND CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING DRAINAGES
- OPERATIONAL PROJECT AREA
- SECTION LINES
- 20 SECTION NUMBER
- EXISTING NATURAL SPRING/SEEP
- PROPOSED STORMWATER DIVERSION CHANNEL
- PROPOSED CONTACT WATER CHANNEL
- PROPOSED UNDERDRAIN CHANNEL
- PROPOSED FENCE
- EXISTING GROUNDWATER MONITORING WELL
- PROPOSED GROUNDWATER MONITORING WELL
- EXISTING DEWATERING WELLS

0 800 1600 FEET

NOTES:

1. OSF BENCHES WILL DIRECT RUNOFF TOWARD THE PERIMETER CONTACT WATER DIVERSION CHANNELS AT A SLOPE OF 1 PERCENT.

Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

PROPOSED ACTION STORMWATER MANAGEMENT LAYOUT

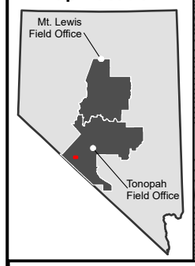
FIGURE 2-9

2022-12-21

Legend

- Plan of Operations Boundary
- Operational Project Area
- Access Road and Infrastructure Corridor
- Proposed Action Post-Reclamation Topography - 20 ft
- Roads
- Buckwheat Exclusion Area Road Reroute
- Quarry
- Quarry and Quarry Lake
- Communication Tower 3 and ATV Trail
- Cave Springs Wash Berm
- Cave Springs Road Realignment
- Argentite Canyon Road Realignment
- ET Cell
- Diversion Channels
- Unmaintained ATV Trails

Map Location



Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 2,000 4,000 Feet

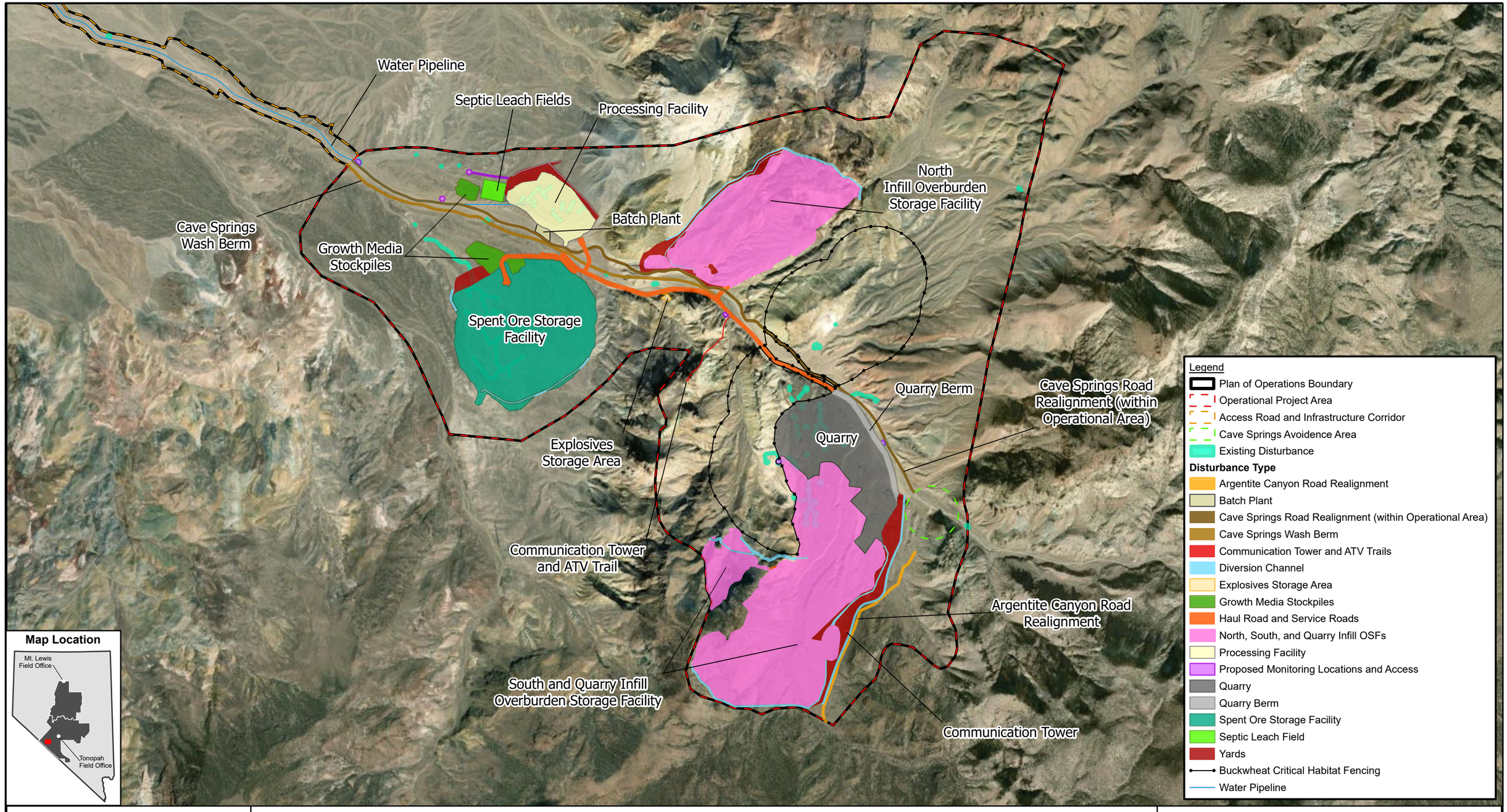
1 in = 2,000 feet

N

PROPOSED ACTION POST-RECLAMATION TOPOGRAPHY

FIGURE 2-10

2024-08-13



Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 3,000 6,000 Feet

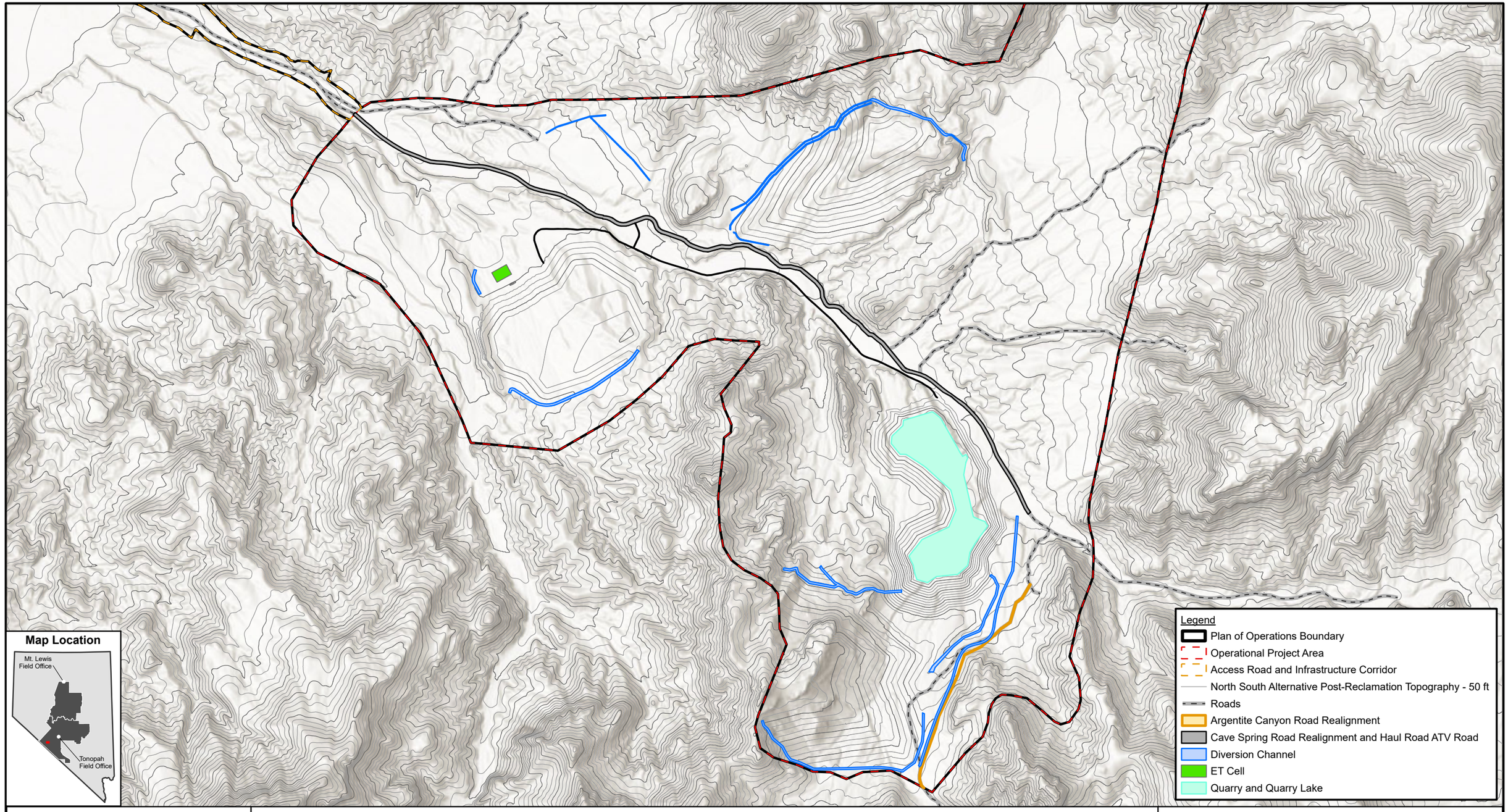
1 in = 3,000 feet

N

NORTH AND SOUTH OVERBURDEN STORAGE FACILITY OPTION PROPOSED FACILITIES

FIGURE 2-11

2024-08-13



Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 2,500 5,000 Feet

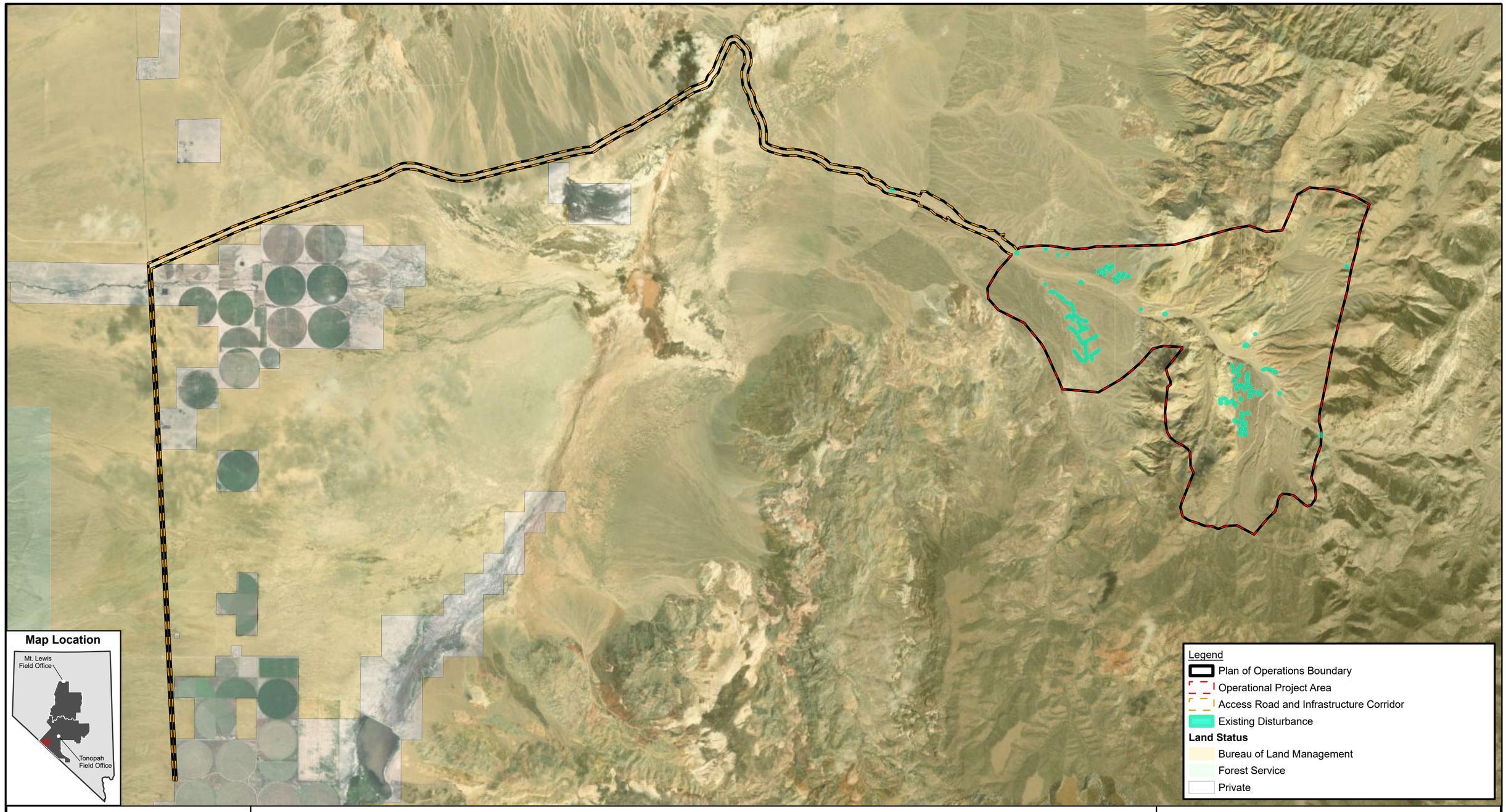
1 in = 2,500 feet

N

NORTH SOUTH ALTERNATIVE POST-RECLAMATION TOPOGRAPHY

FIGURE 2-12

2024-08-13



Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 6,000 12,000 Feet

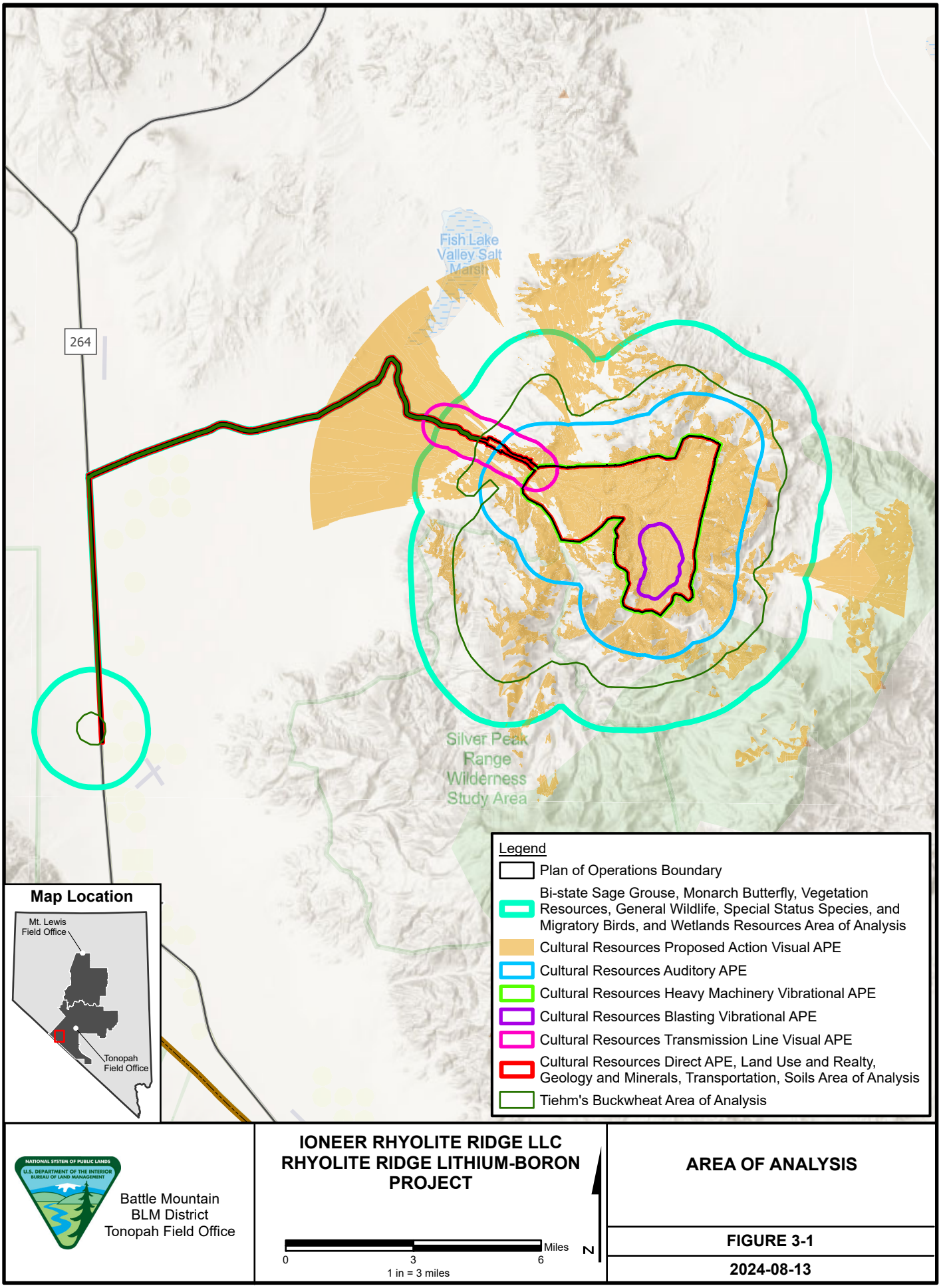
1 in = 6,000 feet

N

NO ACTION ALTERNATIVE

FIGURE 2-13

2024-06-14



Battle Mountain BLM District
Tonopah Field Office

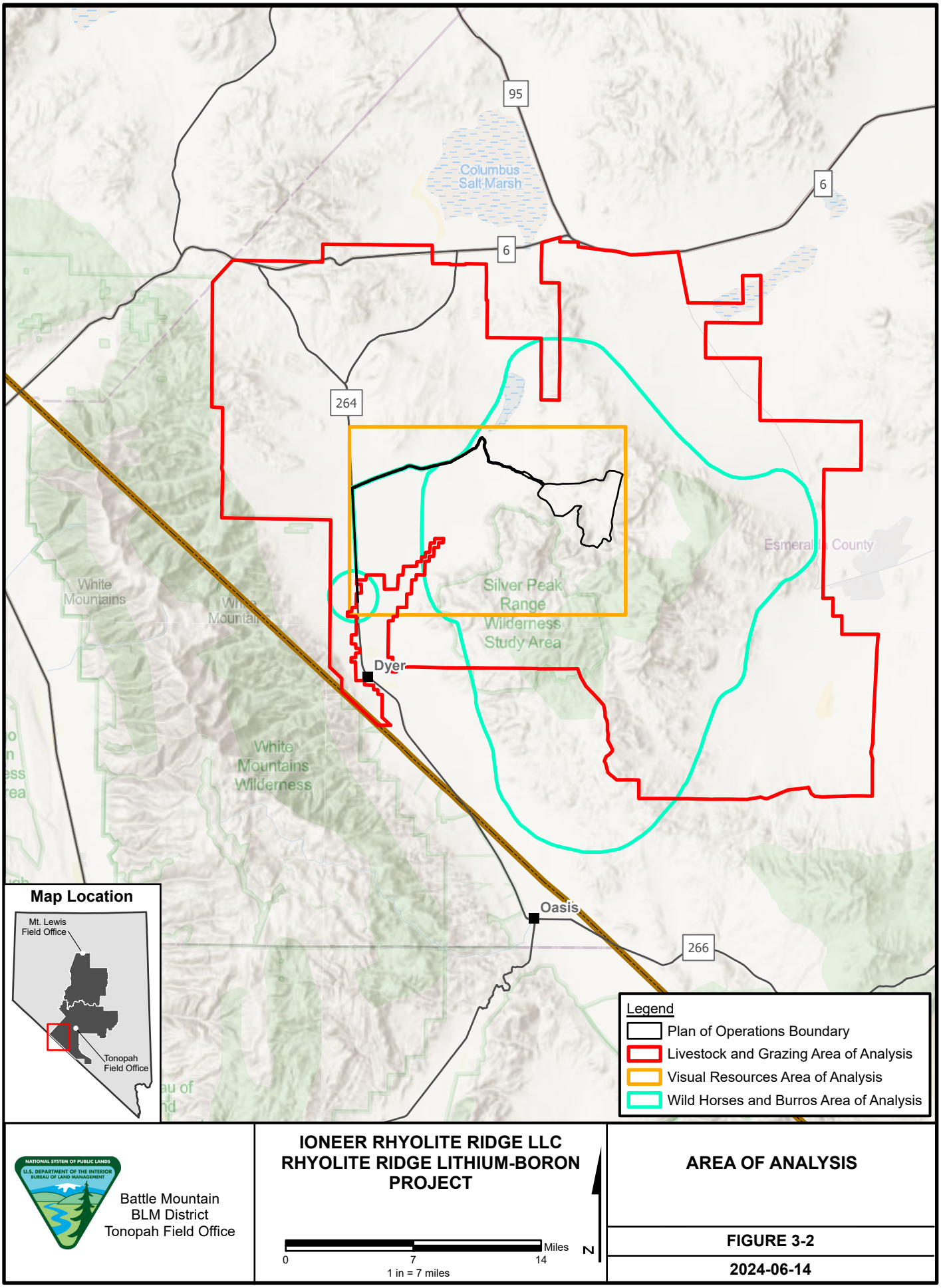
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 3 6 Miles
1 in = 3 miles
N

AREA OF ANALYSIS

FIGURE 3-1

2024-08-13



Battle Mountain BLM District
Tonopah Field Office

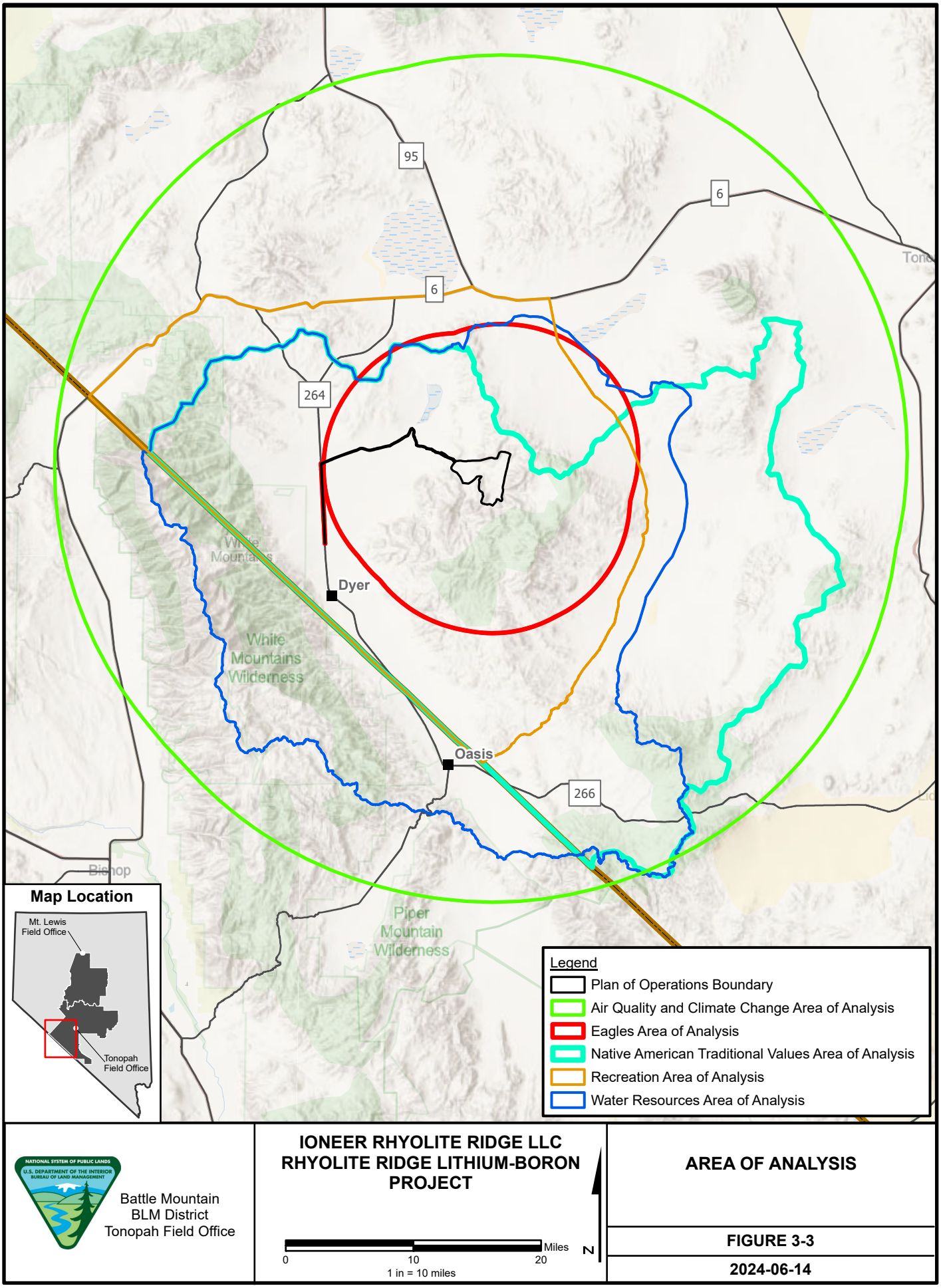
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 7 14 Miles
1 in = 7 miles
N

AREA OF ANALYSIS

FIGURE 3-2

2024-06-14



Battle Mountain BLM District
Tonopah Field Office

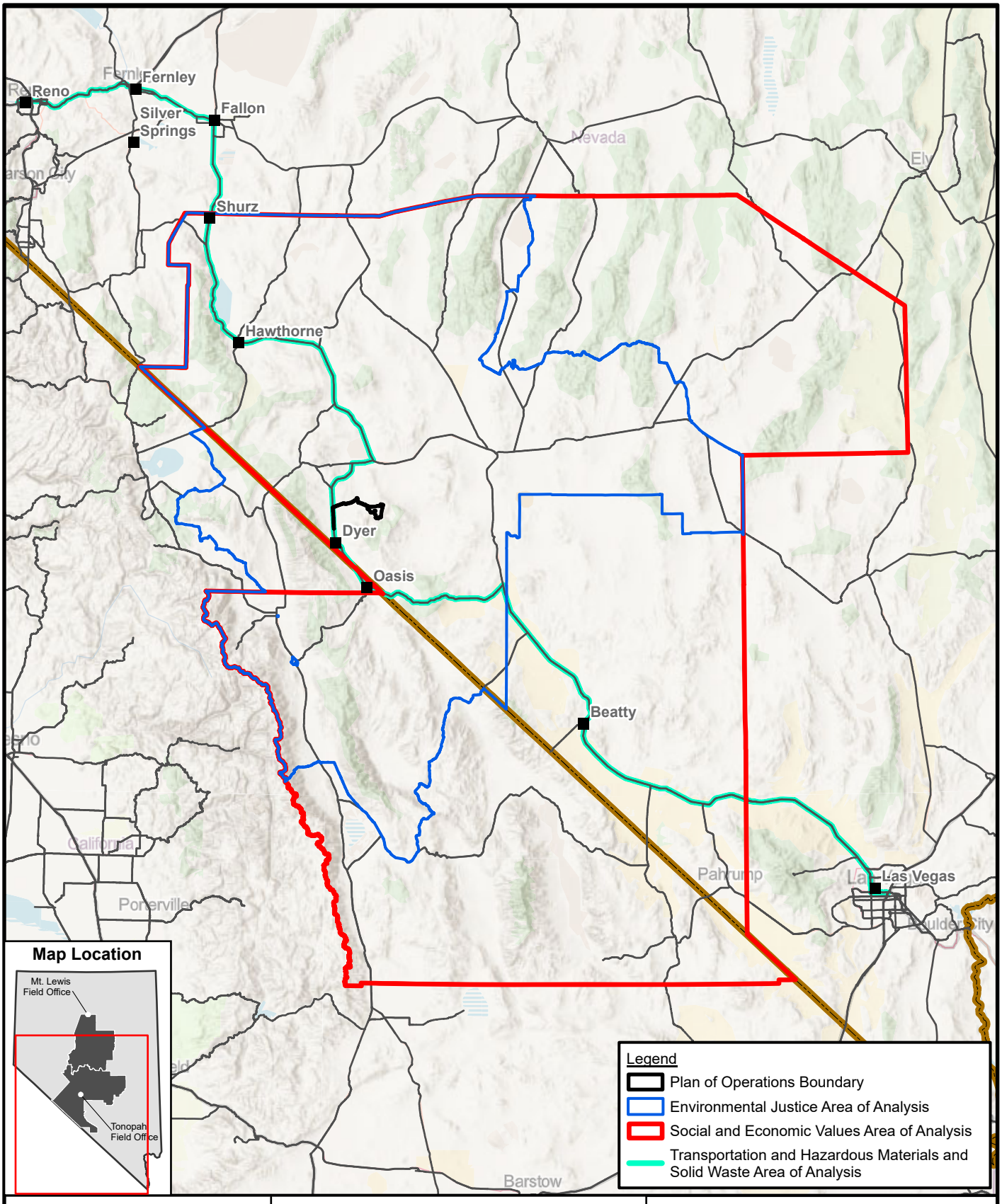
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 10 20 Miles
1 in = 10 miles
N

AREA OF ANALYSIS

FIGURE 3-3

2024-06-14



Battle Mountain BLM District
Tonopah Field Office

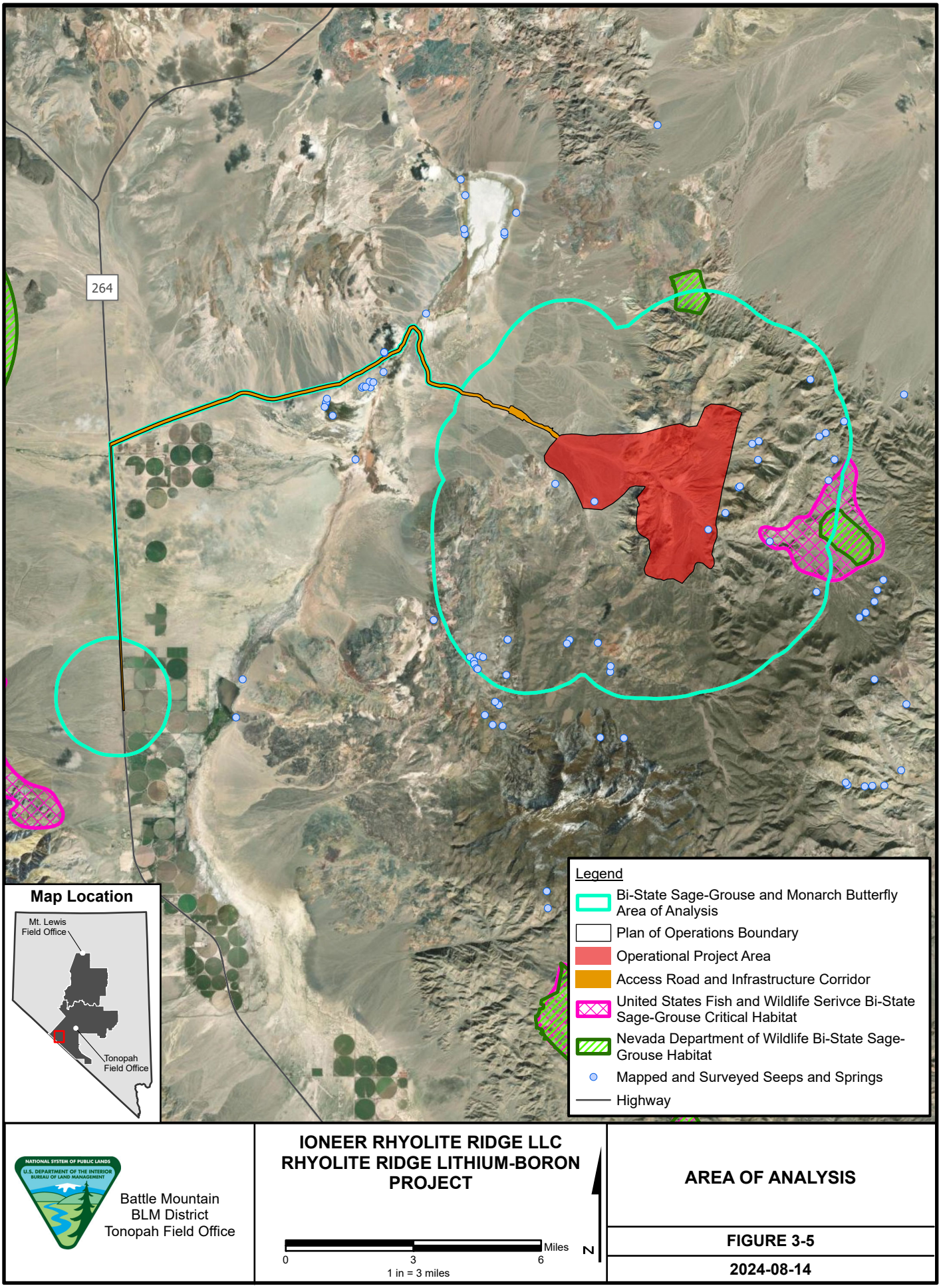
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 35 70 Miles
1 in = 35 miles
N

AREA OF ANALYSIS

FIGURE 3-4

2024-06-14



Battle Mountain BLM District
Tonopah Field Office

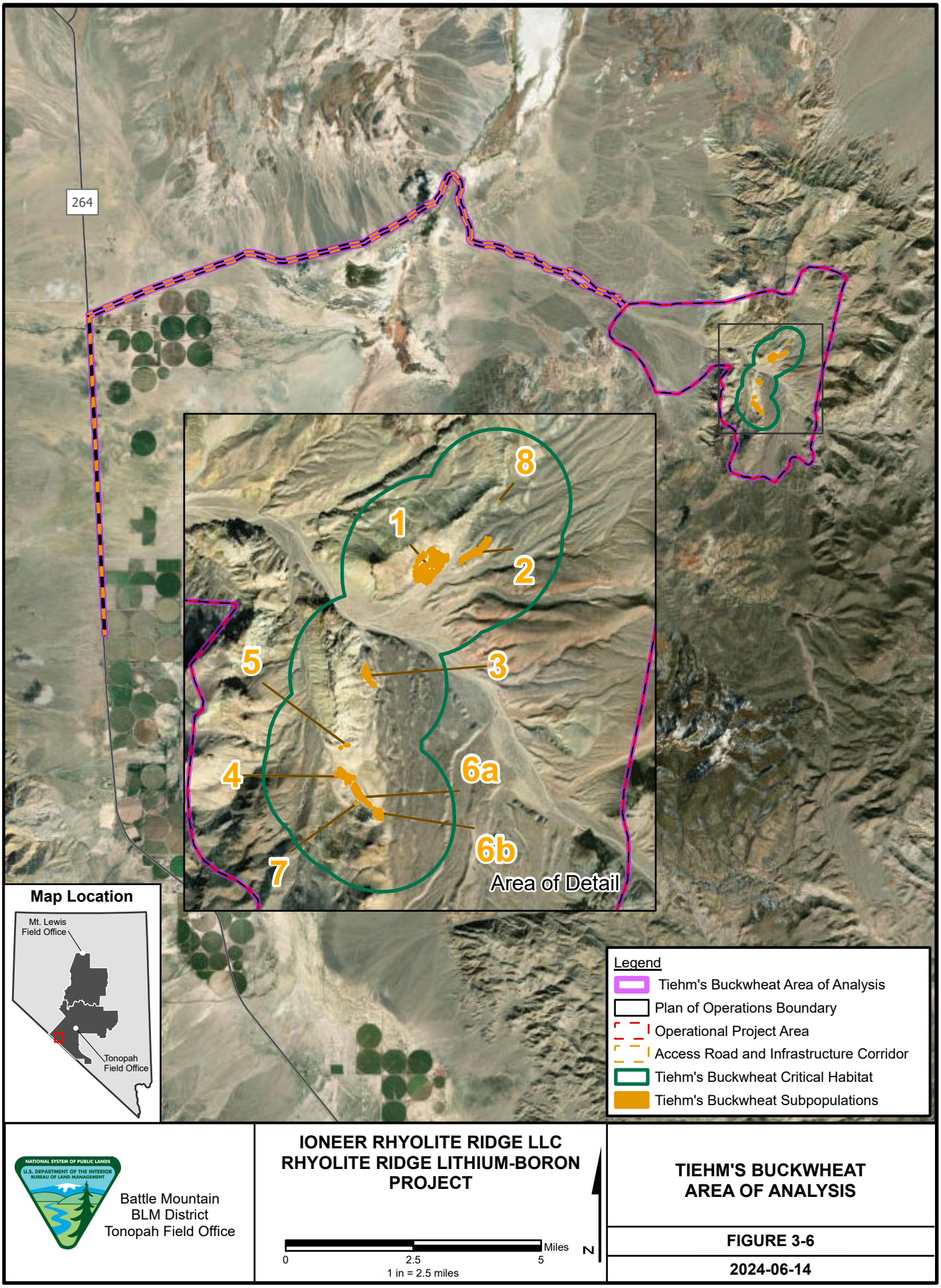
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

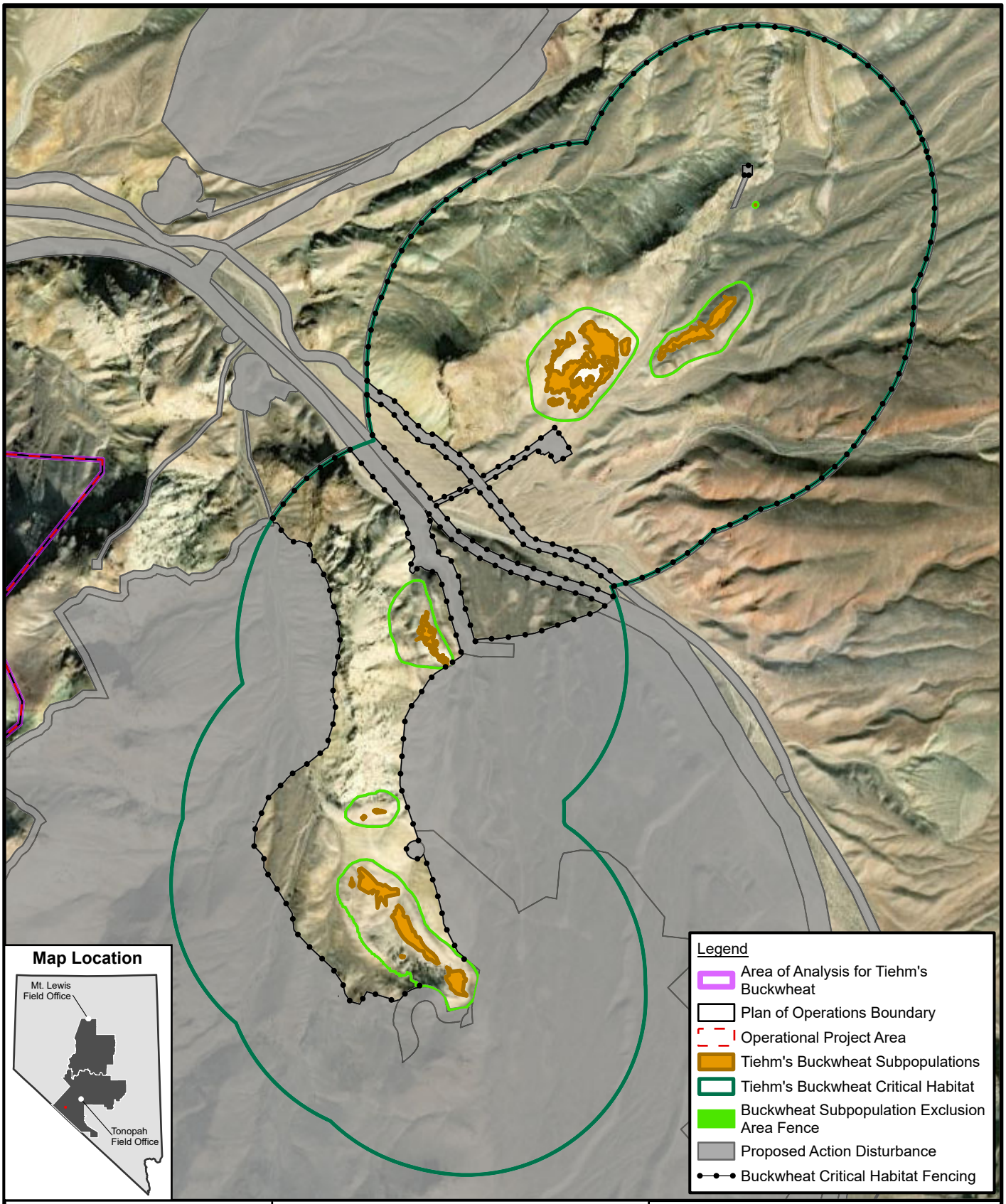
0 3 6 Miles
1 in = 3 miles
N

AREA OF ANALYSIS

FIGURE 3-5

2024-08-14





Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

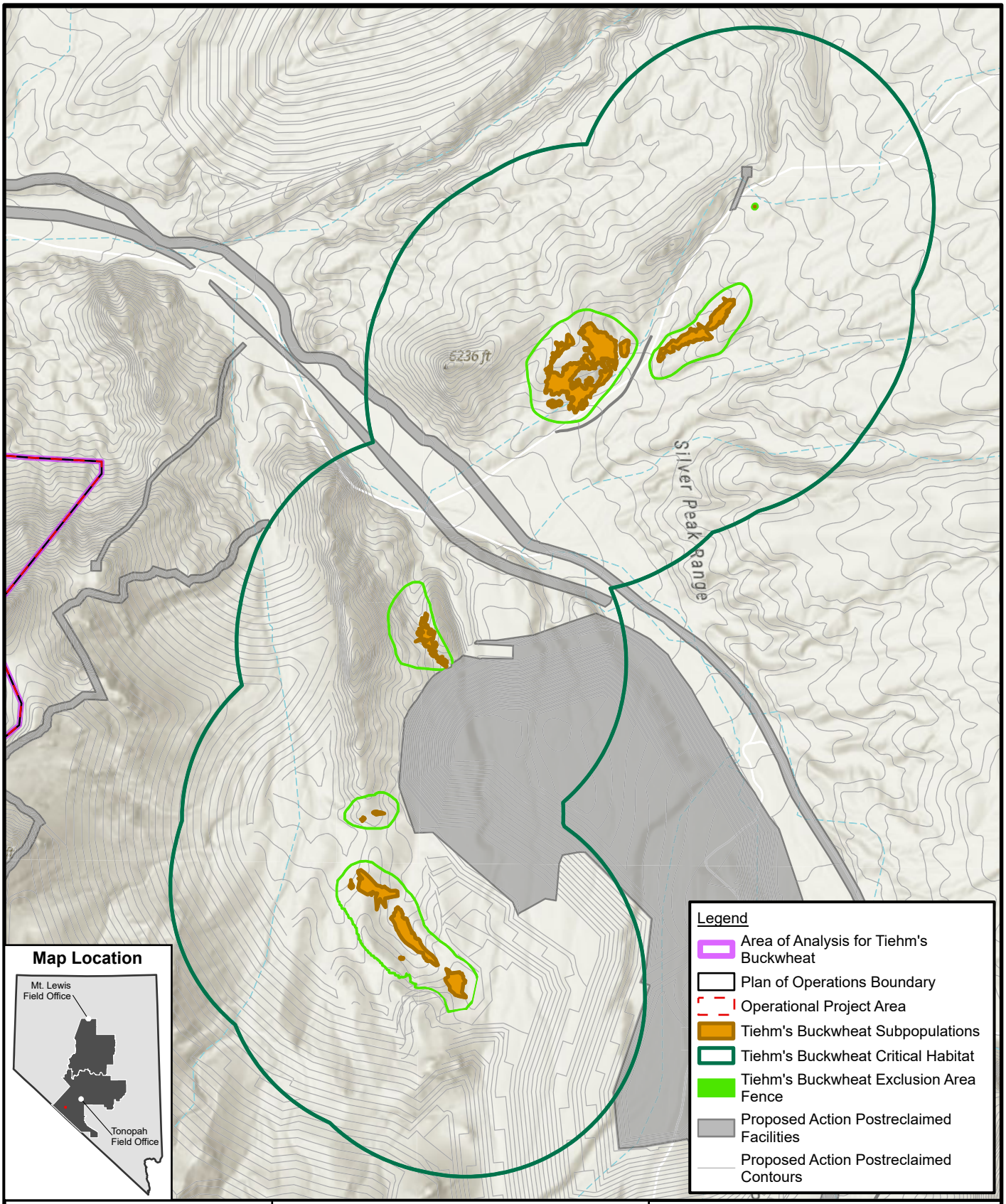
0 1,250 2,500 Feet
1 in = 1,250 feet

N

PROPOSED ACTION DISTURBANCE TO TIEHM'S BUCKWHEAT CRITICAL HABITAT

FIGURE 4-1

2024-06-14



Battle Mountain BLM District
Tonopah Field Office

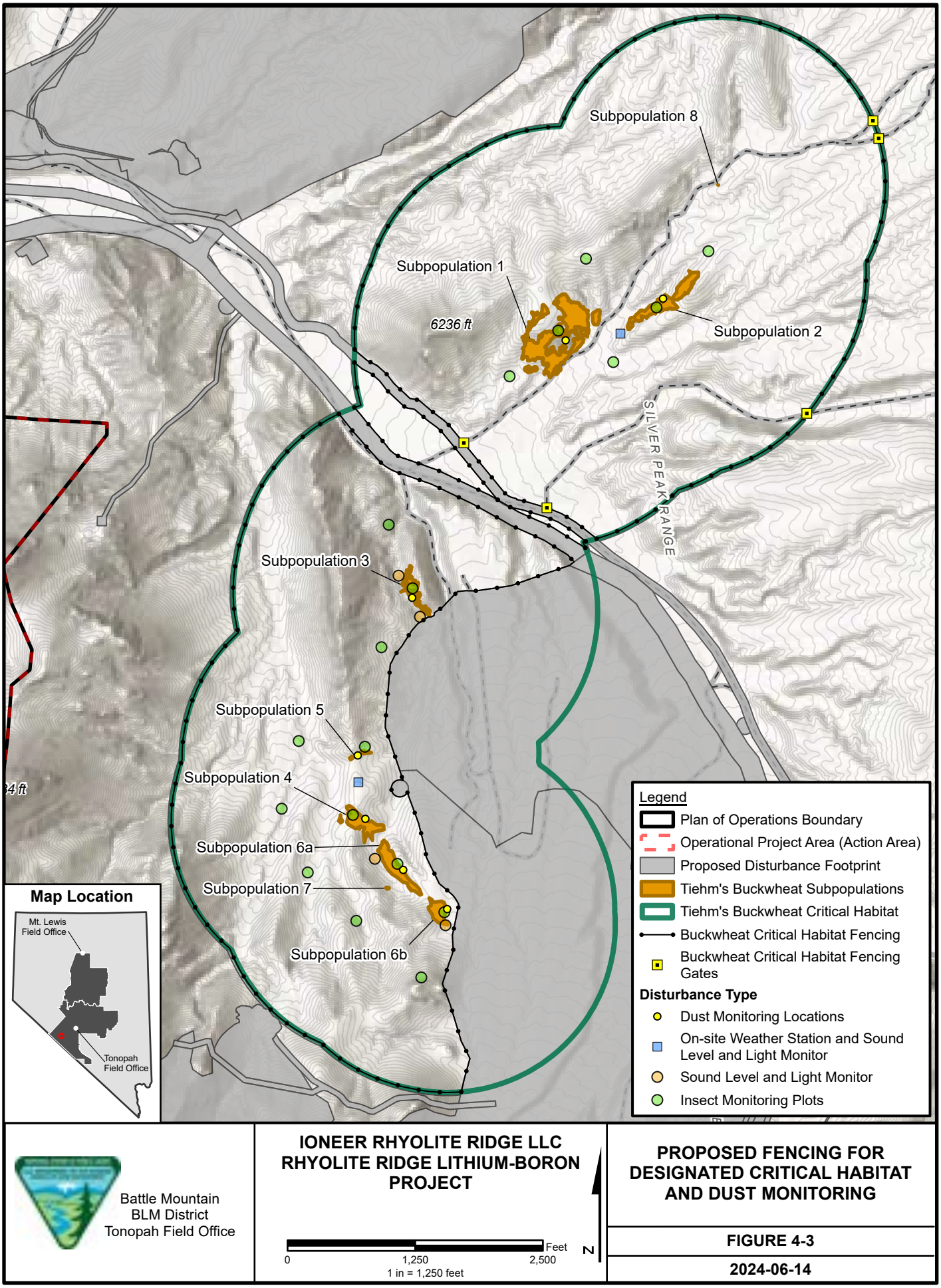
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 1,250 2,500 Feet
1 in = 1,250 feet
N

PROPOSED ACTION POST-RECLAIMED DISTURBANCE TO TIEHM'S BUCKWHEAT CRITICAL HABITAT

FIGURE 4-2

2024-06-14



Battle Mountain
BLM District
Tonopah Field Office

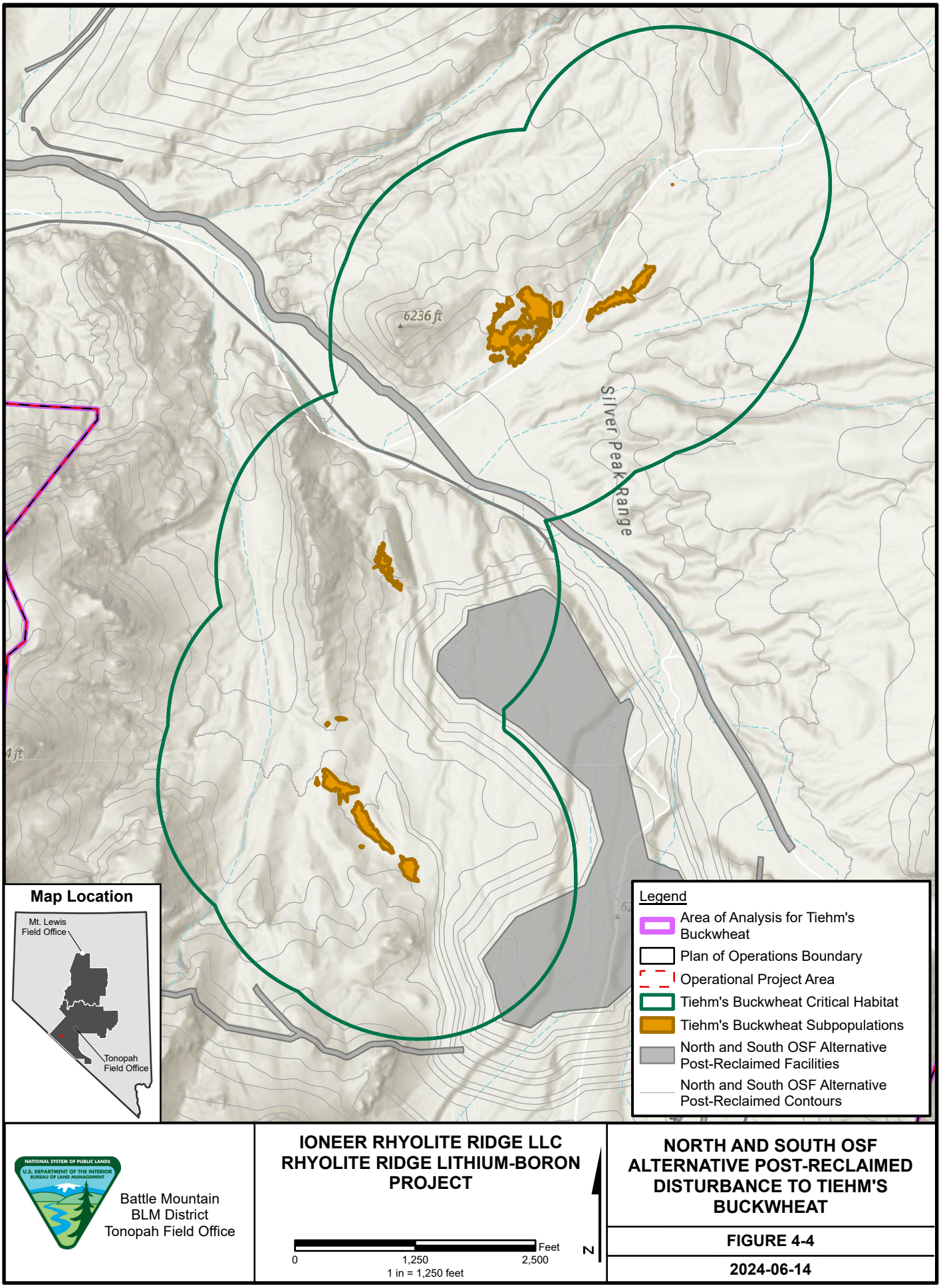
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 1,250 2,500 Feet
1 in = 1,250 feet
N

PROPOSED FENCING FOR DESIGNATED CRITICAL HABITAT AND DUST MONITORING

FIGURE 4-3

2024-06-14



Battle Mountain BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

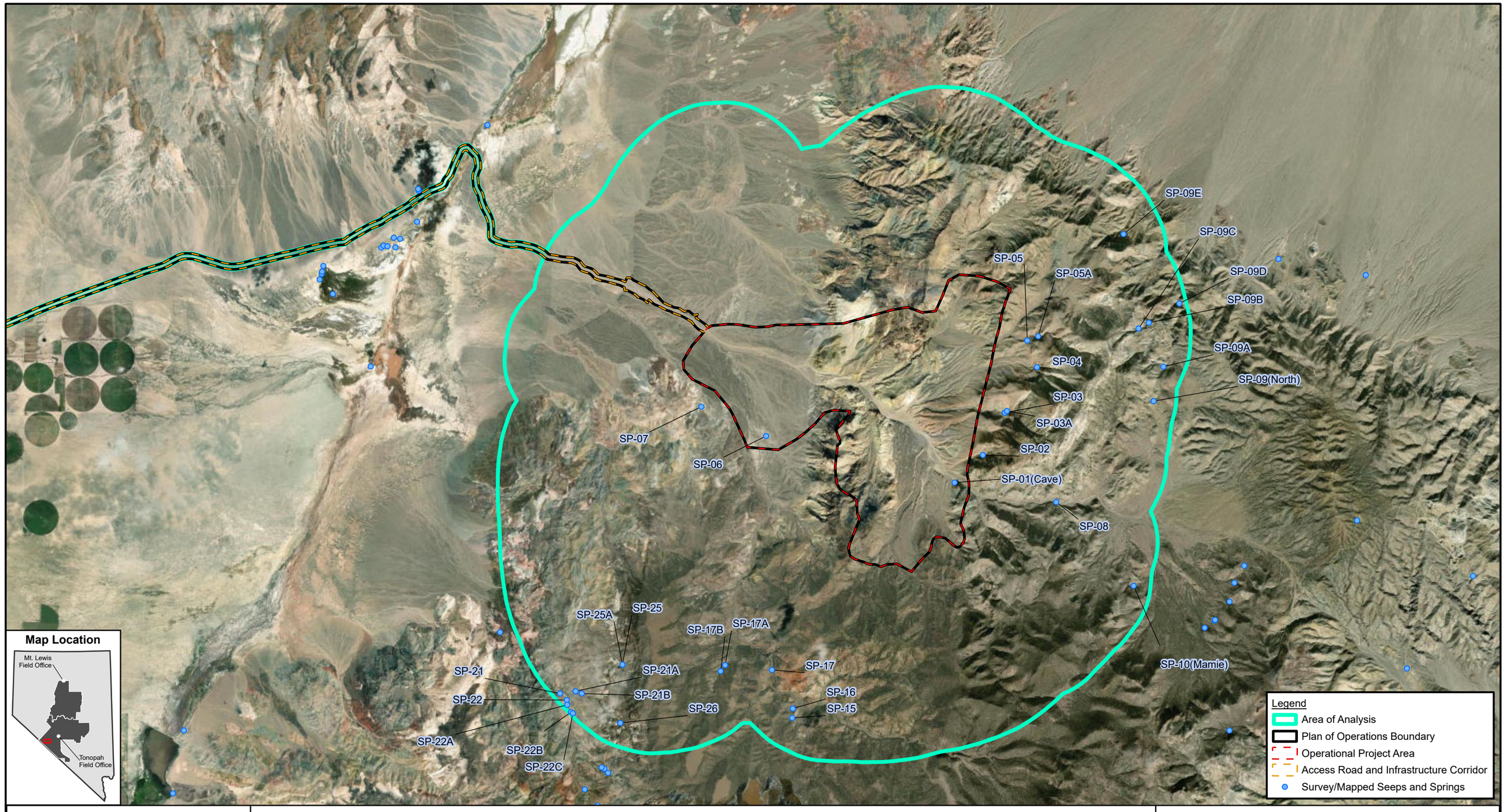
0 1,250 2,500 Feet
1 in = 1,250 feet

N

NORTH AND SOUTH OSF ALTERNATIVE POST-RECLAIMED DISTURBANCE TO TIEHM'S BUCKWHEAT

FIGURE 4-4

2024-06-14



Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 7,000 14,000 Feet

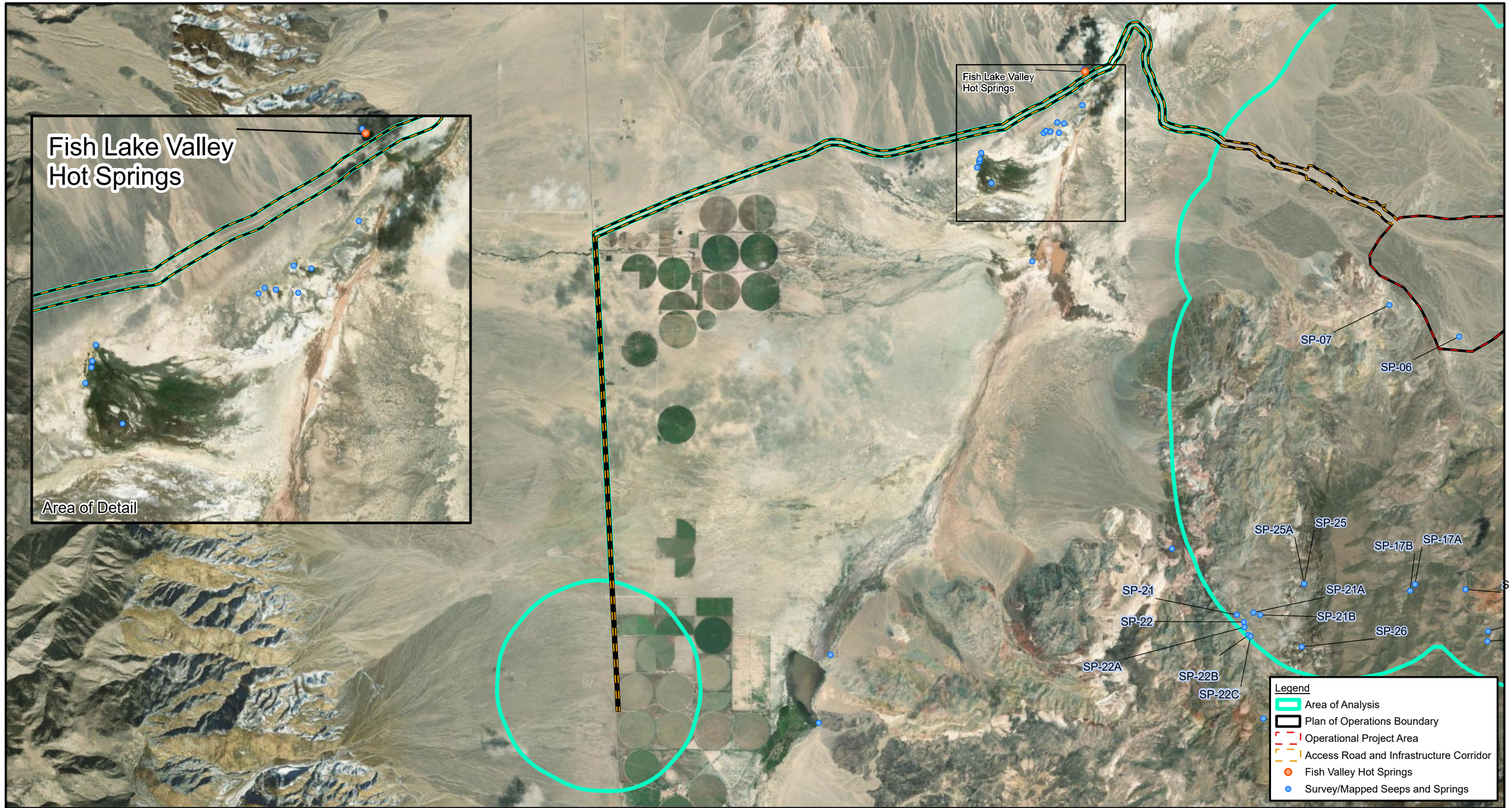
1 in = 7,000 feet

N

OPERATIONAL PROJECT AREA SEEPS AND SPRINGS

FIGURE 4-5

2024-06-14



Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 6,500 13,000 Feet

1 in = 6,500 feet

N

ACCESS ROAD AND INFRASTRUCTURE AREA SEEPS AND SPRINGS

FIGURE 4-6

2024-06-14

Legend

- Area of Analysis (Model Domain)
- Plan of Operations Boundary
- Maximum Extent of the 10-ft Drawdown Contour
- 1-mile Buffer of the Maximum Extent of the 10-ft Drawdown Contour
- TR03D Footprint
- OSF Footprints
- Intermittent Stream
- Perennial Stream

Pumping Well

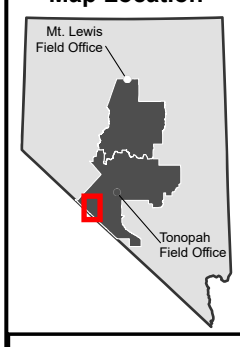
- Representative Fish Lake Water Supply
- Representative Potable Water Well
- TW-2

- NHD 'Springs
- Mapped and Survey Seep and Spring Locations

Water Right POD

- COM
- CON
- DOM
- IRD
- IRR
- MM
- OTH
- PWR
- QM
- REC
- STK
- California

Map Location



Reference: Piteau Rhyolite Ridge Groundwater Model Impacts Report Figure 4.17

Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 2.5 5 Miles

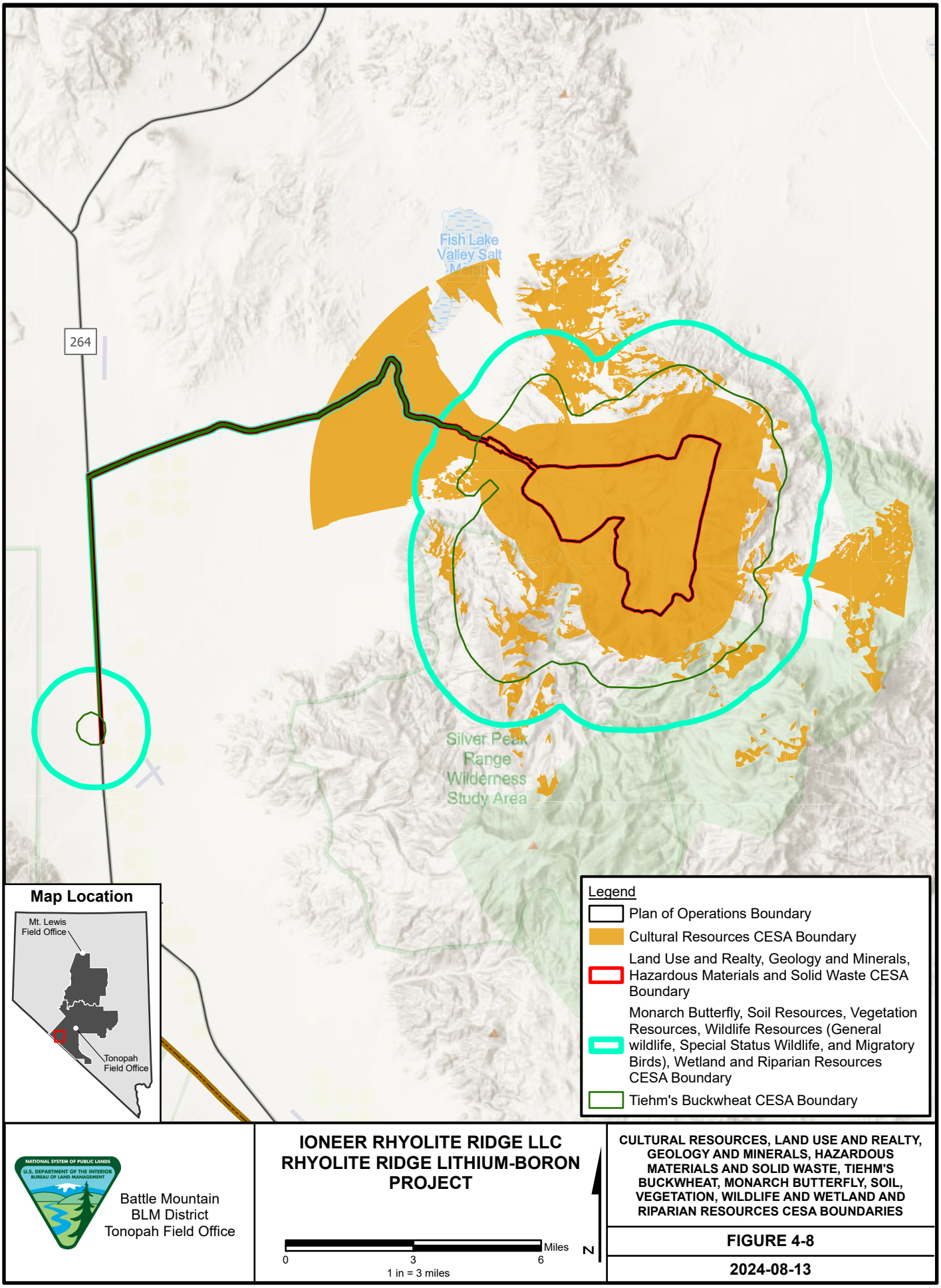
1 in = 2.5 miles

N

10-FT MAXIMUM DRAWDOWN COMPARISON

FIGURE 4-7

2024-06-14



Battle Mountain BLM District
Tonopah Field Office

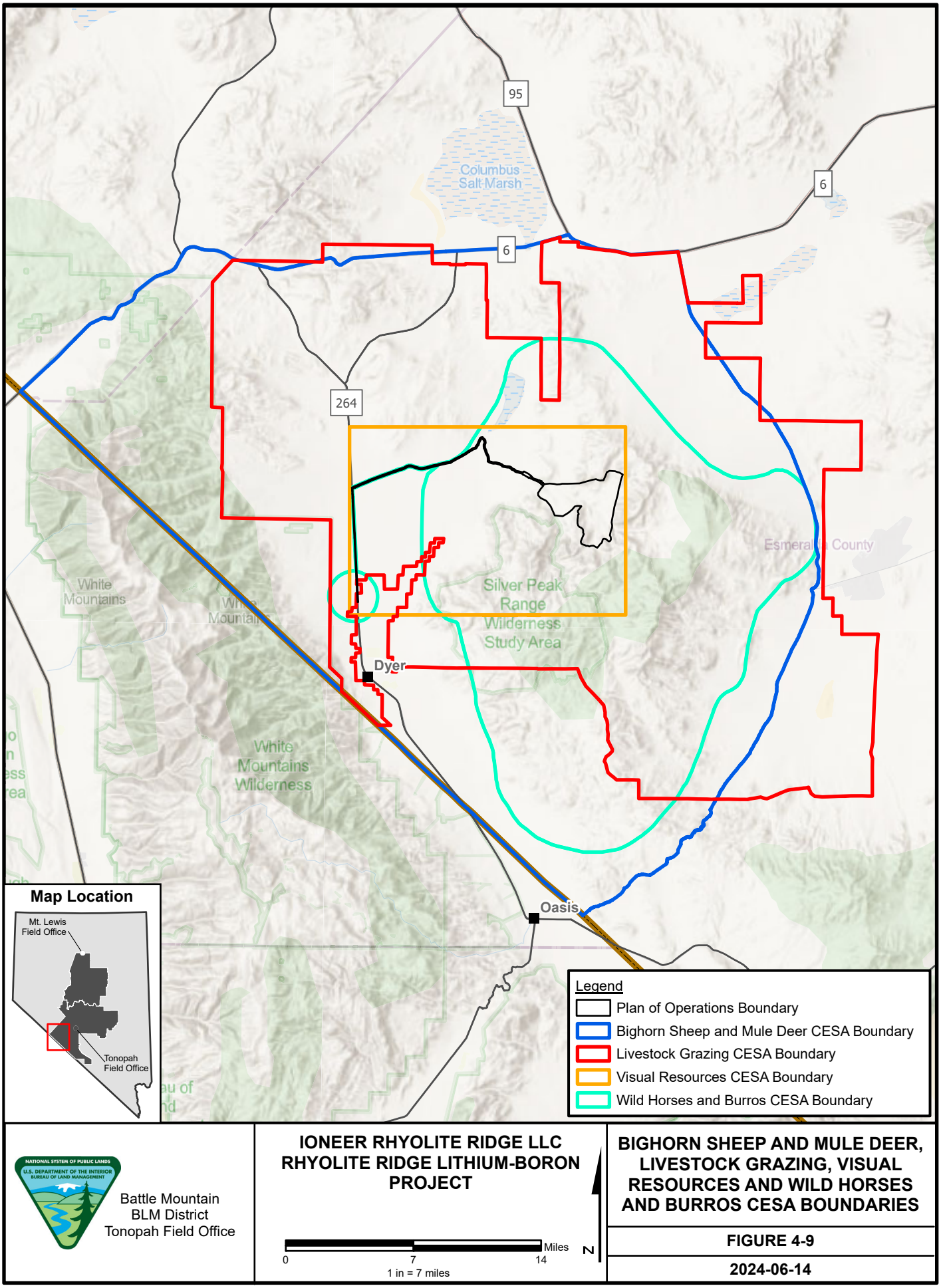
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 3 6 Miles
1 in = 3 miles
N

CULTURAL RESOURCES, LAND USE AND REALTY, GEOLOGY AND MINERALS, HAZARDOUS MATERIALS AND SOLID WASTE, TIEHM'S BUCKWHEAT, MONARCH BUTTERFLY, SOIL, VEGETATION, WILDLIFE AND WETLAND AND RIPARIAN RESOURCES CESA BOUNDARIES

FIGURE 4-8

2024-08-13



Battle Mountain BLM District
Tonopah Field Office

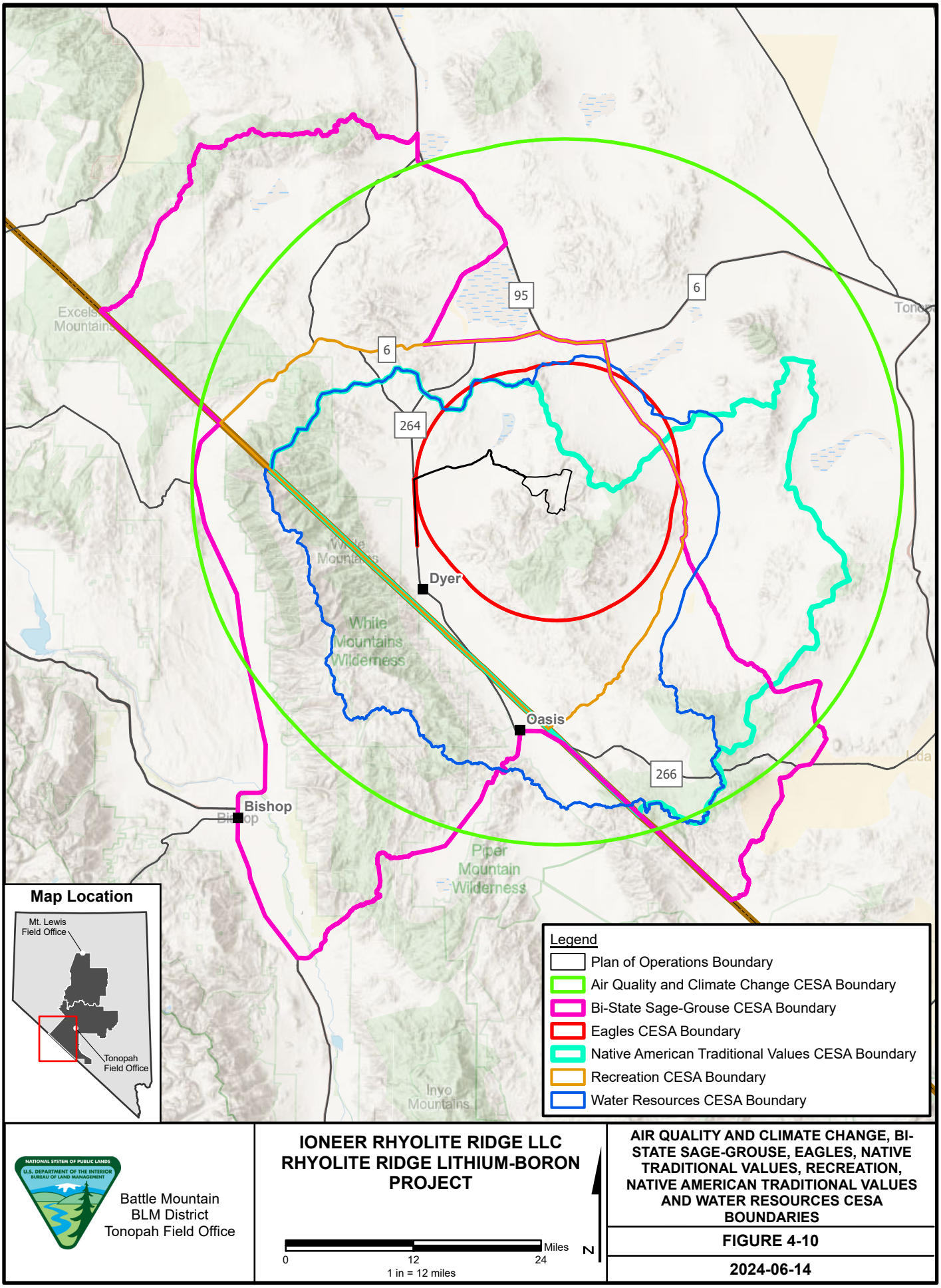
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 7 14 Miles
1 in = 7 miles
N

BIGHORN SHEEP AND MULE DEER, LIVESTOCK GRAZING, VISUAL RESOURCES AND WILD HORSES AND BURROS CESA BOUNDARIES

FIGURE 4-9

2024-06-14



Battle Mountain
BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

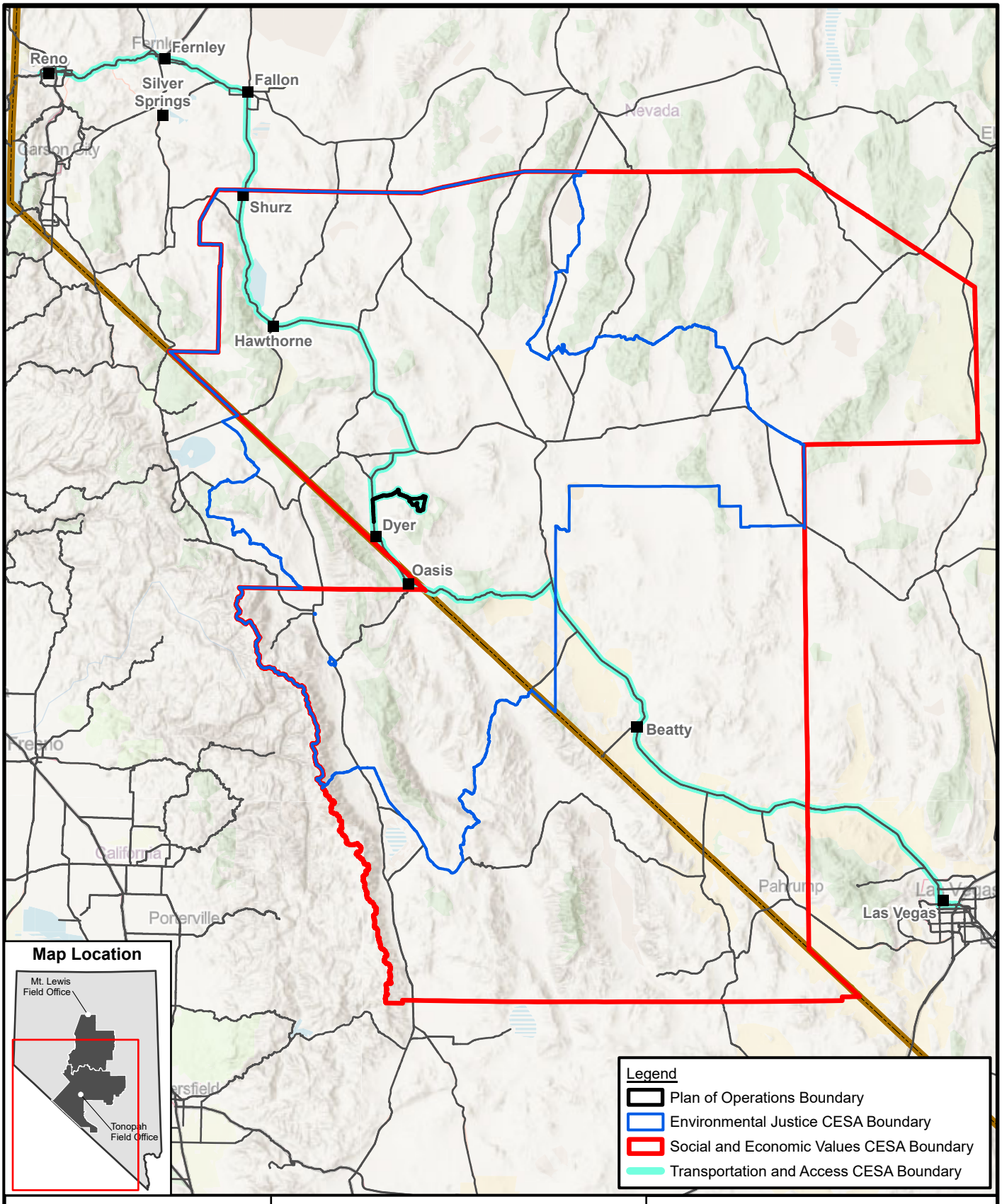
0 12 24 Miles
1 in = 12 miles

N

AIR QUALITY AND CLIMATE CHANGE, BI-STATE SAGE-GROUSE, EAGLES, NATIVE TRADITIONAL VALUES, RECREATION, NATIVE AMERICAN TRADITIONAL VALUES AND WATER RESOURCES CESA BOUNDARIES

FIGURE 4-10

2024-06-14



Battle Mountain BLM District
Tonopah Field Office

IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 37.5 75 Miles
1 in = 37.5 miles
N

TRANSPORTATION AND ACCESS AND ENVIRONMENTAL JUSTICE AND SOCIOECONOMIC VALUES CESA BOUNDARIES

FIGURE 4-11

2024-06-14

Appendix C: Major Permits and Approvals

Permit/Approval	Issuing Authority
Biological Opinion	USFWS
Boiler and High Pressure Vessels Operating Permit	State of Nevada Department of Business & Industry, Division of Industrial Relations, Mechanical Compliance Section
Class II Air Quality Operating Permit	NDEP (Bureau of Air Pollution Control)
U.S. Environmental Protection Agency (USEPA) Identification Number	USEPA and NDEP (Bureau of Sustainable Materials Management)
Explosives Permit	U.S. Bureau of Alcohol, Tobacco, Firearms, and Explosives
Fire and Life Safety	State Fire Marshall, Fire Protection Engineering Bureau
General Permit for Domestic Large-Capacity On-Site Sewage Disposal System (a.k.a. Large-Capacity Septic System)[1]	NDEP (Bureau of Water Pollution Control)
General Stormwater Discharge Permit	NDEP (Bureau of Water Pollution Control)
Hazardous Materials Storage Permit	Nevada Department of Public Safety, State Fire Marshall, and State Emergency Response Commission
Industrial Artificial Pond Permit	NDOW
Mine Identification Number Request	MSHA
Mine Registry Form	Commission on Mineral Resources, Nevada Division of Minerals
Notice of Commencement of Operations	MSHA
Notice of Commencement of Mine Operations	Nevada Department of Business and Industry, Division of Industrial Relations, Mine Safety and Training Section
Notice of Dam Construction – All Ponds	NDWR
Permit for Package Wastewater Treatment Plant[1]	NDEP (Bureau of Water Pollution Control)
Permit to Appropriate Water and/or Approval of change in Point of Diversion, Manner of Use, and Place of Use	NDWR
Permit to Construct Dam – SOSF Underdrain Pond and OSF Contact Water Ponds	NDWR
Plan of Operations/Record of Decision	BLM
Public Water System Permit (Non – Transient Non – Community) Operations	NDEP (Bureau of Safe Drinking Water)
Reclamation Permit and Reclamation Cost Determination	NDEP (Bureau of Mining Regulation and Reclamation)
Sewage System Permits[1]	NDEP (Bureau of Water Pollution Control)
Utility Environmental Protection Act (UEPA) Permit	NPUC (Nevada Public Utilities Commission)
Water Pollution Control Permit	NDEP (Bureau of Mining Regulation and Reclamation)

Source: Ioneer 2022

[1] Final Project sewage management option selection would determine whether the permit is for a large capacity septic system or a package wastewater treatment plant.

Appendix D: Alternatives Considered but Eliminated

Table D-1 Rhyolite Ridge Lithium-Boron Project Preliminary Alternatives and Screening Criteria

Group	Preliminary Alternatives	Consistent with Purpose and Need	Technically Practical and Feasible	Environmentally Reasonable	Economically Practical and Feasible	Alternative to Be Considered for Detailed Study in EIS?
Alternatives Considered for Detailed Analysis						
Alternative A – Proposed Action		Yes	Yes	Yes	Yes	Yes
Alternative B – North and South OSF Alternative		Yes	Yes	Yes	Yes	Yes
Alternative C – No Action Alternative		The No Action Alternative is required to be evaluated per CEQ regulations.				Yes
Alternatives Considered but Dismissed from Detailed Analysis						
Quarry Footprint Alternatives	Larger Quarry	Yes	No	No	Not Evaluated	No
	Quarry North of Cave Springs Road	No	Yes	No	Not Evaluated	No
	Quarry Avoids All Tiehm's Buckwheat Designated Critical Habitat	No	Yes	Yes	No	No
	Quarry Avoids All Tiehm's Buckwheat Subpopulations	Yes	Yes	Yes	Yes	This has been incorporated in the Proposed Action
	Quarry Depth Avoids Groundwater Interception	No	No	Yes	No	No
Quarry Backfill/Infill Alternatives	In-Quarry Base Case Storage	Yes	No	No	Not Evaluated	No
	In-Quarry Alternative Storage	Yes	No	No	Not Evaluated	No
	Partial Backfill to Prevent Post-quarrying Quarry Lake	Yes	Yes	Yes (prevent post Project quarry lake); No (potential for groundwater quality issues from flow-through)	No	No
	Backfill of Quarry to Create Post-quarrying Flow-through Conditions	Yes	No (NDEP would not permit flow-through)	No	No	No
	Rapid Infilling of the Post-quarrying Quarry with Water.	Yes	Yes	No	Not Evaluated	No

Group	Preliminary Alternatives	Consistent with Purpose and Need	Technically Practical and Feasible	Environmentally Reasonable	Economically Practical and Feasible	Alternative to Be Considered for Detailed Study in EIS?
Facilities Placement Alternatives	Adit Avoidance Alternative	Yes	Yes	No	Yes	No
	Moving Crushing Plant and Truck Facilities East closer to the Quarry	Yes	Yes	No	Not Evaluated	No
	Separate Stockpiles North-Northwest of the Quarry	Yes	Yes	No	Not Evaluated	No
	North OSF	Yes	Yes	Yes	Yes	This has been incorporated in the North and South OSF Alternative.
	Reduced Quarry Plan	Yes	Yes	No	Yes	No
	North and Southwest OSF	Yes	Yes	Yes	Yes	This has been incorporated in the North and South OSF Alternative.
	Comingled Stockpile West of the Quarry	Yes	Yes	No	Not Evaluated	No
	Processing Plant in Sparks, Nevada	Yes	Yes	No	No	No
	Spent Ore Storage, Separate Facilities at Siting Area 1 (South of Cave Springs Road)	Yes	Yes	No	Not Evaluated	No
	Spent Ore Storage, Comingled Facility at Siting Area 2 (North of Cave Springs Road)	Yes	Yes	No	Not Evaluated	No
	Cultural Resource Site Avoidance	Yes	Yes	Yes	Yes	This has been incorporated in the Proposed Action
	Surface Disturbance Avoids All Tiehm's Buckwheat Designated Critical Habitat	No	No	Yes	No	No
	Surface Disturbance Avoids All Tiehm's Buckwheat Designated Critical Habitat and its One Mile Buffer	No	No	Yes	No	No
Ore Conveyance Alternatives	Conveyor	Yes	No	No	Not Evaluated	No
	Autonomous Haul Trucks	Yes	Yes	Yes	Yes	This has been included in the Proposed Action
	Electric Vehicle (EV) Fleet	Yes	No	Not Evaluated	Not Evaluated	No

Group	Preliminary Alternatives	Consistent with Purpose and Need	Technically Practical and Feasible	Environmentally Reasonable	Economically Practical and Feasible	Alternative to Be Considered for Detailed Study in EIS?
Sulfuric Acid Plant Design Alternatives	Importing Sulfuric Acid (vs having a Sulfuric Acid Plant on site)	Yes	Yes	No	Not Evaluated	No
	Single absorption with a tail gas scrubber (with caustic reagent)	Yes	Yes	No	Not Evaluated	No
	Single absorption with MAX3™ (with solvent scrubber)	Yes	Yes	No	Not Evaluated	No
	Double absorption with heat recovery system and tail gas scrubber (with caustic reagent)	Yes	Yes	No	Not Evaluated	No
Leaching Alternatives	Heap Leach Facility	Yes	Yes	No	Not Evaluated	No
	Agitated Tank Tailings Storage Facility	Yes	Yes	No	Not Evaluated	No
Power Supply and Infrastructure Alternatives	55 kV and 120 kV Transmission Line and a 15 MW Service from NV Energy	Yes	Yes	No	Not Evaluated	No
	15 MW Prime Power Diesel Generation	Yes	Yes	No	Not Evaluated	No
	Grid Connection	Yes	Yes	No	Not Evaluated	No
	Diesel Internal Combustion Engine Alternative	Yes	Yes	No	Not Evaluated	No
	Natural Gas	Yes	Yes	No	Not Evaluated	No
	CNG/LNG/Propane Fuel	Yes	Yes	No	Not Evaluated	No
Aggregate Sourcing Alternatives	Near-Site Source	Yes	No	Not Evaluated	Not Evaluated	No
	Existing Commercial Sources	Yes	Yes	Yes	Yes	No – Under 40 CFR 1501.9, this is not considered a connected action.

Group	Preliminary Alternatives	Consistent with Purpose and Need	Technically Practical and Feasible	Environmentally Reasonable	Economically Practical and Feasible	Alternative to Be Considered for Detailed Study in EIS?
Haul Road From Quarry Road Alignment and Traffic Control Alternatives	Utilize Existing Road Where Possible	Yes	No	No	Not Evaluated	No
	Maximize Road Separation	Yes	Yes	Yes	Yes	This has been incorporated in the Proposed Action
	Overpass to Avoid Intersection	Yes	No	No	Not Evaluated	No
	Re-Route Road North of Processing Plant to Avoid Intersection	Yes	Yes	No	Not Evaluated	No
	Four-Way Stop	Yes	Yes	No	Not Evaluated	No
	Manned Guard Booth	Yes	Yes	Yes	Yes	This has been incorporated in the Proposed Action
Access Road Alternatives	Slowing of Quarrying Rate	Yes	No	No	Not Evaluated	No
	Silver Peak Access Road	Yes	No	Not Evaluated	Not Evaluated	No
	Gap Springs Access Road	Yes	Yes	No	Not Evaluated	No
	Alternate Adjacent Access Road	Yes	Yes	No	Not Evaluated	No
	Partial Paving	Yes	Yes	No	No	No
	Group Lithium-Boron trucks in Units From Mine Site (compared to free flow)	Yes	Yes	No	Not Evaluated	No
	Conveyor vs Truck Traffic	Yes	No	No	Not Evaluated	No
	Traffic Control Devices to Manage Traffic	Yes	Yes	Yes	Yes	This has been incorporated in the Proposed Action
	Cave Springs Road Revised Reroute Alternative	Yes	No	No	No	No
Water Use Alternatives	Pumping from Fish Lake Valley	Yes	No	No	Not Evaluated	No
Mine Law	Permit the Project Under 2920 Regulations	No	Not Evaluated	Not Evaluated	Not Evaluated	No

Appendix E: Biological Opinion for the Rhyolite Ridge Lithium-Boron Mine Project

United States Department of the Interior

Pacific Southwest Region
FISH AND WILDLIFE SERVICE
Reno Fish and Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, Nevada 89502

In Reply Refer to:
2024-0062693-S7-001

September 4, 2024
Sent Electronically

Memorandum

To: Field Manager, Tonopah Field Office, Bureau of Land Management

From: Field Supervisor, Reno Fish and Wildlife Office, U.S. Fish & Wildlife Service

KRISTEN JULE Digitally signed by KRISTEN JULE
Date: 2024.09.04 09:30:37 -07'00'

Subject: Biological Opinion for the Rhyolite Ridge Lithium-Boron Mine Project

This biological opinion is in response to the Bureau of Land Management's (BLM) request, received via electronic mail on April 1, 2024, for initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*). At issue is BLM's proposed approval of the plan of operations for the Rhyolite Ridge Lithium-Boron Mine Project (project) in Esmeralda County, Nevada. The BLM determined that the proposed project may affect, and is likely to adversely affect, the federally endangered *Eriogonum tiehmii* (Tiehm's buckwheat) and its designated critical habitat. BLM's proposed approval is conducted pursuant to the Federal Land Policy and Management Act of 1976, the Surface Management Regulations in 43 Code of Federal Regulations (CFR) 3809, as amended, and surface occupancy requirements under 43 CFR 3715.

This biological opinion is based on information provided in the Rhyolite Ridge Lithium-Boron Project Biological Assessment (Stantec Consulting Services, Inc. (Stantec) 2024) and correspondence, notes, and information compiled during our consultation with the BLM on the subject project. The information and other references cited in this biological opinion constitute the best scientific and commercial data available on the status and biology of the species and critical habitat considered.

CONSULTATION HISTORY

Ioneer Rhyolite Ridge LLC (Ioneer; project proponent) submitted a Plan of Operations (Plan) for the proposed project to the BLM in May 2020. In the following years, Ioneer made multiple revisions to the Plan, and BLM most recently accepted the Plan in August 2022. A revised summary of the preferred alternative was submitted to BLM by Ioneer in 2023. Ioneer's changes to the Plan between 2020 and 2023 have resulted in decreased impacts to *Eriogonum tiehmii* and its designated critical habitat (Figure 1).

Ioneer has been engaged with the BLM and the Service regarding the protection of *Eriogonum tiehmii* and measures to ensure the long-term viability of the species since the Plan was first proposed in 2020. As a result of these discussions, Ioneer moved project features and scaled back the extent of proposed impacts to *E. tiehmii* to approximately 191 acres under the proposed project (Stantec 2024). In addition, Ioneer incorporated measures to conserve *E. tiehmii* into the design of the current Plan, as described in the Buckwheat Protection Plan (WestLand 2024a). The Buckwheat Protection Plan is considered part of the proposed project. In addition, all activities have been designed to avoid any surface disturbance within occupied habitat for *E. tiehmii.*

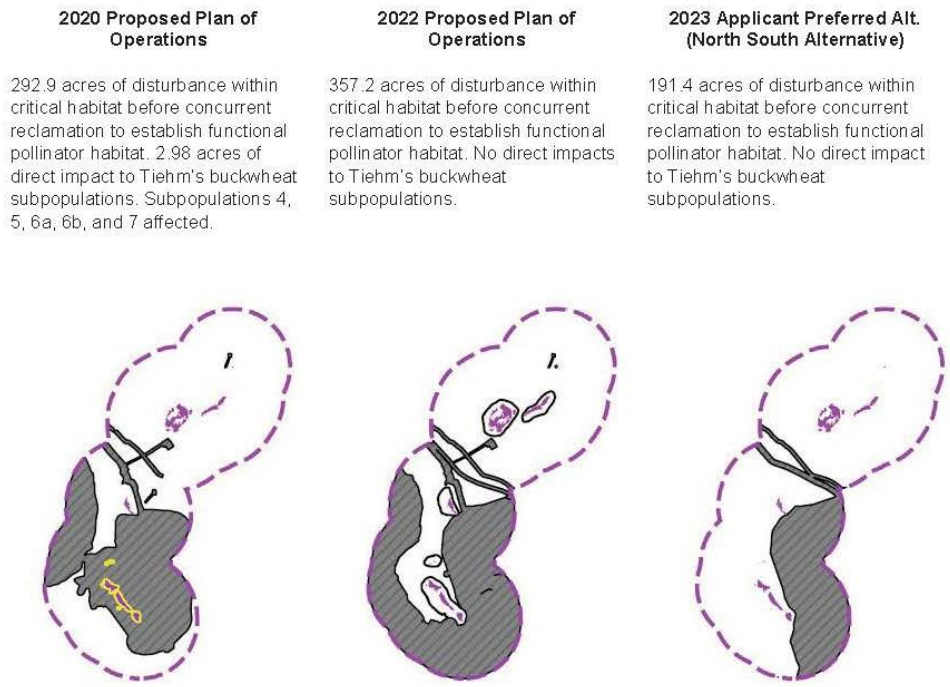


Figure 1: Ioneer's project redesigns to conserve Eriogonum tiehmii and its critical habitat. Critical habitat is outlined by a hatched purple line, and the occupied E. tiehmii habitats are depicted as purple polygons. Grey polygons display the extent of impacts from the proposed project within critical habitat. The left-most figure was the Plan as proposed in 2020. The middle figure depicts the Plan as proposed in 2022. The right-most figure shows the project as currently proposed and considered in the biological opinion (WestLand 2024a).

Beginning in January 2023, staff from the Service, BLM, and Ioneer have met several times to discuss the proposed project and address specific issues. The Service received BLM's draft biological assessment for the proposed project on January 18, 2024. The Service received the BLM's request for initiation of section 7 formal consultation on the proposed project on April 1, 2024. The draft environmental impact statement was published on April 15, 2024 (88 Federal Register (FR) 2883). The Service received the final biological assessment on July 18, 2024 (Stantec 2024). The Service provided a draft copy of the biological opinion to the BLM for review on July 19, 2024. The BLM submitted comments on the draft biological opinion to the Service on August 2, 2024.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

At issue is BLM's proposed approval of the plan of operations for the construction, operation, and closure of a new lithium-boron mine (proposed project). If approved by BLM, the footprint of the proposed project will encompass approximately 7,166 acres, which consists of an Operational Project Area (OPA), and an Access Road and Infrastructure Corridor. The total proposed surface disturbance from the OPA will be 2,266 acres (see Figure 22), including approximately 191 acres of disturbance within designated critical habitat for *Eriogonum tiehmii*.

The mine will operate 24 hours per day, 365 days per year for approximately 23 years. The 23-year mine life encompasses the construction, mining, processing, and reclamation and closure phases. This does not include the years required for the pollinator habitat reclamation monitoring and reporting period, which is anticipated to occur from years 20 to 35. Therefore, the life of the action refers to the entire 35-year period, inclusive of pollinator habitat monitoring, reporting, and management activities.

The following paragraphs briefly describe the various elements of the proposed project that BLM is considering for approval, as described in the biological assessment (Stantec 2024) and the Buckwheat Protection Plan (WestLand 2024a) (see Figure 2 and Figure 3). Refer to those documents for additional project details. The Buckwheat Protection Plan is considered part of the proposed project and is incorporated into the biological assessment in its entirety as Appendix B (Stantec 2024). Where applicable, the following paragraphs describe the location of project elements in relation to designated critical habitat for *E. tiehmii* to provide spatial context. The Environmental Baseline and Effects Analysis sections of this biological opinion provides more details about the location of the project elements in relation to *E. tiehmii* and its critical habitat.

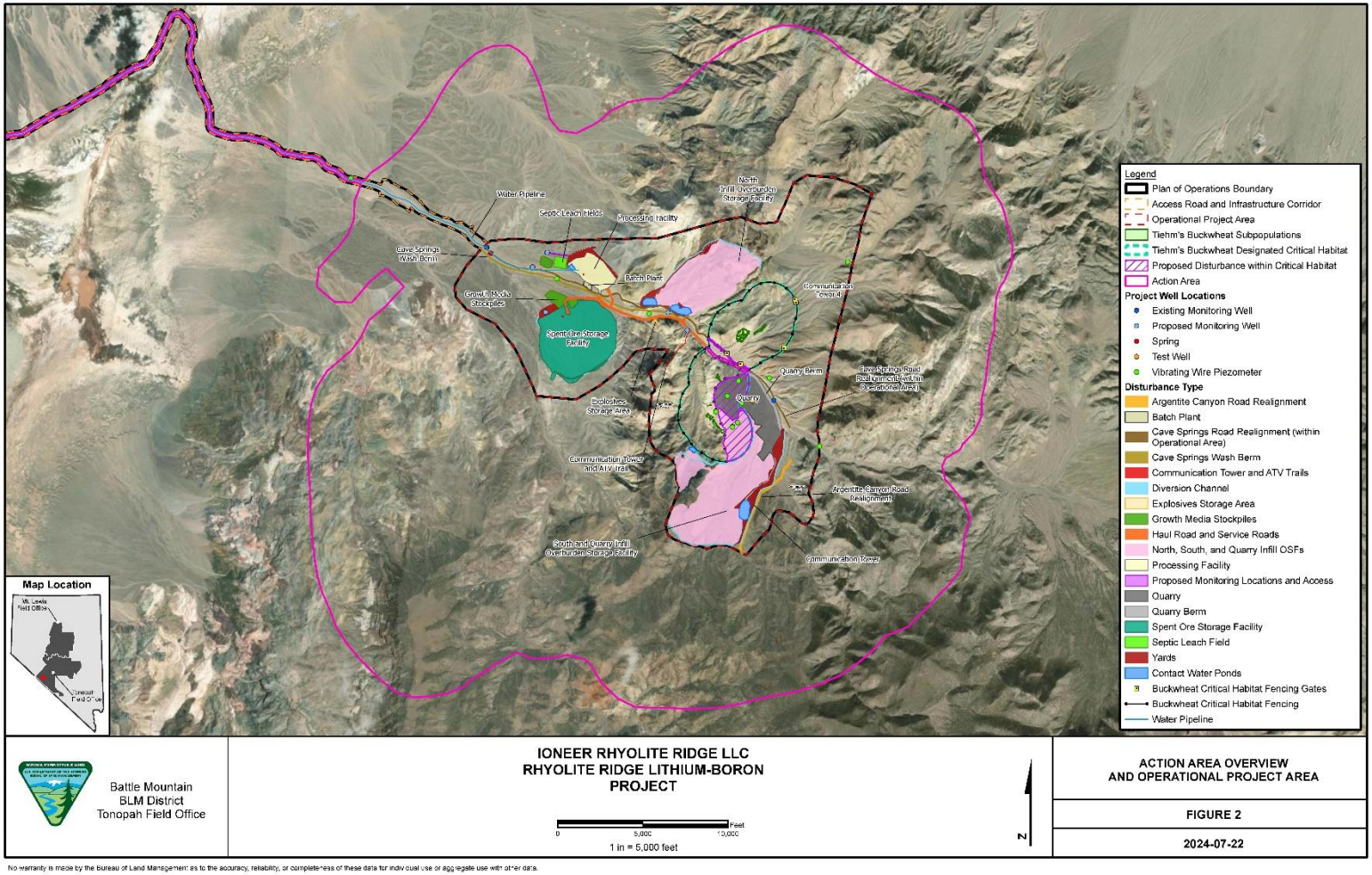


Figure 2: Proposed mine elements (Stantec 2024)

Exploration

If approved by the BLM, Ioneer will conduct exploration and resource definition activities concurrent with mining operations. Exploration activities may consist of reverse circulation and core drilling from constructed drill sites with single or double sumps, constructed roads, overland travel routes, bulk sampling, geotechnical auger holes, and geological test pits. Exploration activities will disturb 35 acres of habitat in areas proposed for disturbance by the eventual quarry or other project elements or will occur outside of designated critical habitat.

Mining Operations

If approved by BLM, Ioneer will excavate overburden rock and ore from a surface quarry. Haul trucks will transport ore to the processing plant, overburden rock and lithium-rich clays to two external overburden storage facilities (OSFs) or to the internal Quarry Infill OSF, and the residuum from the processing plant to the Spent Ore Storage Facility (SOSF). Ore will be crushed and placed into a vat leach system where sulfuric acid will be used to leach the lithium and boron. An evaporation/crystallization process will be used to produce lithium and boron products, which will be shipped off-site. Spent ore from the vat leach and evaporation/ crystallization processes will be dewatered at the processing plant area, then trucked to the SOSF.

Transportation for the import of equipment and supplies and export of processed materials will occur from State Route (SR) 264 along the existing road in the Access Road and Infrastructure Corridor to the OPA. Water used for the processing plant and dust control will be sourced from on-site groundwater wells within the OPA and from existing agricultural wells and a new pump station located on private land in the Fish Lake Valley and within the Access Road and Infrastructure Corridor Area. Water from this well will be pumped via a pipeline adjacent to SR 264 and the access road to the processing plant.

Site preparation will be conducted in accordance with the grading plan and design for each component and will include clearing, grubbing, and salvaging of growth media (approximately 6 inches of the alluvium from initial grubbing/grading activities at facilities such as the OSFs) for concurrent or future use in reclamation (*e.g.,* habitat restoration). See the *Growth Media Stockpiles* section for additional details. Ioneer will realign segments of a county road that bisects the OPA, Cave Springs Road, to accommodate a haul road prior to the start of construction. Ioneer will also install appropriate downgradient stormwater and sediment control features at the onset of construction and throughout the construction process in accordance with a Stormwater Management Plan.

The processing plant will be approximately 1.2 miles away from *Eriogonum tiehmii* critical habitat. Approximately 87 acres of the South and Quarry Infill OSF and 86 acres of the quarry will occur within *E. tiehmii* critical habitat. The North OSF will be constructed 382 feet outside *E. tiehmii* critical habitat. The SOSF will be constructed approximately 1-mile away from *E. tiehmii* critical habitat. The processing plant will be approximately 1.2 miles away from *E. tiehmii* critical habitat.

Between approximately 400 to 500 people will work at the site during construction; 350 peoplewill be employed for the mining and processing phases, in staggered shifts (Stantec 2024). During the construction phase, Ioneer estimates that daily traffic will vary from 186 to 248 vehicle passes on the access road. Daily traffic will vary from 230 to 288 vehicle passes during operations (Stantec 2024).

Quarry Development

The quarry will be constructed and operated in phases. Excavation of the quarry will commence concurrently with the beginning of site construction activities and will be developed using open cast quarrying methods that utilize heavy equipment (*e.g.,* backhoe excavators, loaders, dozers, and haul trucks) to remove overburden to the OSFs. Explosives will be used to achieve sufficient fragmentation to allow removal of the certain overburden units as well as the ore zone. No blasting will occur within the alluvium and lithium-rich clay units, which means that minimal blasting will be required during the initial quarry development near the ground surface. Following blasting, backhoe excavators will be used to extract the ore and overburden. Development of the quarry, including mining and backfilling, will be completed within approximately 18 years after initiation.

A diversion structure will be installed around the southern end of the quarry to prevent surface water from entering. In addition, a 60-foot-wide quarry berm within a 200-foot-wide disturbance area will be constructed between the quarry and Cave Springs Wash. Cave Springs Wash is a natural feature where surface water collects during precipitation events. For the portion within critical habitat, the haul road will be co-located with Cave Springs Wash. A berm will be constructed along Cave Springs Wash with overburden and be approximately 10 feet high. The maximum quarry depth is anticipated to be approximately 960 feet.

A 6-foot-high berm with slopes at an angle-of-repose and a fence will be constructed around the quarry perimeter, except within *Eriogonum tiehmii* critical habitat, which will be fenced during initial quarry excavation along the quarry rim. At reclamation, the size of the berm may be larger to enhance safety and accommodate the storage of excavated alluvium and the fence will be removed. After closure, the berm around the non-backfilled portion of the quarry will remain.

Quarry Geotechnical Design and Stability

Geo-Logic Associates conducted slope stability studies in 2022 and 2023 to address concerns about quarry slope stability in zones of the quarry near *Eriogonum tiehmii* subpopulations (Geo-Logic Associates 2022; Geo-Logic Associates 2023). Consistent with the 2022 and 2023 studies, development of the quarry will be conducted to optimize the extraction of ore while maintaining geotechnical stability using a factor of safety of 1.2 or greater. This will be achieved in the vicinity of *E. tiehmii* subpopulations by using 10-foot benches (instead of the 30-foot benches proposed in other areas of the quarry) and installing ground anchors. Ioneer will implement a multi-tiered monitoring system to determine if and when potential failure of quarry faces might occur. The monitoring program will include daily visual inspections of quarry faces, mapping, and monitoring. The monitoring program will have two goals: to ensure the safety of the mining

operation and to guard against failure of the quarry slopes proximal to the *E. tiehmii* subpopulations.

If unstable zones are discovered, Ioneer will implement procedures and protocols that could include suspension of mining activities at the site of failure, stopping mining activities altogether to resolve the problem, and implementation of mitigation protocols to stabilize the quarry faces.

In the post-mining efforts to ensure stability of quarry faces and the overall slope of the final quarry, Ioneer will install buttresses along the western quarry wall.

Quarry Dewatering

During mine operations, surface water (*i.e.,* rainfall and snowmelt) and local groundwater entering the quarry will be intercepted by in-pit sumps, drains, and/or dewatering wells. Pipelines will convey the water to sumps around the perimeter of the quarry for storage. The water will be used for dust suppression within the quarry or on other roads, or for other project-related activities. During reclamation and after mining, dewatering will cease, and a quarry lake will form. Dewatering operations may require use of powerlines or generators, which will be constructed or occur in areas already proposed for disturbance within designated critical habitat.

Growth Media Stockpiles

During quarry development, the top 6 inches of topsoil and associated vegetation will be salvaged and retained as a growth media resource for subsequent reclamation efforts. Growth media stockpiles will be constructed at the SOSF and west of the processing plant. Surfaces of the stockpiles will be contoured with slopes at 3:1 (horizontal: vertical) to reduce erosion, and growth media stockpiles will be seeded with an interim seed mix to stabilize material, reduce wind and water erosion, and minimize the establishment of non-native, invasive plant species. Growth media stockpiles will not be constructed within *Eriogonum tiehmii* critical habitat.

Overburden and Backfill Management

If approved by BLM, the OSFs will be constructed within the valley to the south of the quarry (South OSF), the valley to the north of the quarry and the Cave Springs Wash (North OSF), and in the southern and western portions of the quarry (Quarry Infill OSF). Portions of the Quarry Infill OSF would be constructed within the *Eriogonum tiehmii* critical habitat boundary. The North and South OSF would be constructed outside of *E. tiehmii* critical habitat.

The South and North OSFs will be cleared and grubbed of vegetation prior to use and approximately 6 inches of alluvium will be retained for reclamation growth media and stored in stockpiles. The OSFs will be built using a progressive approach that combines construction with operation involving sequential site preparation, underdrain construction, placement, and concurrent reclamation. The overburden will be hauled via truck and dumped from the adjacent quarry. Each layer or “lift” of overburden will be 20 feet high. Ioneer will separate the lifts with benches that are wide enough to maintain side slopes on the lifts of 3:1 (horizontal: vertical). Slopes will be graded to drain to the reclamation benches. Alluvial overburden will be placed

along the outer slopes of the OSF concurrently during ongoing mining operations as part of the closure process.

The final placement of overburden will be in the Quarry Infill OSF, which will begin in the southernmost part of the quarry and proceed upward and north as the quarry expands to the north. The Quarry Infill OSF will reach a height of approximately 300 feet above the adjacent ground to the south.

Geochemical studies indicate that metals may leach from some of the overburden rock that originates in the quarry. Leaching potential for several metals, including arsenic, aluminum, antimony, iron, and manganese, is consistent with existing, naturally elevated concentrations of these elements in groundwater and surface water. In response, runoff from the OSFs will be directed to the lined OSF contact water ponds. Monitoring wells will be placed downgradient of the OSFs to assess groundwater quality throughout the 23-year mine life and provide responsive indicators and allow for management options in coordination with BLM and the Service to be implemented should any deviation in water quality be identified. Monitoring wells will not be constructed within *Eriogonum tiehmii* critical habitat.

During reclamation, the OSF slopes will be regraded to blend with the surrounding topography and covered with a minimum of 30 inches of alluvial cover (including approximately 6 inches of growth media) and revegetated.

Infrastructure

If approved by BLM, Ioneer will construct the following facilities to support the proposed project.

Access Road and Infrastructure Corridor

The Access Road and Infrastructure Corridor consists of approximately 13 miles of roadway between SR 264 and the western edge of the OPA, as well as approximately 6 miles along SR 264 to the Fish Lake Valley. The Access Road and Infrastructure Corridor will be approximately 2.7 miles from *Eriogonum tiehmii* designated critical habitat.

Haul Roads and Service Roads

Most of the traffic entering and exiting the OPA will be passenger vehicles, semi-trucks providing material and supplies, and vehicles (including buses) transporting employees. The initial traffic will include equipment for early works mobilization and site grading, as well as construction equipment and materials for construction of the batch plant.

Two primary types of roads will be constructed within the OPA: service roads and haul roads. Service roads will move equipment and supplies between the various project components and will provide for light-vehicle traffic. These service roads will not exceed 8% grade and be approximately 20 feet (nominal) wide plus shoulders, sufficient to safely pass equipment and supplies.

Haul roads will allow the haul trucks to transport ore, overburden, and spent ore between the quarry, processing plant, OSFs, and SOSF, with enough space incorporated into the design to allow for safe passage of two 150-ton haul trucks as well as sufficient room for safety berms and surface water runoff control systems. These roads will be constructed as close to natural grade as possible (maximum grade of 10%) with balanced cut/fill widening, as necessary. Haul roads will be maintained on a routine basis to ensure safe, efficient haulage operations and to minimize fugitive dust and diesel emissions. Ioneer relocated the haul road, as proposed in previous Plan of Operations (see *Consultation History*), from adjacent to *Eriogonum tiehmii* subpopulations to the east side of the quarry, away from the subpopulations south of Cave Springs Road. With this relocation, the majority of the haul road that is not within the quarry footprint will now be located outside of critical habitat except as necessary to exit the quarry and get to the processing plant and the North OSF.

The Cave Springs Wash berm is co-located with the haul road along Cave Springs Road and is described in more detail under the *Quarry Development* section above. Approximately 2,755 feet and 10 acres of the haul road and Cave Springs Wash berm will occur within *Eriogonum tiehmii* critical habitat.

All roads will be constructed using in-situ material. Inert overburden rock may be used as supplemental material, as necessary, either during construction or as part of subsequent maintenance activities.

All service and haul roads will be maintained according to Mine Safety and Health Administration standards and will accommodate drainage and sediment controls. Dust will be controlled with water trucks and/or a BLM- and Service-approved chemical binding agent.

Cave Springs Road Realignment

Cave Springs Road is an existing road on public land that bisects the OPA. This road will require a localized realignment within the OPA to accommodate planned haul roads. Approximately 3,008 feet and 6.5 acres of the Cave Springs Road realignment will occur within *Eriogonum tiehmii* critical habitat.

Power Supply and Distribution

Diesel-powered generators will supply power for the project during construction. Following construction, Ioneer will generate its own power with a steam turbine generator at the processing plant. The steam turbine generator, and associated facilities, will be constructed at the processing facility, outside of *Eriogonum tiehmii* critical habitat. Activities associated with dewatering may include powerlines or generators. The powerlines or generators needed for dewatering operations will be constructed or occur in areas already proposed for disturbance.

Ancillary Facilities

Ioneer will construct the following ancillary facilities to support implementation of the proposed project. Additional details about each of these facilities can be found in the biological assessment (Stantec 2024).

Processing Plant

This facility, where minerals will be processed to separate the lithium and boron from the mine ore, will be approximately 1.2 miles away from *Eriogonum tiehmii* critical habitat.

Spent Ore Storage Facility

The SOSF, where waste material from mining operations will be stored, will be approximately 1.0 mile away from *Eriogonum tiehmii* critical habitat.

Explosives Storage Area

Explosives will be used in certain areas to break up the overburden and the ore zone to allow adequate removal. The explosives storage area will be approximately 3,021 feet from *Eriogonum tiehmii* critical habitat.

Septic Leach Fields

Septic leach fields or a sewage package plant will be constructed west of the processing facility, which is over 1-mile away from *Eriogonum tiehmii* critical habitat.

Communication Towers

Ioneer will construct five communication towers powered by solar panels with battery backup. Communication Towers 1 and 2 will be constructed at the processing facility and SOSF, respectively. Communication Towers 3, 4, and 5 will be constructed 1,311 feet, 80 feet, and 2,759 feet outside of *Eriogonum tiehmii* critical habitat, respectively. An existing off-highway vehicle (OHV) road will be used to access Communication Tower 4. The existing road is currently within *E. tiehmii* critical habitat.

Monitoring Wells

Ioneer will construct monitoring wells adjacent to and downslope of project features within the OPA. Access to Monitoring Well 1 will require travel through *Eriogonum tiehmii* critical habitat on Cave Springs Road.

Water Supply Facilities

Water wells, pump station, and pipelines will primarily be constructed within the Access and Infrastructure Corridor outside of the OPA, approximately 2.7 miles from *Eriogonum tiehmii*

critical habitat, or at the processing plant, which is approximately 1.2 miles away. Nine vibrating wire piezometers and/or test wells will be constructed within the quarry or the South and Quarry Infill OSF footprint.

Stormwater Diversion Channel

Stormwater diversion channels will occur around the quarry and South and Quarry Infill OSF. Surface water diversion channels will border the OSFs to capture surface runoff from the surrounding natural topography. Non-contact water will be diverted around the OSF and directed toward the natural drainages. Runoff from the facility will be directed to and collected at a lined contact water pond (OSF contact water ponds) to preclude the potential of metals leaching from the facility. Temporary sediment control structures will be installed as part of the incremental development of the OSFs and will be sized appropriately for the 100-year, 24-hour storm event. Storm diversion channels will occur outside of *Eriogonum tiehmii* critical habitat.

Yards

Yards will be located at the SOSF, processing plant, North OSF, and adjacent to the quarry and South and Quarry Infill OSF. These yards will be approximately 1.5 miles, 1.2 miles, and 1,559 feet from *Eriogonum tiehmii* critical habitat, respectively.

Batch Plant

The batch plant will be located south of the processing plant, approximately 1.4 miles from *Eriogonum tiehmii* critical habitat, and will not be retained after construction.

Waste Management

If approved by BLM, employee training plans will address appropriate disposal practices, to include education on which wastes may be placed in a landfill, as well as management of regulated substances. Nonhazardous solid wastes will be disposed off-site in a licensed facility. Waste that may be regulated under the Resource Conservation and Recovery Act will be managed accordingly.

Spills and releases of hydrocarbons, non-hazardous, and hazardous materials will be contained, mitigated, stored, and properly transported off-site in accordance with applicable guidelines. Spill containment and clean-up equipment will be maintained at strategic locations throughout the OPA, including oil absorbent rolls, oil absorbent pads, oil absorbent booms, oil absorbent pillows, spill kits, and empty drums.

No storage of hazardous material or waste disposal will occur within, or in proximity to *Eriogonum tiehmii* critical habitat. Potential petroleum release from equipment or vehicular travel may occur within *E. tiehmii* critical habitat.

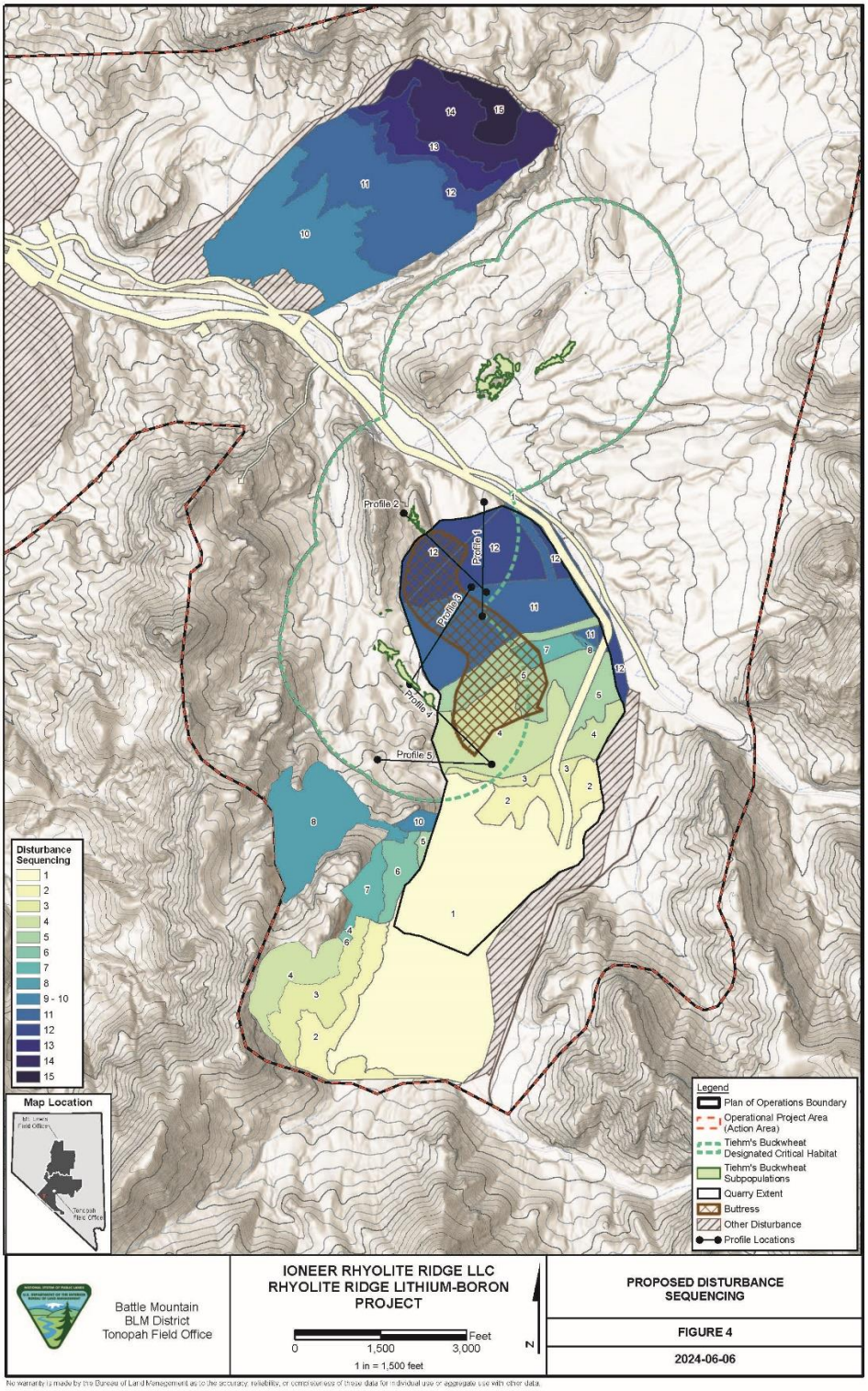


Figure 3: Project disturbance sequencing (Stantec 2024)

Reclamation

If approved by the BLM, the proposed project will result in the cumulative disturbance of 191.4 acres of *Eriogonium tiehmii* critical habitat (see Table 1). Ioneer will implement the reclamation and closure phase of the project between years 18 and 35, and will reclaim 146 acres of *E. tiehmii* critical habitat. Different reclamation standards will occur within and outside of *Eriogonum tiehmii* critical habitat. This section of the biological opinion will describe reclamation outside of critical habitat; the reclamation proposed within critical habitat is described in the Conservation Measures section, under Applicant-Proposed Conservation Measure 6.

The OSFs outside of *Eriogonum tiehmii* critical habitat will be reclaimed concurrently with active use, with reclamation benches constructed every 100 vertical feet and overall reclaimed side slopes of 3:1 (horizontal: vertical). All areas of disturbance associated with the haul roads and unneeded service roads outside of *E. tiehmii* critical habitat will be reclaimed at closure by ripping the surface to loosen the compacted soil. Once ripped, they will be regraded to blend with local topography to limit erosion and promote natural drainage. A 16-foot-wide all-terrain-vehicle road will remain where the haul road used to be for monitoring access. Slope stability monitoring will include visual inspections.

The reclamation areas outside of *Eriogonum tiehmii* critical habitat will be covered with native materials that can generate unimpacted runoff or store water during the colder times of the year and remove it through evaporation and evapotranspiration during the warmer months. Growth media for the South and Quarry Infill OSF will be sourced directly from the quarry material. Prior to placement of the growth media, the subsurface will be roughened by ripping, and then the growth media will be placed and spread using a minimal number of passes to limit compaction. Upstream drainages will be diverted away from reclaimed facilities to prevent potential erosion, where practicable. Seedbed preparation will be conducted, as needed, following growth media placement. Ioneer anticipates that soil amendments will not be needed due to adequate availability of retained native growth media (alluvium). Mulching will occur on areas where growth media has been applied to provide erosion control, promote soil moisture retention, and provide supplemental organic material. Broadcast seeding will primarily be used, with hydroseeding as a secondary method.

The reclamation seeding and seed mix outside of designated critical habitat is described in detail in the biological assessment (Stantec 2024). All seed will be certified, properly labeled, and will meet the requirements of the Federal Seed Act and the seed and noxious weed laws of Nevada.

Table 1: Project development and reclamation activities for quarry, overburden stockpiles, and ancillary facilities within critical habitat. Pollinator habitat reclamation represents the acres of reclamation to be accomplished using the methods outlined in this document for critical habitat. Highwall bench reclamation acres represent the acreage of quarry highwall benches where the benches will be ripped and seeded, but no further reclamation will occur due to safety concerns. Cumulative acres reclaimed is the running total of reclamation through the life of the Action within critical habitat. Reclaimed in current year represents the total acres reclaimed in any given year within critical habitat. The quarry lake, Cave Springs Road realignment, and OHV road used for monitoring access will remain as unreclaimed features, which amount to a total of 45 acres (Stantec 2024)

Year of Implementation	Cumulative Acres Disturbed	Reclamation of Pollinator Habitat	Reclamation of Highwall Bench	Cumulative Acres Reclaimed	Reclaimed in Current Year
1	21.1			0.0	0.0
2	21.4	3.2		3.2	3.2
3	23.6			3.2	0.0
4	66.9			3.2	0.0
5	87.9			3.2	0.0
6	87.9			3.2	0.0
7	88.2			3.2	0.0
8	88.2			3.2	0.0
9	88.2			3.2	0.0
10	88.2			3.2	0.0
11	133.8			3.2	0.0
12	191.4			3.2	0.0
13	191.4			3.2	0.0
14	191.4		6.8	10.0	6.8
15	191.4		7.1	17.1	7.1
16	191.4			17.1	0.0
17	191.4			17.1	0.0
18	191.4		16.5	33.6	16.5
19	191.4	103.0	9.6	146.2	112.6
TOTAL	191 (rounded to nearest whole acre)	106	40	146	Not applicable

Conservation Measures

If approved by BLM, Ioneer will implement various conservation measures to avoid and minimize project-related adverse effects to *Eriogonum tiehmii* and its critical habitat, as described in detail in the biological assessment and Buckwheat Protection Plan (Stantec 2024; WestLand 2024a). The Buckwheat Protection Plan is considered part of the proposed project and is incorporated into the biological assessment in its entirety as Appendix B (Stantec 2024). The Service provides a summary of the conservation measures below. The conservation measures are identified as either environmental protection measures (EPM) or applicant-proposed conservation measures (APCM) in the biological assessment. Implementation of the project as described in BLM's biological assessment, which includes the Buckwheat Protection Plan, the

APCMs, and the EPMs, are components of the proposed action; the analysis contained in this biological opinion is based upon the implementation of these conservation measures.

Ioneer's conservation measures include numerous monitoring commitments (see Appendix A). The goal of all monitoring associated with the species and its critical habitat is to assist Ioneer in detecting changes in site conditions that may be caused by various aspects of the proposed project and to implement measures to further minimize adverse effects to *Eriogonum tiehmii* and its critical habitat.

APCM-1. Avoidance of Tiehm's Buckwheat and Designated Critical Habitat.

Ioneer redesigned substantial parts of its Plan of Operations since its original plan was submitted in 2020 to avoid direct impacts to *Eriogonum tiehmii* subpopulations and minimize impacts to critical habitat.

APCM-2. Geotechnical Design of the Quarry Walls to Provide Appropriate Margins of Safety.

Ioneer will incorporate geotechnical design of the quarry wall for stability during operations. The design factor of safety criteria for quarry wall stability during operations is 1.20 or greater, and where necessary ground anchors will be installed to achieve this factor of safety. Geotechnical design will be incorporated into the closure of the quarry, including construction of buttresses where ground anchors were required, to provide long-term stability of the walls to minimize the risk of quarry wall collapse adjacent to *Eriogonum tiehmii* subpopulations and within its critical habitat. The modeled slope stability in the vicinity of the *E. tiehmii* subpopulations in the closed quarry will range from 1.81 to 2.71 (Geo-Logic Associates 2023; WestLand 2024a).

APCM-3. Geotechnical Monitoring

Ioneer will implement multiple geotechnical monitoring systems to ensure the stability of the quarry walls to avoid adverse effects to *Eriogonum tiehmii* and its critical habitat that occur outside of the quarry. This will be accomplished by visual inspections and radar systems, providing continuous monitoring of the site during the mining operations. If indicated through monitoring that additional management actions, such as deployment of additional ground anchors, additional layback of the quarry wall, or buttress construction, these will be implemented to ensure quarry wall stability.

APCM-4. Establish Fencing and Signage to Protect Tiehm's Buckwheat and Critical Habitat

Ioneer will place fencing and or signage, as appropriate, along the limits of proposed disturbance within *Eriogonum tiehmii* critical habitat, as well as around, but outside of critical habitat to prevent unauthorized access or disturbance outside of proposed areas. Fencing outside of the limits of proposed disturbance will be constructed one foot away from *E. tiehmii* critical habitat.

Fencing will be four-strand wildlife-friendly design with the top and bottom strands using barbless wire. Gates will be constructed at key areas to control access to *Eriogonum tiehmii* critical habitat. The fence locations will be located and staked prior to construction by a land surveyor licensed in Nevada. During survey of the fence alignment and fence construction, a biological monitor will be present.

APCM-5. Restrict Public Access to the County Road

Ioneer will restrict public access to all roads in and through *Eriogonum tiehmii* critical habitat to prevent unauthorized access or disturbance outside of designated areas. Ioneer will use pilot vehicles to manage interactions between the public and mine traffic on the county road. This will minimize potential adverse effects to *E. tiehmii* and its critical habitat from unauthorized access.

APCM-6. Pollinator Habitat Reclamation Within Critical Habitat

Ioneer will enhance reclamation efforts inside of *Eriogonum tiehmii* critical habitat to help conserve pollinators and minimize the project-related adverse effects of habitat loss for pollinator species. The overall goal of the reclamation is to support the restoration of ecosystem processes and functions. Reclamation efforts inside of critical habitat will be enhanced to accelerate the establishment of habitat suitable for the various life history stages of the diverse pollinator guild that supports *E. tiehmii* (Functional Habitat). Ioneer will experiment, refine, and optimize various restoration methods during early phase reclamation efforts. Beginning in year 4 of quarry operations, experimental test plots for habitat restoration will be implemented on areas outside of *E. tiehmii* critical habitat to better inform pollinator habitat reclamation within critical habitat when it begins.

Reclaimed sites will be assessed both qualitatively and quantitatively. A qualified ecologist will qualitatively evaluate the conditions of the sites quarterly to identify any areas that will require additional work such as supplemental seeding or other stabilization efforts. Annual quantitative assessments of reclaimed sites will be conducted to determine progress towards the interim functional habitat and final reclamation success objectives and to inform management activities, as appropriate. The protocols and procedures to evaluate enhanced reclamation methods to achieve the reclamation objectives outlined in this plan will be developed in collaboration with the Service and BLM prior to year 2 of the project and will include interim and final success criteria. Annual reports detailing the monitoring efforts will be submitted to the BLM and the Service.

APCM-7. Control of Nonnative, Invasive, and Noxious Species

Ioneer will implement a non-native, noxious, and invasive weed species control program within the operations footprint to minimize project-related adverse effects from non-native species. The noxious weed program will occur through the life of the project, until final reclamation success criteria have been achieved and the bond has been released. The noxious weed monitoring and control plan will be developed prior to implementation of project construction in coordination with the BLM and the Service. Ioneer will utilize herbicides and hand-pulling methods within

and outside of critical habitat. Ioneer will implement multiple measures to reduce the risk of exposing *Erigonium tiehmii* to herbicides, such as utilizing a 50-foot-wide buffer from subpopulations for herbicide application and measures to reduce herbicide drift. Weed control within the 50-foot-wide buffer will be accomplished using hand pulling or other approved hand-operated mechanical methods. All herbicide applicators will be state certified, receive site-specific training, and either be qualified as or accompanied by a biological monitor. Herbicide application will meet all product label requirements. Ioneer will require herbicide applicators to be knowledgeable of plant identification to ensure that assigned staff have a working knowledge in the identification of nonnative, invasive, or noxious weed species as well as native plant species. Annual reports detailing the monitoring and treatment efforts will be submitted to the BLM and the Service.

APCM-8. Light Management to Minimize Adverse Impacts to Pollinators

Dark sky lighting best management practices will be used throughout the operations area to minimize the adverse effects of lighting on *Eriogonum tiehmii* and its critical habitat through light-related disturbance to pollinators. Key elements of light management to minimize impacts to pollinators will include the use of state-of-the-art light sources that can be switched on and off easily and dim well. Ioneer will conduct an annual audit of lighting fixtures and will deploy light monitoring equipment proximate to *E. tiehmii* subpopulations. Light monitoring equipment will be co-located at noise monitoring sites (APCM-17) to capture the intensity of lighting and frequency of light being detected (see Figure 4).

Light monitoring, along with other biotic and abiotic monitoring data (*e.g.,* noise, local weather conditions, and dust deposition), will be used to explore and identify, to the extent practicable, changes in site condition within critical habitat and year-over-year shifts (if any) in potential pollinator/insect visitor diversity and abundance and *Eriogonum tiehmii* demographics. If monitoring data shows negative trends, Ioneer will implement measures to minimize effects caused by lighting. Annual reports synthesizing the monitoring data will be submitted to the BLM and the Service.

APCM-9. Dust Control and Monitoring of Fugitive Dust Emissions within Tiehm's Buckwheat Subpopulations

Fugitive dust will be controlled on roadways and other areas to minimize adverse effects to *Eriogonum tiehmii* and its critical habitat (*e.g.,* pollinators). Along the haul road, proximate to *E. tiehmii* subpopulations and critical habitat, control efforts will be implemented with water applications and approved dust suppressants. Ioneer will collect baseline data on dust and deploy dust monitoring stations near *E. tiehmii* populations (see Figure 4). Dust deposition from each of the monitoring sites will be collected and reported monthly along with information about project implementation (*e.g.,* haul road traffic). If the trailing 12-month average dust deposition level at any monitoring site exceeds the standard of 4 grams per square meter (g/m^2) per day, Ioneer will take measures to minimize dust generation. If these measures do not result in a material reduction in dust deposition attributable to mining activities, Ioneer will evaluate specific placement of dust control fencing or establishment of reduced speed limits (*i.e.,* less than the 35

miles per hour) along the haul road proximate to *E. tiehmii* subpopulations to reduce dust deposition.

Ioneer will fund research using *Eriogonum tiehmii* plants it has growing in its greenhouse (as authorized under their recovery permit under the Act) and, if authorized by BLM and the Service, will fund in-situ studies at the site. Dust monitoring data, along with other biotic and abiotic monitoring data (*e.g.,* noise, light, local weather conditions) will be used to explore and identify, to the extent practicable, changes in site condition within critical habitat and year-over-year shifts (if any) in potential pollinator/insect visitor diversity and abundance and *E. tiehmii* demographics. Annual reports synthesizing the monitoring data will be submitted to the BLM and the Service.

APCM-10. Remove Fencing and Debris from the Three Transplant Experimental Sites Located within Tiehm's Buckwheat Critical Habitat

Ioneer will restore areas formerly used for research activities related to *Eriogonum tiehmii* on BLM land. Fencing and debris from these sites will be removed and disposed of, and the sites will be regraded (as needed) and seeded with species approved by BLM and the Service.

APCM-11. Minimize the Effects of Blasting to Tiehm's Buckwheat Subpopulations and Critical Habitat

Ioneer will implement measures to minimize the adverse effects of energy transmission from blasting to *Eriogonum tiehmii* populations and critical habitat. To protect *E. tiehmii* from flyrock (rock that is ejected from the blast site) and minimize dust generated by blasting, Ioneer will physically arrest flyrock by muffling/covering the blasting area with heavy rubber mats/wire rope mats and/or other suitable covering materials when blasting within 100 meters of any *E. tiehmii* subpopulation.

APCM-12. Demographic and Recruitment Monitoring

Ioneer will collect quantitative data along previously established transects on an annual basis to estimate the number of plants in each subpopulation and track changes in population density, flower production, and size structure. Ioneer will continue *Eriogonum tiehmii* seed collection efforts in accordance with the currently accepted standards determined by the Center for Plant Conservation. Ioneer will continue long-term monitoring of seed viability in support of the demographic monitoring outlined in this APCM. Specific procedures and protocols outlining the data collection, reduction, and long-term data management and reporting for this APCM will be developed in cooperation with the Service and BLM.

Demographic and recruitment monitoring, along with abiotic monitoring data (*e.g.,* noise, light, local weather conditions, and dust deposition) will be used to explore and identify, to the extent practicable, changes in site condition within critical habitat and year-over-year shifts (if any) in potential pollinator/insect visitor diversity and abundance and *Eriogonum tiehmii* demographics. Annual reports synthesizing the monitoring data will be submitted to the BLM and the Service.

APCM-13. Develop a Specific Environmental Awareness Program for Project Employees, Contractors, and Guests Specific to Eriogonum tiehmii

Ioneer will develop an environmental training program that provides a brief description of the natural history and status of *Eriogonum tiehmii* and its critical habitat, discuss the conservation program, and outline restrictions related to unauthorized access to critical habitat. Ioneer will ensure that all personnel receive this training before beginning work on site; Ioneer will update the training program and provide refresher training as appropriate or as directed by the BLM.

APCM-14. Control Stormwater from Project Activities Located in or with the Potential to Discharge to Critical Habitat

Ioneer will develop and implement a stormwater plan that will capture runoff from project facilities outside of critical habitat and keep the water from running onto undisturbed portions of critical habitat. Erosion and sediment control will be accomplished through application of best management practices to limit erosion and reduce sediment from precipitation or snowmelt runoff. Following construction, areas of cut and fill proximate to or within critical habitat will be seeded using a seed mix developed in conjunction with the BLM and the Service.

APCM-15. Critical Habitat and Subpopulation Monitoring

Ioneer will monitor fencing surrounding critical habitat on a quarterly basis and document the general condition of critical habitat, including *Eriogonum tiehmii* subpopulations. Monitoring reports will be submitted within 20 days of each inspection and will specifically note the amount and extent of habitat disturbance within critical habitat to document compliance with the authorized action or if the action is affecting *E. tiehmii* or critical habitat in a way or to an extent that was not previously considered.

APCM-16. Monitor Insect Visitors and Pollinator Diversity and Abundance

Ioneer will monitor insect visitation and pollinators during peak flowering of *Eriogonum tiehmii* each year using cameras and pan traps and will provide an annual pollinator monitoring report, to the BLM and the Service, documenting the relative abundance and diversity of insects collected at each independent sample site.

Insect and pollinator monitoring data, along with abiotic monitoring data (*e.g.,* noise, light, local weather conditions, and dust deposition; see Figure 4), will be used to explore and identify, to the extent practicable, changes in site condition within critical habitat and year-over-year shifts (if any) in potential pollinator/insect visitor diversity and abundance and *E. tiehmii* demographics.

APCM-17. Monitor Noise Proximate to Tiehm's Buckwheat Subpopulations

Ioneer will implement noise monitoring activities proximate to *Eriogonum tiehmii* subpopulations during peak flowering of *E. tiehmii* each year. Noise monitoring data, along with other biotic and abiotic monitoring data (*e.g.,* light, local weather conditions, and dust

deposition) will be used to explore and identify, to the extent practicable, changes in site conditions within critical habitat and year-over-year shifts (if any) in potential pollinator/insect visitor diversity and abundance and *Eriogonum tiehmii* demographics. Annual reports synthesizing the monitoring data will be submitted to the BLM and the Service.

APCM-18. Develop an Ex-Situ Conservation Program in Cooperation with the Service and BLM.

Ioneer will establish a conservation program for *Eriogonum tiehmii* to aid in understanding best practices for conservation of the species. The goal of the conservation program is to identify seed collection, seed storage, and propagation requirements and methods to establish *E. tiehmii* grown in an ex-situ greenhouse setting in potentially suitable reclaimed and undisturbed sites. The program will build on Ioneer's ongoing seed collection work and propagation research being conducted in the greenhouse constructed on private lands and built for this purpose. Ioneer will conduct seeding and transplant experiments within the OPA as approved by BLM and the Service, and in accordance with Service policy (Controlled Propagation of Species listed under the Endangered Species Act; 65 FR 56916).

EPM-1: No Water and Dust Suppressant Use Near Tiehm's Buckwheat Subpopulations and Designated Critical Habitat

Ioneer will not water or use dust suppressants within *Eriogonum tiehmii* critical habitat beyond the approximately 191 acres of proposed disturbance within critical habitat without prior coordination with the BLM.

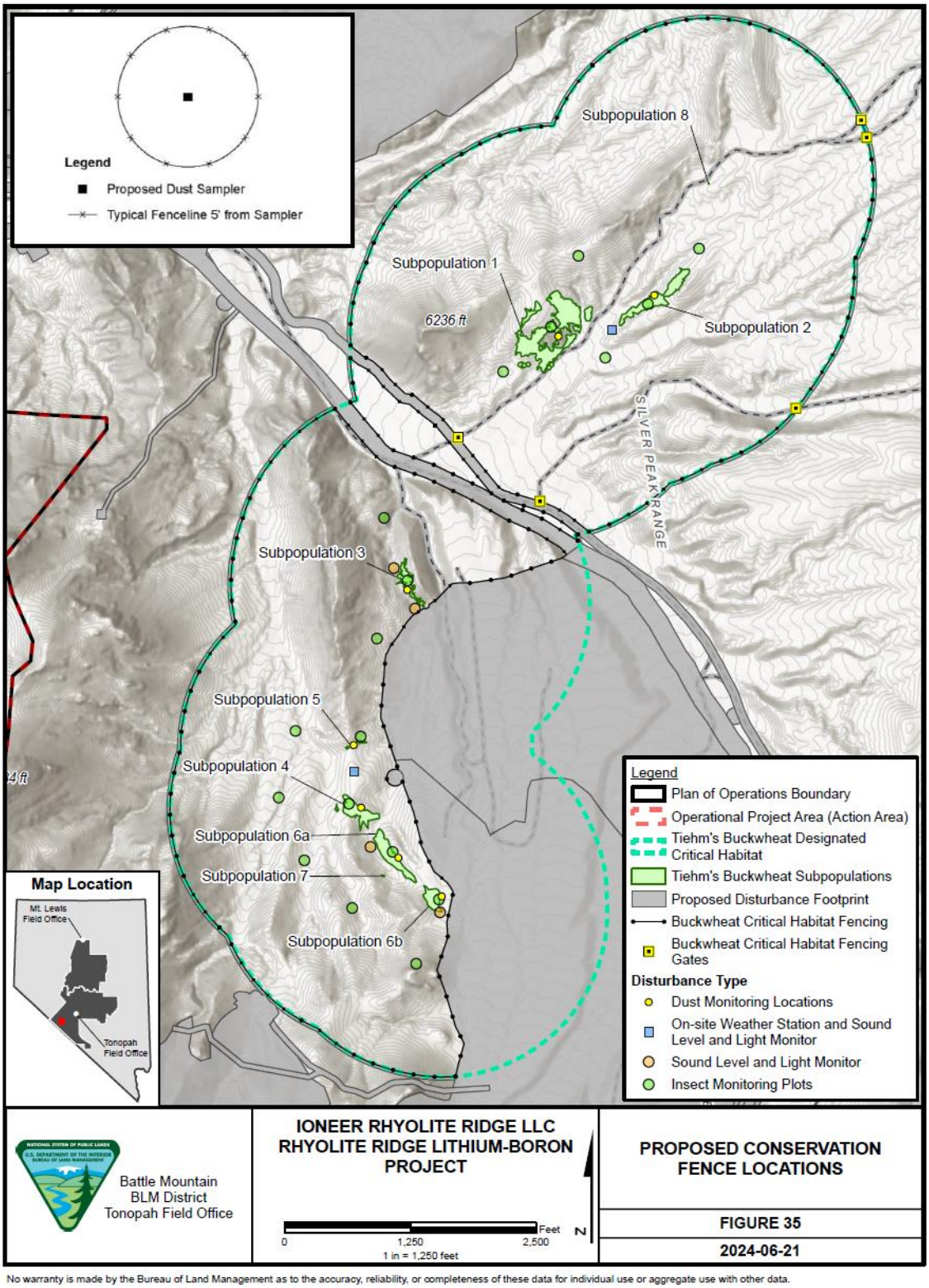


Figure 4: Locations of dust, noise, light, weather, and insect monitoring stations (Stantec 2024)

ANALYTICAL FRAMEWORK FOR THE SECTION 7(A)(2) DETERMINATIONS

Jeopardy Determination

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means “to engage in an action that reasonably will be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the status of the species, which describes the range-wide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the environmental baseline, which refers to the condition of the listed species in the action area, without the consequences to the listed species caused by the proposed action; (3) the effects of the action, which are all consequences to listed species caused by the proposed action that are reasonably certain to occur; and (4) the cumulative effects, which evaluate the effects on the species of future State or private activities in the action area that are reasonably certain to occur.

For the section 7(a)(2) determination regarding jeopardizing the continued existence of the species, the Service begins by evaluating the effects of the proposed Federal action and the cumulative effects. The Service then examines those effects against the current status of the species to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the species in the wild.

Destruction or Adverse Modification Determination

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. “Destruction or adverse modification” of critical habitat means “a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species” (50 CFR 402.02).

In accordance with policy and regulation, the destruction or adverse modification analysis in this biological opinion relies on four components: (1) the status of critical habitat, which describes the condition of all designated critical habitat in terms of its physical and biological features, the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (2) the environmental baseline, which refers to the condition of critical habitat in the action area, without the consequences to critical habitat caused by the proposed action; (3) the effects of the action, which are all consequences to critical habitat caused by the proposed action that are reasonably certain to occur; and (4) cumulative effects, which evaluate the effects on critical habitat of future State and private activities in the action area that are reasonably certain to occur .

For purposes of the adverse modification determination, the effects of the proposed Federal action on the designated critical habitat are evaluated in the context of the condition of all designated critical habitat, taking into account any cumulative effects, to determine if the consequences of the proposed action are likely to appreciably reduce the value of critical habitat as a whole for the conservation of the species.

STATUS OF THE SPECIES AND ITS CRITICAL HABITAT

Status of the Species

The Service listed *Eriogonum tiehmii* as endangered on December 16, 2022 (87 FR 77368).

Eriogonum tiehmii is a low growing perennial herb in the buckwheat family (Polygonaceae) that is found across a 10-acre area, ranging in elevation from 5,906-6,234 feet in elevation in the Silver Peak Range, Esmeralda County, Nevada.

A thorough review of the taxonomy, life history, and ecology of *Eriogonum tiehmii* is presented in the species status assessment report (SSA; Service 2022), proposed listing rule (86 FR 55775) and final listing rule (87 FR 77368). A summary of the species needs, reproduction, numbers, distribution, and recovery goals of the species, as more thoroughly described and cited in the SSA and listing documents, is provided below.

Eriogonum tiehmii is the dominant native herb in the sparsely vegetated community in which it occurs resulting in an open plant community with low plant cover and stature. Where *E. tiehmii* grows, the vegetation varies from exclusively *E. tiehmii* plants to sparse associations with a few other low growing herbs and grass species. The species occurs on dry, upland sites, subject only to occasional saturation by rain and snow and is not found in association with free surface or subsurface waters.

Like most terrestrial plants, *Eriogonum tiehmii* requires soil for physical support and as a source of nutrients and water. *E. tiehmii* occurs on soil with a high percentage (70–95 percent) of surface fragments. The soil pH is greater than 7.6 (*i.e.,* alkaline) in all soil horizons. *E. tiehmii* is distributed on these soils along an outcrop of lithium clay and boron in exposed former lake beds.

High rates of endemism (*i.e.,* when a species naturally occurs in just one place) are characteristic of plants growing on unusual soils (Mason 1964; Rajakaruna 2004; Hulshof and Spasojevic 2020). Taking all soil components into consideration, current research suggests that there is a range of soil conditions in which *Eriogonum tiehmii* thrives that is different from adjacent, unoccupied soils. *E. tiehmii* meets the definition of a soil specialist or edaphic endemic (*i.e.,* a species naturally occurs in just one place due to soil characteristics) because it occurs primarily or exclusively on challenging soils that differ from the surrounding soil matrix and grows better on soils with these conditions (Mason 1964; Gankin and Major 1964; Rajakaruna and Bohm 1999; Rajakaruna 2004; Palacio *et al.* 2007; Escudero *et al.* 2014).

Soil specialists or edaphic endemics are under different selection regimes compared with non-specialists because they are generally subjected to stressful physical and chemical properties such as increased metal concentrations, lower water availability, lower nutrient availability, higher light levels, and/or poor soil structure (Palacio *et al.* 2007; Boisson *et al.* 2017; Hulshof and Spasojevic 2020). Like many other soil specialists or edaphic endemics, colonization of unoccupied, but suitable habitat by *Eriogonum tiehmii* may be limited by dispersal (Palacio *et al.* 2007; Hulshof and Spasojevic 2020; McClinton *et al.* 2020).

In this section, we will synthesize the status of the species, which describes the range-wide condition of the species, the factors responsible for that condition, and its survival and recovery needs by reviewing the numbers, distribution, and reproduction of *Eriogonum tiehmii* (see *Analytical Framework for Section 7(a)(2)*).

Numbers

Permanent belt transects were established in 2019 to estimate the number of individuals in subpopulations 1, 2, 3, 4, and 6, and these locations have been sampled along the transects annually since. Population estimates using belt transects are not complete counts of every individual in a subpopulation; rather, plants are counted along fixed locations within subpopulations, and mathematical models are used to estimate the total number of plants throughout the subpopulation based on the density counted along the transect. Belt transects are used by scientists to estimate population numbers when counting every individual (*i.e.,* a population census) on an annual basis is unfeasible. In various years, population estimates are compared to complete counts to ensure the estimates are providing accurate results. Populations 5, 7, and 8 are counted in their entirety every year; a belt transect estimate is not needed because there are relatively few individuals to count in these subpopulations. Table 2 shows population estimates using the belt transect method (WestLand 2024b), unless otherwise noted.

WestLand conducted belt transect surveys in 2019 and estimated 43,921 *Eriogonum tiehmii* plants (WestLand 2024b). The following year, in 2020, the estimated number of *E. tiehmii* decreased to 38,241 plants. It's unclear if there was a true decrease in the population or if it was an artifact of the survey methods. For example, the permanent belt transects and models used to calculate population estimates were relatively new, and it can take time for surveyors to become consistent with implementing methods and protocols. All surveyors do not detect plants with the same reliability and various methods of surveying have not yet accounted for this variation.

In 2021, following an herbivory event that killed or damaged many *Eriogonum tiehmii* plants (see *Herbivory* section below), the population was surveyed using both the belt transect and population census methods. WestLand conducted belt transect surveys and estimated a total population size of 22,399 plants. Fraga (2021a) conducted a population census (*i.e.*, complete count of all individuals), and documented 15,757 plants. Based on the number of plants counted during the 2021 population census, and the difficulties previously described with belt transect survey method, the 2019 population was likely over-estimated (Service 2022). The population has been estimated to be between 28,000 and 29,000 individuals between 2022 and 2024 (WestLand 2024b).

With this limited amount of data and the varying methods and surveyors used to collect the data, the available information on the number of *Eriogonum tiehmii* individuals does not allow us to ascertain long-term population trends. However, we know there are tens of thousands of *E. tiehmii* across the range of the species (See Table 3).

Distribution

Eriogonum tiehmii was first discovered in 1983. As of 1994, *E. tiehmii* was only known from its type locality. Field surveys located five new locations (subpopulations 2 through 6) on approximately 9 acres, all within 1 mile of the type locality (Morefield 1995). From surveys conducted in 2019, the estimated area occupied by the species increased by approximately 14 percent; however, it is unclear if this indicates a true increase in the amount of area occupied by *E. tiehmii* because observers and mapping tools used have not been consistent among years. In 2019, surveys of potential habitat led to the discovery of two additional locations (subpopulations 7 and 8).

Eriogonum tiehmii is known from 8 subpopulations that cover approximately 10 acres (see Figure 5). The distance between the furthest subpopulations is approximately 1.5 miles. Because of its restriction to a specific type of substrate and the extensive surveys that have been conducted to find the species in recent years, we consider it unlikely that a substantial number of additional subpopulations exist. The extremely limited distribution of *E. tiehmii* renders it vulnerable to negative stochastic events.

Table 2: Summary of Eriogonum tiehmii subpopulation size per year in acres (Service 2022).

Subpopulation	Occupied habitat (acres) in 2008/2010	Occupied habitat (acres) in 2019
1	4.71	4.81
2	1.17	1.56
3	0.62	0.63
4	0.58	1.04
5	0.03	0.04
6	1.64	1.88
7	N/A	0.004
8	N/A	(1 plant)
Total	**8.75**	**9.97**

Table 3: Estimated number of Eriogonum tiehmii plants using belt transects (unless otherwise noted) and footnote notations provided by WestLand 2024b.

Subpopulation	2019	2020[2]	2021	2022[3]	2023[5]	2024[5]
1	9,240	10,146	5,592	7,710	9,047	8,625
2	4,541	6,724	3,600	4,584	4,520	4,564
3	1,860	1,734	867	4,191[4]	1,471	1,665
4	8,159	3,059	1,116	2,253	1,427	2,211
5[1]	199	No Data	9	15	31	22
6a	11,824	11,001	7,831	6,933	7,003	8,357
6b	8,047	5,575	3,367	2,868	4,533	3,590
7[1]	50	No Data	15	20	13	12
8[1]	1	2	2	2	4	2
Total	**43,921**	**38,241**	**22,399**	**28,626**	**28,049**	**29,048**

1. Due to the subpopulations' small size, complete counts of these subpopulations were conducted in all years. In 2020, surveys were not conducted for Subpopulations 5 and 7.
2. Transect surveys conducted partially by University of Nevada, Reno, personnel. Estimates vary from 2019, possibly due in part to detection probability differences among observers.
3. Higher estimates in 2022 as compared to 2021 could in part be due to plants in 2021 that appeared dead but recovered in 2022.
4. Surveyors detected a substantial number of seedlings along one transect in Subpopulation 3, thus resulting in a substantially higher estimate than in other years.
5. Preliminary results.

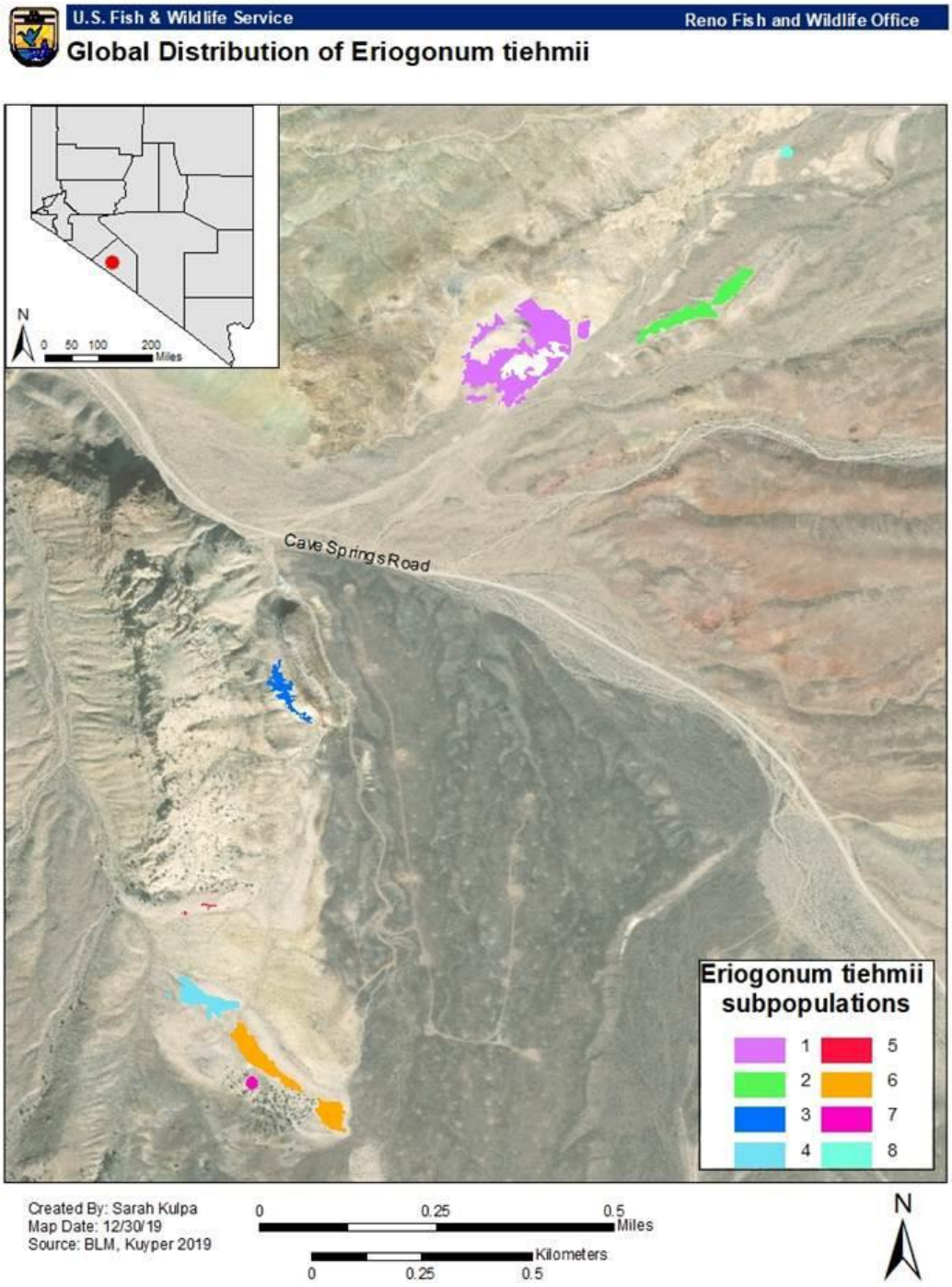


Figure 5: Range-wide distribution of Eriogonum tiehmii (Service 2022)

Reproduction

Timing for flowering and seed production may vary due to year-to-year fluctuations in temperature and precipitation patterns. New leaves are produced in late winter and early spring, flowering occurs from late May to mid-June, and seeds ripen in late-June through mid-July.

Although there is no information on *Eriogonum tiehmii*'s specific water needs during its various life cycle events, it appears to be primarily dependent on occasional precipitation for its moisture supply (Morefield 1995). Low precipitation could entirely prevent reproductive activity in some years, although under low precipitation conditions in 2020, *E. tiehmii* individuals were able to still produce seed (McClinton *et al.* 2020).

The primary seed dispersal agents of *Eriogonum tiehmii* are probably gravity, wind, and water. Upon maturation of the fruit, seeds are likely to fall to the ground in the immediate vicinity of the parent plant, becoming lodged in the soil surface. The number of seeds produced by individual *E. tiehmii* plants is variable.

We have no information on the longevity and viability of *Eriogonum tiehmii* seed in the soil seed bank (natural storage of seeds within the soil of ecosystems) or what environmental cues are needed to trigger germination. However, many arid plants possess seed dormancy enabling them to delay germination until receiving necessary environmental cues.

Eriogonum, in general, are sexual reproducers and insects are the most common pollinators (Gucker and Shaw 2019). Studies have shown that *Eriogonum* flowers can be pollinated by everything from bee flies and spiders to specialist pollinators, while some *Eriogonum* species are capable of self-pollination. During studies conducted in 2020, abundance and diversity of arthropods observed in *E. tiehmii* subpopulations was found to be especially high for a plant community dominated by a single native herb species. Primary insect visitors to *E. tiehmii* flowers include bees, wasps, beetles, and flies (McClinton *et al.* 2020). Results from a study conducted in the wild indicate that *E. tiehmii* plants may be able to produce some seed when pollinators are excluded (through wind pollination or selfing), but open pollination significantly increased seed production. For genetic exchange of *E. tiehmii* to occur, insect visitors and pollinators must be able to move freely between subpopulations.

As further described in the SSA, it has been well documented that not all floral visitors are pollinators and not all pollinators are equally effective in their pollination services (Senapathi *et al.* 2015; Garratt *et al.* 2016; Wang *et al.* 2017). Visit frequency and per-visit pollen deposition are useful metrics to compare relative contributions of insect visitors to plant species (Ne'eman *et al.* 2010), but may not be well suited to understand pollinator performance and pollination success to an individual plant or within the broader scale of plant-pollinator community (Willcox *et al.* 2017). Studies that correlate insect visitor frequency with pollinator effectiveness or performance (the ability of a floral visitor to remove and deposit pollen) have not been conducted for *E. tiehmii*.

Successful transfer of pollen among *Eriogonum tiehmii* subpopulations may be inhibited if subpopulations are separated by distances greater than pollinators can travel and/or a pollinator's nesting or foraging habitat and behavior is negatively impacted. Flight distances are generally correlated with body size in bees; larger bees can fly farther than smaller bees. Some evidence suggests that larger bees do not need their habitat to remain contiguous, but it is more important that the protected habitat is large enough to maintain floral diversity (BLM 2012). While researchers have reported long foraging distance for solitary bees, most individuals remain close to their nest, thus foraging distance tends to be 1,640 feet or less (BLM 2012; Danforth *et al.* 2019; Antoine and Forrest 2021). Nest building is common in some solitary wasps, such as Sphecidae and Pompilidae, which were observed at *E. tiehmii* subpopulations. The distances between hunting sites and nests are unknown for wasps, but many wasps probably hunt close to their nest (within 66 feet) (O'Neill 2019). Most butterflies, flies, and beetles find egg laying and feeding sites as they move across the landscape. The most common bee and wasp pollinators have a fixed location for their nest, and thus their nesting success is dependent on the availability of resources within their flight range (Xerces 2009). Also, alternative pollen and nectar sources (other plant species within the surrounding vegetation) are needed to support pollinators during times when *E. tiehmii* is not flowering.

In summary, successful reproduction of *Eriogonum tiehmii* depends on appropriate weather conditions and the availability of pollinators. Weather conditions can vary greatly over time in this area. We do not have demographic data on lifespan, survival, time to first reproduction, or the number of plants present every year prior to 2019 to determine trends in reproductive success. We also do not understand if differences in effectiveness exist among the pollinator species. However, the wide variety of insect species that can pollinate *E. tiehmii* provides stability; *E. tiehmii* likely does not depend on a single pollinator species and variation in the abundance of any single species of pollinator is unlikely to affect reproduction of *E. tiehmii*.

Threats

The current range of *Eriogonum tiehmii* is subject to anthropogenic threats such as mineral development, road development and OHV activity, livestock grazing, nonnative and invasive plant species, and climate change, as well as natural threats such as herbivory and potential effects associated with small population size (Service 2022).

Mineral Exploration

Mineral exploration, including the drilling of boreholes and the excavation of exploration trenches, began in the area where *Eriogonum tiehmii* occurs in 1962. Some of the earlier exploration trenches (*i.e.,* prior to 2016) were within the *E. tiehmii* subpopulation boundaries and most of the subpopulations have been affected by mineral exploration to some degree. If approved by BLM, the proposed project will continue the history of mineral exploration onsite. The proposed project was identified as a threat to the species in the Species Status Assessment, but at that time, fewer details were known about the proposed project and various design elements have since changed (Service 2022). This biological opinion is the first large-scale

mining project in the action area that an action agency has engaged with the Service through Interagency Consultation (16 U.S.C. 1531 *et seq)*.

Roads and OHVs

Roads within the area where *Eriogonum tiehmii* occurs include the county-maintained Cave Springs Road, unnamed wash roads, and past mine exploration roads. Cave Springs Road bisects *E. tiehmii* critical habitat with subpopulations 1, 2, and 8 north of the road and subpopulations 3, 4, 5, 6, and 7 south of the road. Subpopulations 1, 2, 5, and 8 are also directly adjacent to secondary dirt roads. OHVs travelling off these roads have affected *E. tiehmii* subpopulations as documented in multiple studies, likely killing individuals and disturbing habitat, including in subpopulation 1 in 2007, 2019, 2020, and 2021, and in subpopulations 4, 5, and 6 in 2021 (Service 2022). In addition, OHV's may expose *E. tiehmii* individuals or other plants which host its pollinators to excessive levels of dust. Dust deposition has been shown to have a variety of physiological effects on plants, such as declines in photosynthetic and transpiration rates, which may result in reduced plant growth and survival. In addition, plant species may experience reduced reproduction from dust deposition.

To restrict access of OHVs into subpopulations of *Eriogonum tiehmii*, the BLM constructed two pipe rail fences in December 2021. One fence, approximately 1,500 feet long, was constructed along the unnamed wash road southeast of subpopulation 1. A second fence was installed at the entrance of the intersection of Cave Springs Road and an exploration road, preventing OHV access to subpopulations 3, 4, 5, 6, and 7.

Livestock Grazing

The area where *Eriogonum tiehmii* occurs is within the BLM's Silver Peak livestock grazing allotment. Evidence of livestock use within subpopulations has been observed in the past, for example trampling has been observed within subpopulation 1. In 2022, the current permittee voluntarily agreed to not graze livestock in the vicinity of the subpopulations. As a result, current effects from grazing to *E. tiehmii* subpopulations have been reduced relative to past conditions (Stantec 2024).

Nonnative and Invasive Plant Species

Nonnative, invasive plant species could negatively affect *Eriogonum tiehmii* through competition, displacement, and degradation of the quality and composition of its habitat. Beginning in 2019, surveys have documented the presence of *Halogeton glomeratus* (salt lover) and it has since become the most abundant nonnative, invasive species within and adjacent to all *E. tiehmii* subpopulations (Center for Biological Diversity 2019; Ioneer 2020; Fraga 2021b; WestLand 2021). Although *H. glomeratus* is not an extremely competitive plant and does not become dominant in undisturbed areas or areas with competing vegetation, salt desert shrublands (the plant community in which *E. tiehmii* occurs) are particularly susceptible to invasion of *H. glomeratus* if ground disturbing activities that reduce desirable vegetation and increase bare soil occur in these communities (DiTomaso *et al.* 2013; Padgett *et al.* 2018, Fraga 2024).

Additional nonnative, invasive species found within *Eriogonum tiehmii* subpopulations include *Salsola tragus* (prickly Russian thistle) and *Amaranthus albus* (tumbleweed). *S. tragus* was documented co-occurring with *Halogeton glomeratus* in disturbed areas (*i.e.,* near exploration wells and along the access road).

Climate change

Any direct, long-term impact from climate change to *Eriogonum tiehmii* is yet to be determined. The timing of phenological events, such as flowering, are often related to environmental variables such as temperature. Large scale patterns of changing plant distributions, flowering times, and novel community assemblages in response to rising temperatures and changing rainfall patterns are apparent in many vegetation biomes. However, we do not know if or how climate change may alter the phenology of *E. tiehmii* or cause changes in plant distribution, community assemblage, and pollinator behavior.

Eriogonum tiehmii is adapted to dry, upland sites, subject only to occasional saturation by rain and snow. Increasing temperature can affect precipitation patterns. The fraction of winter precipitation (November through March) that falls as snow versus rain is declining in the western United States (Palmquist *et al.* 2016). Shifts from snow to rain when temperatures are cold enough to limit water losses from plant transpiration, and soils that are not frozen may have minimal impact on deep soil water storage. If rainfall replaces snow and temperatures are increased enough to thaw soils to stimulate plant growth and physiological activity earlier in the year, this will result in less deep soil water recharge (*i.e.,* less soil water infiltration and more evaporation) and potential changes in plant community composition (Huxman *et al.* 2005).

Statewide and regional trends in temperature, precipitation, snowpack, and other indicators of regional climatology can be used as a proxy to discuss current climate trends. Nevada has seen an increase in average temperatures of approximately 2 degrees Fahrenheit (°F) over the last century, with heat waves increasing throughout the southwestern United States (U.S. Environmental Protection Agency 2016). General precipitation trends in the Great Basin have been observed to be both increasing and decreasing among various locations, seasons, and time periods of analysis. Likewise, statewide precipitation is highly variable and has showed no overall trend in annual average precipitation during the last century (Runkle *et al.* 2022).

As described in the SSA, total precipitation was above average from 2015 to 2019 (Service 2022). As noted in the *Herbivory* section below, higher temperatures and drought conditions may have contributed to herbivore effects to *Eriogonum tiehmii* in 2020, but a causal link has not been clearly established. Stantec reviewed data from the Western Regional Climate Center and found that the thirty-year average annual mean maximum temperature, annual mean temperature, and annual mean minimum temperature were similar from 1961 to 1991 and 1981 to 2010 with less than one percent negative change across all three parameters (Stantec 2024; Morton 2024). Thirty-year average annual mean precipitation showed a 13.6 percent negative change from 1961 to 1991 and 1981 to 2010 (Stantec 2024; Morton 2024). We do not know how or if climate change may alter precipitation patterns within the local microclimates where *E. tiehmii* occurs,

and how it may relate to long-term demographics for the species. We do not have long-term census data to compare to precipitation data.

Fire is a naturally occurring phenomenon that impacts the distribution and structure of vegetation. However, due to increasing temperatures and reductions in precipitation, the severity and frequency of wildfires is likely to increase. While the Great Basin, where the species occurs, is extremely prone to fires, with 14 million acres burning in the last 20 years, there are no reported accounts of fire within *Eriogonum tiehmii* habitat or in the surrounding Rhyolite Ridge area. We currently do not have any data to suggest what level of effect wildfire could have on *E. tiehmii*; however, it could result in habitat loss, habitat fragmentation, and/or the removal of *E. tiehmii* individuals.

Herbivory

In September 2020, researchers and members of the public observed wide-scale damage to *Eriogonum tiehmii* individuals in all subpopulations, which had not been observed in previous years. Researchers estimated that 37 percent of all plants were killed and an additional 24 percent were damaged by the 2020 herbivory event (Thill and Kuyper 2020, Morefield 2020). Two small Nevada native mammal species were observed on site or by sign (*i.e.,* burrows and mounds) and were identified as possibly responsible for the vegetation damage (Morefield 2020; West 2020). Field observations were corroborated by environmental DNA (eDNA, *i.e.,* trace DNA found in soil, water, food items, or other substrates with which an organism has interacted) analyses on damaged *E. tiehmii* roots, undamaged control samples of *E. tiehmii* roots, soil tailings adjacent to damaged plants, control soil from undamaged plants, and rodent scat found near damaged plants (Grant 2020). The rodent DNA found associated with damaged plants most likely originated from the locally abundant white-tailed antelope ground squirrel (*Ammospermophilus leucurus*; Grant 2020). This reduction in *E. tiehmii* numbers, known as an herbivory event, was evident in *E. tiehmii* population surveys (Table 2).

It is currently unclear what lead to this herbivory event, if similar events have occurred in the past, and what the likelihood is of another event occurring in the future. Above average precipitation from 2015 to 2019 may have led to a substantial increase in rodent numbers. Below average precipitation in 2020 may have led to a decrease in the abundance of annual plants that could have caused a shift in herbivory and the increased damage to *Eriogonum tiehmii*. To date, the ecological connection between precipitation and the herbivory event is largely speculative. Herbivory on *E. tiehmii* has not been documented in any other year that scientists have surveyed for the species.

Small Population

Generally, the extinction probability of a population increases as population size decreases, with small populations having a greater risk of extirpation and extinction. The risks to small plant populations, like *Eriogonum tiehmii*, include losses in reproductive individuals, declines in seed production and viability, loss of pollinators, loss of genetic diversity, and Allee effects (Eisto *et al.* 2000; Berec *et al.* 2007; Willis 2017).

Recovery

The Service completed a recovery outline for *Eriogonum tiehmii* on March 23, 2023 (Service 2023). The recovery outline found that *E. tiehmii* has a high degree of threat and has a low recovery potential, primarily due to a potential conflict with mining interests at the population location. The recovery outline was written before additional details and design elements were known about the proposed mine. Threats to the species described in the recovery outline were habitat loss and degradation from mineral exploration and development, road development and OHV use, livestock grazing, and nonnative, invasive plant species; herbivory; and climate change. The Service found that with sufficient funding and commitment to implementing conservation measures, monitoring, and incorporating monitoring results into adaptive management, the species could be recovered. We will consider these aspects of recovery in the later sections of this biological opinion, including how the implementation of the proposed project, inclusive of conservation measures and monitoring, factor into the recovery of the species.

Important aspects of recovery for *Eriogonum tiehmii* include the following:

- stable or increasing, self-sustaining subpopulations with the physical and biological features needed to support the species that include open, sparsely vegetated areas, suitable soils and hydrology, and year-round and connected habitat for pollinators;
- maintenance of subpopulations to provide sufficient representation, resiliency, and redundancy to ensure a high probability of survival for the foreseeable future;
- collection of seeds for long-term ex situ storage and for testing propagation and transplantation methods;
- threats are sufficiently understood and abated; and
- demographic monitoring to provide the information necessary to ensure that these objectives are fulfilled.

The recovery outline described the following recovery objectives:

- Objective 1: Work with partners to protect the existing population (comprised of eight subpopulations) and critical habitat.
- Objective 2: Continue to fill knowledge gaps on species and population needs, habitat needs, and threats.
- Objective 3: Develop a research program to identify methods to direct seed, transplant, and/or translocate *Eriogonum tiehmii.*
- Objective 4: Implement long-term ex situ conservation measures.

Status of Designated Critical Habitat

The Service designated approximately 910 acres as critical habitat for *Eriogonum tiehmii* on December 16, 2022 (87 FR 77368). The entire unit, Rhyolite Ridge Unit, is on Federal lands managed by the BLM in the Silver Peak Range. Cave Springs Road, a rural, unpaved county

road, bisects the unit. The Service excluded roads and other man-made structures existing as of the effective date of the final rule from the designation of critical habitat.

The unit is currently occupied and contains the single population comprised of eight subpopulations of *Eriogonum tiehmii* and all the habitat that is occupied by the species across its range. This unit includes the physical footprint of where the plants currently occur and their surroundings to 1,640 feet in every direction from the periphery of each subpopulation. This area of surrounding habitat contains the PBFs necessary to support the conservation needs of *Eriogonum tiehmii*.

In designating critical habitat, we found that a 1,640-foot area around subpopulations was sufficient to support the maximum foraging distance of primary insect visitors that are presumed to be the pollinators of *Eriogonum tiehmii*. For genetic exchange of *E. tiehmii* to occur, insect visitors and pollinators must be able to move freely between subpopulations.

Physical and Biological Features

Based on our current knowledge of the habitat characteristics required to sustain the species' life-history processes, we determined that the following PBFs are essential to the conservation of *Eriogonum tiehmii*:

1. Plant community. A plant community that supports all life stages of *Eriogonum tiehmii* includes:
    a. Open to sparsely vegetated areas with low native plant cover and stature.
    b. An intact, native vegetation assemblage that can include, but is not limited to, *Atriplex confertifolia* (shadscale saltbush), *Artemisia nova* (black sagebrush), *Ephedra nevadensis* (Nevada mormon tea), *Hilaria jamesii* (James' galleta), and *Sporobolus airoides* (alkali sacaton) to maintain plant to plant interactions and ecosystem resiliency and provide the habitats needed by *E. tiehmii* insect visitors and pollinators.
    c. A diversity of native plants whose blooming times overlap to provide insect visitors and pollinator species with flowers for foraging throughout the seasons and to provide nesting and egg-laying sites; appropriate nest materials; and sheltered, undisturbed habitat for hibernation and overwintering of pollinator species and insect visitors.
2. Pollinators and insect visitors. Sufficient pollinators and insect visitors, particularly bees, wasps, beetles, and flies, are present for the species' successful reproduction and seed production.
3. Hydrology. Hydrology that is suitable for *Eriogonum tiehmii* consists of dry, open, relatively barren, upland sites subject to occasional precipitation from rain and/or snow for seed germination.
4. Suitable soils. Soils that are suitable for *Eriogonum tiehmii* consist of:
    a. Soils with a high percentage (70 to 95 percent) of surface fragments that are classified as clayey, smectitic, calcareous, mesic Lithic Torriorthents; clayey-

skeletal, smectitic, mesic Typic Calcicargids; and clayey, smectitic, mesic Lithic Haplargids.

b. Soils that have a thin (0 to 5.5 inches) A horizon, B horizons that are present as Bt (containing illuvial layer of lattice clays) or Bw (weathered), C horizons that are not always present, and soil depths to bedrock that range from 3.5 to 20 inches.
c. Soils characterized by a variety of textures, and include gravelly clay loam, sand, clay, very gravelly silty clay, and gravelly loam.
d. Soils with pH greater than 7.6 (*i.e.,* alkaline) in all soil horizons.
e. Soils that commonly have on average boron and bicarbonates present at higher levels, and potassium, zinc, sulfur, and magnesium present at lower levels.

Threats to Critical Habitat

Critical habitat for *Eriogonum tiehmii* is subject to anthropogenic threats such as mineral development, road development and OHV activity, livestock grazing, nonnative and invasive plant species, and climate change (Service 2022).

Livestock Grazing

Eriogonum tiehmii critical habitat is within the BLM's Silver Peak livestock grazing allotment. Evidence of livestock use within subpopulations has been observed in the past. In 2022, the current permittee voluntarily agreed to not graze livestock in the vicinity of the subpopulations. As a result, effects from grazing to *E. tiehmii* critical habitat have been reduced relative to past conditions. Past grazing practices may have altered the PBFs of critical habitat; however, because we do not have information regarding their condition prior to the onset of livestock grazing, we cannot assess how it affected the plant community, pollinators and insect visitors, hydrology, and soils we have described as PBFs.

Mineral Exploration

As stated previously, mineral exploration activities within critical habitat began in 1962. Drilling of boreholes and excavation of exploration trenches likely degraded the PBFs of critical habitat. Mineral exploration, including the proposed project, was identified in the final critical habitat rule as an activity that may require special management considerations (87 FR 77368). This biological opinion is the first large-scale mining project in the action area that an action agency has engaged with the Service through Interagency Consultation (16 U.S.C. 1531 *et seq)*.

Ioneer disturbed 11.8 acres of critical habitat in 2018 and 2019 as a part of their South Infill Exploration Project. Reclamation of disturbance within critical habitat is ongoing. The disturbed area was recontoured and seeded upon completion. An evaluation in 2022 indicated that 7.6 acres required additional reclamation; 4.8 acres needed additional reseeding and 2.8 acres required more substantial work. Work currently being undertaken to achieve reclamation goals within critical habitat includes construction of a gate adjacent to and south of Cave Springs Road, regrading and reshaping of disturbed areas where more substantial work was required, application of pre-emergent herbicide in the regraded/reshaped areas to limit germination of non-

native, invasive, and noxious weed species, and reseeding in those areas that needed reseeding (Stantec 2024).

Roads and OHVs

Roads within critical habitat include the county-maintained Cave Springs Road, unnamed wash roads, and past mine exploration roads. Use of these roads likely creates dust that may affect at least two of the PBFs of critical habitat, specifically the plant community and pollinators and insect visitors. We do not have site-specific information regarding this potential effect. In addition, off-road use by OHVs has resulted in effects to the PBFs of designated critical habitat, as documented in multiple studies (Service 2022).

To restrict access of OHVs into critical habitat, the BLM constructed two pipe rail fences in December 2021 (Service 2022). One fence, approximately 1,500 feet long, was constructed along the unnamed wash road southeast of the critical habitat that supports subpopulation 1. A second fence was installed at the intersection of Cave Springs Road and an exploration road, preventing OHV access to the critical habitat that supports subpopulations 3, 4, 5, 6, and 7. These fences help protect designated critical habitat from further degradation due to OHVs.

Climate Change

We described how climate change may alter local conditions for *Eriogonum tiehmii* previously in this biological opinion. Specific monitoring data related to the PBFs that address the plant community, pollinators and insect visitors, and hydrology are not available to assess the effects from any shifts in precipitation or temperature cycles or amounts relative to the conservation value of critical habitat for *Eriogonum tiehmii*. Climate change is unlikely to affect the fourth PBF, soils. Climate change may increase the likelihood and severity of wildfires. The plant community (PBF 1) within critical habitat is dominated by low-growing, desert plant species; therefore, severe wildfire may not be a primary threat to this area because of a relatively low fire fuel load. However, a severe wildfire could reduce available habitat for the plant community and potential pollinators (PBF 1 and 2). Changes in temperature and precipitation caused by climate change could affect the plant community, pollinators, and hydrology (PBF 1, 2, and 3).

Nonnative and Invasive Plant Species

Nonnative, invasive plant species are a threat to critical habitat for *Eriogonum tiehmii* because they can degrade the native plant community required for the conservation of *E. tiehmii* (PBF 1). As stated in the *Status of the Species* section above, surveys have documented the presence of *Halogeton glomeratus* and it has since become the most abundant nonnative, invasive species within critical habitat and adjacent to all *E. tiehmii* subpopulations (Center for Biological Diversity 2019; Ioneer 2020; Fraga 2021b; WestLand 2021). Although *H. glomeratus* is not an extremely competitive plant and does not become dominant in undisturbed areas or areas with competing vegetation, salt desert shrublands (the dominant plant community in critical habitat where *E. tiehmii* occurs) are particularly susceptible to invasion of *H. glomeratus* if ground

disturbing activities that reduce desirable vegetation and increase bare soil occur in these communities (DiTomaso *et al.* 2013; Padgett *et al.* 2018, Fraga 2024).

Additional nonnative, invasive species found within critical habitat include *Salsola tragus* (prickly Russian thistle) and *Amaranthus albus* (tumbleweed). *S. tragus* was documented co-occurring with *Halogeton glomeratus* in disturbed areas (*i.e.,* near exploration wells and along the access road).

ENVIRONMENTAL BASELINE

The regulations implementing the Act define the environmental baseline as "the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The impacts to listed species or designated critical habitat from Federal agency activities or existing Federal agency facilities that are not within the agency's discretion to modify are part of the environmental baseline" (50 CFR 402.02).

Because the action area encompasses all subpopulations of *Eriogonum tiehmii* and its designated critical habitat, the condition of *E. tiehmii* and its designated critical habitat in the action area have been fully described in the Status of the Species section above.

Action Area

The implementing regulations for section 7(a)(2) of the Act define "action" as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. Examples include but are not limited to: (a) actions intended to conserve listed species or their habitat; (b) the promulgation of regulations; (c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or (d) actions directly or indirectly causing modifications to the land, water, or air" (50 CFR 402.02). For this biological opinion, the proposed action is the BLM's approval of the plan of operation for the Rhyolite Ridge Lithium-Boron Mine Project. If the BLM approves the plan of operations, Ioneer will construct, operate, and close the mine, as summarized in the Description of the Proposed Action section of this biological opinion, and described in detail in the BLM's biological assessment and WestLand's Buckwheat Protection Plan (Stantec 2024; WestLand 2024a).

Regulations implementing the Act describe the "action area" as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR 402.02). Consequently, the action area for this consultation includes all areas where the BLM's proposed action, approval of the plan of operations of the project, will result in modifications to the land, air, or water. In this biological opinion, we define the action area as the

physical footprint of all project-related elements of the Rhyolite Ridge Lithium-Boron Mine Project, inclusive of the Access and Infrastructure Corridor, which may be exposed to project-caused modifications such as noise, lighting, particulate matter deposition, and altered surface runoff. We estimate that project-caused modifications of land, air, or water will occur up to the 10-foot drawdown contour (where groundwater will draw down 10 feet) around the OPA where land may experience subsidence; 50 feet from the centerline of SR 264 where dust, lighting, and noise may extend beyond current conditions due to increased traffic; and 100 feet from the centerline of Hot Ditch and Cave Springs roads where dust, lighting, and noise may extend beyond current conditions due to increased traffic. See Figure 6 for an illustration of the action area.

The action area, which covers 30,492 acres (Stantec 2024), is public land administered by the BLM and managed for multiple uses. Past and present activities in the action area that may be affecting the current condition of *Eriogonum tiehmii* and its critical habitat include livestock grazing, mineral exploration, the construction of roads, and OHV use. The past and present status of each of these activities in the action area is described above in the *Status of the Species and Status of Designated Critical Habitat* sections.

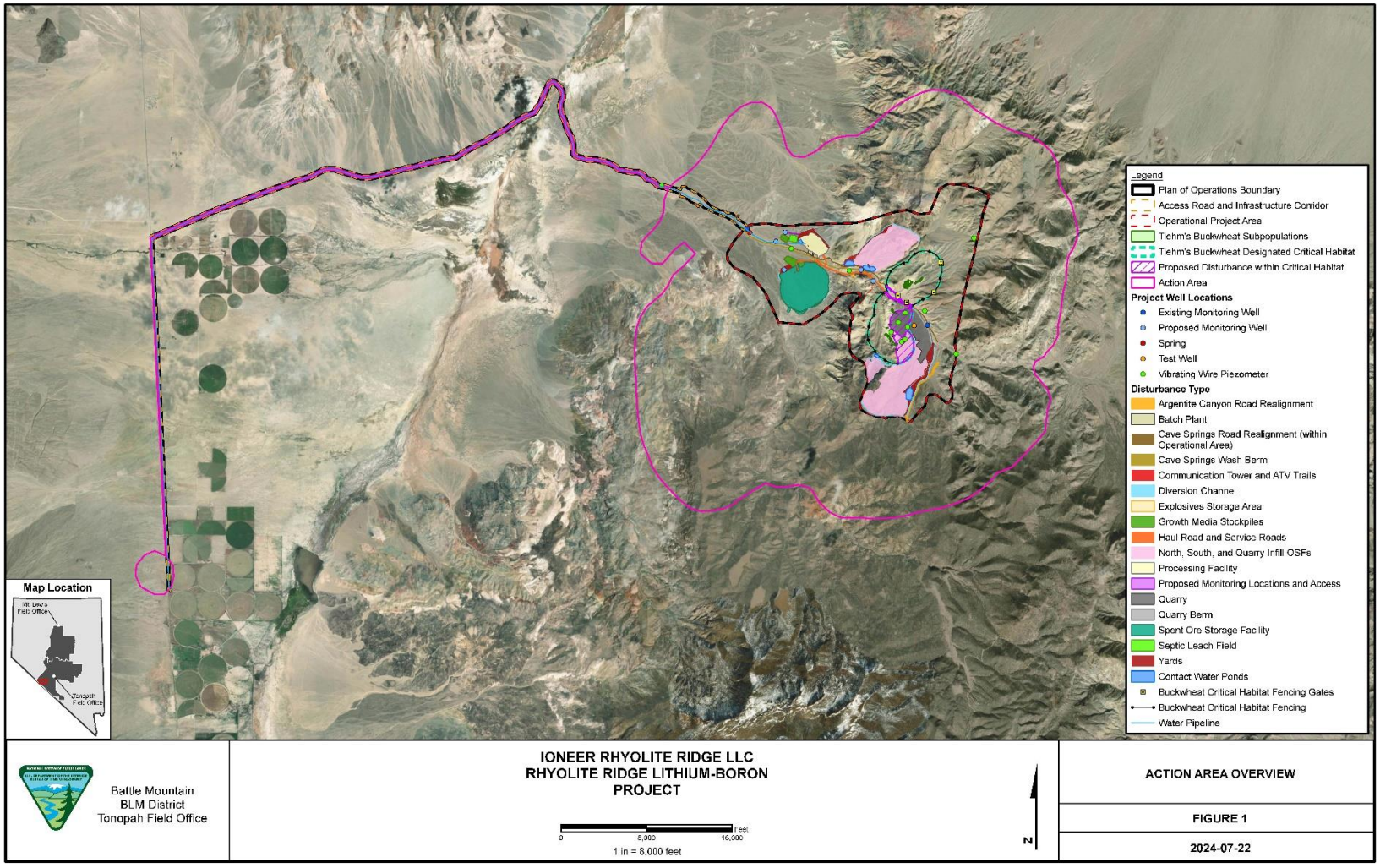


Figure 6: Action Area (Stantec 2024)

Status of the Species in the Action Area

All subpopulations of *Eriogonum tiehmii* are within the action area; see the Status of the Species section.

Status of Critical Habitat in the Action Area

All critical habitat of *Eriogonum tiehmii* is within the action area; see the Status of the Species section.

EFFECTS OF THE ACTION

Introduction

Regulations implementing the Act define the effects of the action as "all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action but that are not part of the action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action" (50 CFR 402.02).

In this section, we will review the stressors that will result from the proposed project that are relevant to the species and its critical habitat. We define stressors as changes to the land, air, or water that result from the proposed action. We will determine if the species or critical habitat will be exposed to those stressors. Where exposure to stressors occurs, we will consider how the species and its critical habitat will respond to the exposure. Given those responses, we will determine how the project may affect the numbers, distribution, reproduction and recovery of the species, and the physical and biological features of critical habitat.

Stressors from Project Activities

Exploration

Stressors from exploration include particulate matter deposition (*e.g.,* dust from excavation, driving on dirt surfaces, and tailpipe emissions), pollinator habitat removal, and effects to pollinators (from lighting, noise, and vibration). Exploration will be temporary and will occur within areas proposed for disturbance from other project elements.

Mining Operations

Stressors from mining operations include herbicides, spread of invasive plants, release of hazardous materials and runoff (*e.g.,* leached elements and petroleum), greenhouse gas emissions, quarry slope wall failure, fencing, particulate matter deposition (*e.g.,* dust from excavation and blasting, driving on dirt surfaces, and tailpipe emissions), pollinator habitat removal, changes in hydrology, and effects to pollinators (from lighting, noise, and vibration).

Overburden and Backfill Management

Stressors from overburden and backfill management include particulate matter deposition (*e.g.,* dust from clearing and grubbing, placing material, placing alluvium, driving on dirt surfaces, and tailpipe emissions), pollinator habitat removal, changes in hydrology, release of hazardous materials and runoff (*e.g.,* leached elements, and petroleum), spread of nonnative plants, and effects to pollinators (from lighting, noise, and vibration).

Infrastructure

Stressors from infrastructure include particulate matter deposition (*e.g.,* dust from driving on dirt surfaces and tailpipe emissions), pollinator habitat removal, changes in hydrology, spread of non-native plants, and effects to pollinators (from lighting, noise, and vibration).

Waste Management

Stressors from waste management include habitat loss due to exposure to hazardous materials and runoff (*e.g.,* leached elements, and petroleum).

Stressors relevant to Eriogonum tiehmii

After review of the Status of the Species, the following stressors from project activities are relevant to *Eriogonum tiehmii*: herbicides; spread of nonnative, invasive plants; release of hazardous materials and runoff; greenhouse gas emissions; quarry slope wall failure; fencing; pollinator habitat removal; particulate matter deposition (*e.g.,* dust); changes in hydrology; and effects to pollinators (from lighting, noise, and vibration).

Stressors relevant to Eriogonum tiehmii critical habitat

After review of the Status of Critical Habitat, the following stressors from project activities are relevant to designated critical habitat for *Eriogonum tiehmii*: herbicides; spread of nonnative, invasive plants; release of hazardous materials and runoff; greenhouse gas emissions; quarry slope wall failure; fencing; pollinator habitat removal; particulate matter deposition (e.g., dust); changes in hydrology; and effects to pollinators (from lighting, noise, and vibration)

Effects on *Eriogonum tiehmii*

Ioneer has modified the proposed project from previous iterations to avoid direct damage to (*e.g.*, crushing) or removal of *Eriogonum tiehmii* plants. Consequently, we anticipate that the proposed action will not damage *E. tiehmii* plants during the life of the action (*i.e.,* 35 years). The following paragraphs discuss how *E. tiehmii* plants may be exposed to project-related stressors and, given that exposure, how the individuals will respond.

Although project facilities will not directly remove individual *Eriogonum tiehmii* plants, the proposed facilities will occur in close proximity to *E. tiehmii*. Table 4 lists the nearest distance between the subpopulations and several of the closest major project elements**.** Seven dust

monitoring locations will be in direct proximity to each subpopulation. These dust monitoring stations, which are described in APCM-9, are intended to assist in monitoring and minimizing project-related effects from dust to *E. tiehmii* and pollinators.

Table 4: Proximity of proposed mine facilities to Eriogonum tiehmii subpopulations (Stantec 2024).

Subpopulation	Distance from South and Quarry Infill OSF (feet)	Distance from Quarry (feet)	Distance from Haul Road (feet)	Distance from North OSF (feet)	Distance from Dust Monitoring Locations (feet)
1	4,025	1,849	1,502	2,022	37
2	4,536	2,381	2,558	2,587	14
3	1,520	15	138	3,758	12
4	329	558	2,171	5,825	12
5	331	208	1,611	5,327	45
6a	265	698	2,379	6,225	Adjacent to subpopulation
6b	165	744	2,858	6,882	Adjacent to subpopulation
7	492	1,046	2,823	6,680	No dust monitors occur at this subpopulation
8	6,087	3,998	4,118	2,263	No dust monitors occur at this subpopulation

Herbicides

Eriogonum tiehmii individuals may be affected by exposure to herbicides associated with controlling nonnative and invasive weeds (*i.e.,* APCM-7). However, Ioneer will implement multiple measures to reduce the risk of exposure, such as utilizing a 50-foot-wide buffer from *E. tiehmii* subpopulations for herbicide application and measures to reduce herbicide drift. Weed control within the 50-foot-wide buffer will be accomplished using hand pulling or other approved hand-operated mechanical methods. All herbicide applicators will be state certified,

receive site-specific training, and either be qualified as or accompanied by a biological monitor. Herbicide application will meet all product label requirements. Therefore, we do not expect *E. tiehmii* to be adversely affected by the application of herbicides.

Spread of Nonnative, Invasive Plants

Eriogonum tiehmii may be affected by exposure to nonnative, invasive plant species. As described in the *Status of the Species* section above, *E. tiehmii* occurs in a sparsely vegetated community with low plant cover and stature. Where *E. tiehmii* grows, the vegetation varies from exclusively *E. tiehmii* plants to sparse associations with a few other low growing herbs and grass species. Nonnative, invasive plant species could negatively affect *E. tiehmii* through competition (*i.e.,* loss of resources needed for survival, like sunlight and water), displacement (*i.e.,* loss of habitat), and degradation of the quality and composition of its habitat. Fraga (2024) claims nonnative, invasive plants "are likely to spread, especially along haul roads, due to the large amounts and high frequency of water application that is proposed to occur to reduce fugitive dust" and "this amount of water is significant and would increase the spread of invasive plant species across the Project area that might otherwise be limited to Cave Spring." However, Ioneer will implement a non-native, noxious, and invasive weed species control program through the life of the project, until final reclamation success criteria have been achieved and the bond has been released to minimize project-related adverse effects from non-native species (APCM-7). A noxious weed monitoring and control plan will be developed prior to implementation of project construction in coordination with the BLM and the Service. The plan will include measures for the use of herbicides, trained staff, and routine monitoring. With the implementation of APCM-7, we do not expect *E. tiehmii* to be adversely affected by the spread of nonnative invasive plants.

Hazardous Materials and Runoff

Exposure to hazardous materials, including petroleum from vehicles or equipment, runoff, and leached elements may result from the proposed project. We do not expect *Eriogonum tiehmii* plants will be exposed to hazardous materials from equipment because equipment containing hazardous materials will not be used within or above occupied habitat. We do not expect *E. tiehmii* to be exposed to runoff because Ioneer will implement stormwater control measures (APCM-14). We do not expect *E. tiehmii* to be exposed to leached elements because facilities that contain materials with the potential to leach hazardous metals (*e.g.*, OSF contact water ponds) are located far away from populations and are at lower elevations.

Release of hazardous materials may expose pollinators and their habitat to this stressor outside of habitat occupied by *Eriogonum tiehmii*. Individual pollinators and plants the pollinators rely on may die or have decreased reproductive success because of exposure to hazardous materials. A decrease in the abundance of pollinators could affect the reproduction of *E. tiehmii*. To minimize the potential adverse effects on pollinators outside of habitat occupied by *Eriogonum tiehmii*, soils contaminated with hazardous materials resulting from spills or leaks will be addressed immediately, with spill kits being located throughout the action area; and contaminated soils will be removed from the spill site, stored in appropriate secondary containment areas, and

transported to a licensed off-site disposal facility. We expect few pollinators and the plants they rely on will be exposed to hazardous materials. Given we do not expect *E. tiehmii* or its pollinators to be exposed to hazardous materials, including petroleum from vehicles and equipment, runoff, or leached elements, we do not expect *E. tiehmii* to be adversely affected by hazardous materials.

Greenhouse Gas Emissions

Operations associated with the proposed project will result in approximately 471,589 tons per year of direct greenhouse gas emissions and 24,429 tons per year of indirect GHG emissions in terms of carbon dioxide (CO_2; Stantec 2024). Indirect greenhouse emissions are related to transport and delivery of quarried materials. As stated previously, greenhouse gas emissions have been linked with accelerated global climate change. As a result, the proposed project may contribute to climate change to some extent.

Although the emissions likely to be emitted from the proposed project can be quantified, the Service cannot determine the extent to which *Eriogonum tiehmii* will be exposed to the emissions and how *E. tiehmii* will respond to that specific exposure. That is, we cannot quantify the level of impact the greenhouse gas emissions from this individual project will have on global climate change, how that impact will translate to climatic changes within the action area, and how the *E. tiehmii* will respond to the stressors from the proposed mine. Adverse effects to *E. tiehmii* caused by project-related emissions (*e.g.*, increased risk of severe wildfire, and changes to temperature and precipitation) are not reasonably certain to occur.

Quarry Wall Slope Failure

The west quarry wall will be lower in elevation and adjacent to *Eriogonum tiehmii* subpopulations. Slope failure may adversely affect *E. tiehmii*, its pollinators, and their habitats by habitat loss and direct mortality. Ioneer has incorporated design features into the quarry construction plan to minimize risks associated with slope failure, including the use of ground anchors (APCM-2). During the mine-life, these design features will result in an estimated factor of safety of 1.2 for the quarry wall adjacent to subpopulations. During and after mine closure, additional design features (*i.e*., buttresses) will increase the modeled slope stability in the vicinity of the *E. tiehmii* subpopulations in the closed quarry to a factor of safety of 1.81 to 2.71. The modeled slope stability included a review of the closed quarry with its associated lake. Geo-Logic Associates (2023) examined whether the lake would affect the critical slip surface of various locations around the quarry and found that there were no locations near *E. tiehmii* subpopulations, and only one location away from *E. tiehmii,* where water elevation interacted with the critical slip surface, decreasing the factor of safety in that distant, specific location from 1.9 to 1.72. Therefore, the risk of wall slope failure has been minimized, and adverse effects to *E. tiehmii* from wall slope failure are discountable (Geo-Logic Associates 2023, WestLand 2024a). Although Emerman (2024) regards the slope stability analysis as unreliable, largely based on Australian mining standards, an architect/civil engineer with the Service reviewed the Supplemental Geotechnical Report prepared by Geo-Logic Associates and found it to be acceptable (Johns 2023; Geo-Logic Associates 2023). Given the proposed design of the quarry

walls (APCM-2), and ongoing stability monitoring during operations (APCM-3), failure of the wall slope is not reasonably certain to occur. Consequently, *E. tiehmii* is not expected to be exposed to this stressor.

Fencing

Fencing construction may affect *Eriogonum tiehmii* through loss or disturbance of pollinator habitat, changes to the current hydrological conditions (*i.e.,* how water flows across the surface of the land) that support occupied habitat due to digging soil for fence post installation, increasing particulate matter deposition during fence construction, and spreading non-native vegetation. The proposed fencing is a conservation measure intended to prevent unauthorized access or disturbance to *E. tiehmii* subpopulations from the proposed project (APCM-4) and to deter mammals from being attracted to dust monitoring stations (APCM-9). Fencing will be four-strand wildlife-friendly design with the top and bottom strands barbless. Fence construction will not remove any individual *E. tiehmii* plants and fencing will not cast shade on *E. tiehmii* plants.

To minimize adverse effects from fence construction, vegetation and soil disturbance will be limited to the smallest amount necessary, construction personnel will only use areas outside *E. tiehmii* occupied habitat for work areas, and fenced areas will be monitored during quarterly critical habitat monitoring (APCM-15). With the implementation of quarterly monitoring, and because of the minimal level of disturbance required for fence construction and the temporary nature of this activity, effects to *E. tiehmii* subpopulations from loss or disturbance to pollinator habitat, particulate matter deposition, altered hydrology, and the spread of nonnative vegetation will be insignificant. We do not expect *E. tiehmii* to be adversely affected from installing and maintaining fencing.

Particulate Matter Deposition

Various elements of the proposed project will generate particulate matter emissions (*e.g.,* dust and aerial pollutants), including vehicular travel along the access roads, quarry operations (*e.g.,* blasting), construction operations (including construction of the South and Quarry Infill OSF, North OSF, Cave Springs Road realignment, and Cave Springs Wash berm), haul traffic on the haul road, access to monitoring wells and access to Communication Tower 3.

Dust

Dust deposition has been shown to have a variety of physiological effects on plants when they are exposed to the stressor (Stantec 2024). Common documented effects to plants include declines in photosynthetic and transpiration rates due to deposited dust decreasing the stomatal conductance of leaves, declines in photosynthetic rates due to a reduction in photosynthetically active radiation reaching the leaves, and increased leaf temperatures. These physiological effects may result in reduced plant growth and survival. In addition, plant species may experience reduced reproduction from dust deposition. Many of the documented effects have been shown to vary in magnitude depending on the plant species, soil types, and precipitation. In this section,

we will consider what levels of dust deposition will result in effects to *Eriogonum tiehmii* and if the proposed project will generate dust levels sufficient to result in those biological effects.

Determining the level of dust deposition at which effects to *Eriogonum tiehmii* are reasonably certain to occur is difficult without species-specific studies or studies that document a no-effect threshold in similar species. In addition, most studies document total dust deposition, which can make comparison to the dust deposition rates modeled for the proposed project difficult. Stantec (2024) reviewed the current literature regarding the biological effects of dust deposition on plants, including studies that measured dust deposition in various levels of grams per square meter (g/m^2) that resulted in photosynthetic effects, reduced shoot growth, and decreased fruit production. However, none of the plants mentioned in these studies were *Eriogonum* species from the southwest; different species likely respond to dust in different ways and to different degrees. Studies regarding the effects of dust on a species of milkvetch (*Astragalus* spp.) from the desert southwest have potential applicability to *E. tiehmii*. Using the results of that study, Stantec (2024) used a threshold of 4 g/m^2/day as the impact threshold for particulate matter deposition in the analysis for *E. tiehmii*; that is, based on this information, we will consider levels of dust deposition above 4 g/m^2/day to be where *E. tiehmii* may begin to experience adverse effects.

This represents the best scientific and commercial data available regarding the effects of dust deposition on *Eriogonum tiehmii* because it was a study of a perennial plant in a similar environment in the desert southwest. The available science is very limited, and there are no studies that directly address *E. tiehmii*. We have no information to suggest a different threshold than 4 g/m^2 per day is appropriate. Although Fraga (2024) states the studies using *Astragalus* spp. may not be comparable and impacts to *E. tiehmii* could be more significant, no alternative studies or dust deposition thresholds were provided. Therefore the 4 g/m^2 threshold continues to be the best available science related to *E. tiehmii*. However, if BLM approves the proposed project, Ioneer will fund research using *E. tiehmii* plants it has growing in its greenhouse under its federal recovery permit, and possibly in-situ within the OPA if approved by BLM and the Service (APCM-9). The research will provide data on the physiology and growth of *E. tiehmii* and will be used to refine thresholds for the implementation of the management strategy outlined here. That is, if the science shows that a different threshold is appropriate, management will be triggered at that new threshold. Finally, Ioneer will conduct demographic monitoring of the species (APCM-12) that will document changes in population trends, which combined with abiotic monitoring (*e.g.,* dust, noise and light monitoring), will guide management of the proposed project using the best scientific and commercial data available.

Dust deposition is likely to decrease in subpopulations 1, 2, and 8 from current conditions because the unpaved road between these subpopulations will be closed to public use. Construction of Communication Tower 4 will require the use of this road for approximately seven days with three round trips per day. Once in operation, Ioneer anticipates a single round trip per month for inspection and routine maintenance. On rare instances when the tower needs repair, additional trips will be required for maintenance. The speed limit for all vehicles using the road to Communication Tower 4 will be 10 miles per hour. This level of use will be less than

current recreational uses and at slower speeds (WestLand 2024a); consequently, we consider these effects to be insignificant.

Subpopulations 3, 4, 5, 6, and 7 (particularly subpopulations 3 and 6) near the quarry, haul road, and South and Quarry Infill OSFs will be exposed to elevated dust levels from current conditions. WestLand (2024a) provides an air impact modeling analysis of dust flux from the haul road for early phases of quarry development (year 3 of mine operations) and peak operations (year 11 of mine operations). The speed limit on the haul road will be 35 miles per hour. WestLand conducted the modeling by using multiple inputs for background concentrations, surface silt material content, and fugitive dust control efficiency. To be conservative in this effects analysis, maximum modeled rates of dust deposition at varying levels of dust control efficiencies were used for the contents of modeled surface materials containing 1.7 and 6.4 percent silt.

No background data (*i.e.,* long-term information collected prior to implementation of the proposed action) has been collected on dust deposition in the action area. To account for the lack of background data in the action area, WestLand (2024a) assessed average daily background dust flux based on 19 sites in Nevada and California from the U.S. Geological Survey (USGS) Open-File Report 03-138 and used 0.057 g/m^2/day as a conservative proxy for background levels in the action area based on that report (USGS 2003). Without site specific data collection, this modeling provides the best available data for assessment.

As described in APCM-9 and WestLand (2024a), Ioneer will control fugitive dust on roadways and other areas of surface disturbance (*i.e.,* the quarry) with water and/or approved dust suppressants to achieve between 85 and 90 percent efficiency. Total estimated dust flux based on maximum values from model results for the haul road at year 3 under an 85 percent control efficiency will be minimal, with rates similar to the modeled background rates. This is due to the minimal traffic expected at that stage of project development.

This estimate of dust flux does not consider dust from the quarry, which is possible from blasting and excavation in the early stages of quarry development. As a result, the amount of dust flux at year 3 may be an underestimate. However, blasting within approximately 328 feet of *Eriogonum tiehmii* subpopulations will incorporate blasting mats or other suitable covering materials as described in APCM-11 to minimize dust from blasting; water or other suppressants will be used in the quarry to minimize dust.

At the peak of quarry activity (*i.e.,* year 11), dust flux due to the haul road will increase by approximately 580 to 1,475 percent for the 85 percent control efficiency scenario for 1.7 and 6.4 percent silt, respectively. At this stage, dust input from the pit is expected to be less because the deeper pit will likely capture much of the dust produced. Consequently, the modeling based only on the haul road is unlikely to have underestimated the amount of dust during year 11 peak operations. Overall, the model predicts that the proposed project will produce the greatest amount of dust during year 11.

The total estimated dust flux at 85 percent control efficiency based on both 1.7 and 6.4 percent silt values from model results for the haul road at year 11 will be less than the estimated rates that affected reproduction and growth, but greater than levels estimated to produce effects to photosynthesis (Stantec 2024). However, as described previously, *Eriogonum tiehmii* may respond differently to dust deposition than the species for which we have information. Because it is difficult to estimate the probability and magnitude of effects based on available published data and modeled dust flux, Ioneer will implement dust monitoring (APCM-9). The monitoring will be designed to monitor and minimize effects to *E. tiehmii*, and to ensure the threshold established, 4g/m^2/day, remains appropriate to minimize effects. As stated above, Ioneer will control fugitive dust on roadways and other areas of surface disturbance (*i.e.,* the quarry) with water and/or approved dust suppressants to achieve between 85 and 90 percent efficiency. While the use of water to control dust may result in the spread of nonnative, invasive plant species, we expect this stressor to be managed through the implementation of APCM-7. Effects to pollinators from the use of water or dust suppressants are not reasonably certain to occur. We reviewed the report produced by McCarthy (2024) and found that while resuspension of dust suppressant could occur, we cannot predict the extent of exposure to pollinators, nor how they or how *E. tiehmii* may respond with reasonable certainty. In addition, Ioneer will monitor dust monthly at seven locations and increase the frequency of water applications and/or approved dust suppressants if the current threshold of 4g/m^2/day is met. Should these actions not reduce fugitive dust emission levels, Ioneer will evaluate specific placement of dust control fencing and establishment of speed limits lower than 35 miles per hour along the haul road proximate to *E. tiehmii* subpopulations to reduce fugitive dust emission levels further, as appropriate. Dust suppression will not occur outside of the footprint of project disturbance. Stormwater management activities will be implemented to ensure that any water impacted by the project does not leave the disturbance footprint. The Service and BLM will review and consider approval of the procedures and protocols for monitoring and management of dust before project implementation. As a result of the proposed ongoing data collection, monitoring, and management, adverse effects to *E. tiehmii* resulting from dust will be minimized. Also, the effects are anticipated to be minor to *E. tiehmii* given that the dust flux estimates are on the low end of concentrations under which effects have been observed in other studies. As a result, population level effects to *E. tiehmii* from dust deposition are not expected to occur.

Dust deposition can also result in mortality of insect pollinators. However, the effects depend on the type of dust and vary by species of insect. APCM-9 will be implemented to monitor and manage dust, including seven on-site dust monitors to mitigate fugitive dust. Should dust monitoring adjacent to *Eriogonum tiehmii* subpopulations result in actual dust deposition exceeding the 4 g/m^2/day threshold, specific management actions will be implemented to reduce dust deposition. As a result, project-related exposure of pollinators to the stressor of dust is unlikely to alter pollinator dynamics to such an extent that reproduction in *E. tiehmii* will be appreciably altered.

Other Aerial Pollutants

In addition to the dust deposition modeling for haul traffic, the air quality impact analysis for the proposed project provided details on particulate matter emissions and other criteria pollutants,

relative to the National Ambient Air Quality Standards (NAAQS). This air quality impact analysis included point sources, volume sources, quarry sources, tail pipe emissions, on-site road sources, and off-site commuter and delivery traffic sources to assess all emission sources pertaining to the proposed project to determine compliance with the primary standards set forth in the NAAQS (Stantec 2024, WestLand 2024a).

The NAAQS secondary standards define levels necessary to protect the public "welfare" from any known or anticipated adverse effects of a pollutant. All language referring to effects on "welfare" (*i.e.,* secondary standards) includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants (WestLand 2024a).

Quantifying background concentrations is necessary to evaluate total pollutant impacts in the action area, including project-related impacts and existing conditions. For rural areas, background concentrations are established for PM_{10} and $PM_{2.5}$ (particulate matter 10 and 2.5 micrometers or less in diameter, respectively). Background concentrations for PM_{10} for the proposed project background were set for a 24-hour period at 10.2 micrograms per cubic meter ($\mu g/m^3$) and at 9 $\mu g/m^3$ annually. The approved annual and 24-hour $PM_{2.5}$ background concentration values are 2.3 $\mu g/m^3$ and 8 $\mu g/m^3$, respectively (Stantec 2024). The air quality impact analysis demonstrated that particulate matter concentrations resulting from the proposed project, exposure to which may adversely affect *Eriogonum tiehmii*, are estimated to be below the primary and secondary NAAQS for $PM_{2.5}$ and PM_{10}, for all receptors and emissions combinations. Some peak impacts are adjacent to the northwest portion of occupied habitat for *E. tiehmii*; however, where particulate matter impacts will occur in these areas, the analysis showed that the project will comply with the primary standards set forth in the NAAQS. Because the project will comply with primary NAAQS, it will also be compliant with secondary standards, so impacts to vegetation (such as *E. tiehmii*) are anticipated to comply with NAAQS. As a result, population level effects from aerial pollutants are not expected to occur.

Hydrology

The proposed project will alter both surface and groundwater hydrology within the action area. For example, surface water will be routed around the OSF and SOSF, and dewatering of the quarry will result in groundwater drawdown. Changes in groundwater levels are calculated in 10-foot increments. The extent of the 10-foot drawdown contour associated with the quarry extends up to a maximum of approximately five miles from the quarry in a westerly direction and approximately four miles in a northerly direction (see Figure 2).

The proposed project is not expected to alter surface water hydrology or moisture supply within any of the subpopulations of *Eriogonum tiehmii* based on the location and elevation of the various project elements. *E. tiehmii* subpopulations are located at elevations greater than planned facilities (WestLand 2024a). Additionally, because *E. tiehmii* is dependent on occasional

precipitation and not groundwater for moisture, the increase in the depth to groundwater below the subpopulations due to drawdown is not likely to adversely affect the species.

We also considered whether project-related increases in the depth to groundwater could affect other plant species in the area, which could in turn, adversely affect pollinators of *Eriogonum tiehmii*. Groundwater within the action area has been documented to be 140 feet or greater in depth (Stantec 2024). Typical species within the local vegetation community have a range of root depths from shallow diffuse root systems to deeper more robust root systems. Plants with deeper root systems include Nevada jointfir (*Ephedra nevadensis*) with roots that can extend up to 6.6 feet below the ground (Stantec 2024). Therefore, plants in the area surrounding occupied habitat for *Eriogonum tiehmii* which may be supporting pollinators are unlikely to be using the groundwater that may be affected by the proposed project. As a result, project-related increases in the depth to groundwater due to drawdown is not likely to adversely affect *E. tiehmii* through changes to other plant species and pollinators.

Lowering of a water table by dewatering or water production (groundwater drawdown) may result in subsidence, which can degrade soil and vegetation, but these effects are not well studied and are difficult to apply to the action area. Subsidence within *Eriogonum tiehmii* subpopulations is expected to be minimal at 4 inches or less (Stantec 2024; HydroGeoLogica 2020). The Service cannot determine how *E. tiehmii* will respond to this minimal amount of subsidence. Adverse effects to *E. tiehmii* caused by project-related subsidence are not reasonably certain to occur.

Summary

As we stated previously in this biological opinion, “jeopardize the continued existence of” means “to engage in an action that reasonably will be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02). This regulatory definition focuses on how the proposed action will affect the numbers, distribution, and reproduction of the species under consideration in the biological opinion. For that reason, we have used those aspects of the status of *Eriogonum tiehmii* as the basis to assess the overall effect of the proposed action on the species.

In this section, we will synthesize the analyses contained in the previous paragraphs to determine how the BLM’s approval of the plan of operations for the proposed project are likely to affect the numbers, distribution, and reproduction of *Eriogonum tiehmii* (see *Analytical Framework for Section 7(a)(2)*). We will then assess the effects of these aspects of the proposed action on the recovery of the species; this assessment will lead to a conclusion of whether the proposed action is likely to appreciably reduce the likelihood of both the survival and recovery of *E. tiehmii* in the wild.

Effects on Numbers

The proposed project will not remove or disturb any *Eriogonum tiehmii* individuals because all ground disturbance will be located outside the subpopulations of the species. In addition, while

quarry slope wall failure could result in the loss of individuals, as discussed above, based on the best scientific information available we determined that quarry slope wall failure is unlikely to occur, and therefore a reduction of *E. tiehmii* numbers due to slope failure is unlikely. Consequently, the proposed action will not alter the number of *E. tiehmii* individuals.

Effects on Distribution

Eriogonum tiehmii exists as 1 population, composed of 8 subpopulations, on approximately 10 acres. All proposed project facilities will be located outside of occupied habitat. The placement of dust monitoring equipment within occupied habitat will remove an insignificant amount of habitat for the footings of the monitors and fence posts (on the order of a few square feet) (APCM-9). In addition, while quarry slope wall failure could result in the loss of habitat and a decreased distribution of the species, as discussed above, based on the best scientific information available we determined that quarry slope wall failure is unlikely to occur, and therefore a reduction of the distribution of *E. tiehmii* due to slope failure is unlikely. Consequently, the proposed action will not alter the distribution of *E. tiehmii*.

Effects on Reproduction

Eriogonum tiehmii plants reproduce through the production of seeds. Although *E. tiehmii* plants appear to be capable of self-pollination, pollination significantly increases seed production (McClinton *et al.* 2020) and leads to increased genetic diversity. As a result, adverse effects to pollinators may affect *E. tiehmii* through reduced seed production and genetic exchange (though not eliminated because the species is capable of self-pollination). As described below, the proposed project has the potential to affect populations of pollinators through habitat removal, collisions with mine equipment/traffic, and changes in abiotic factors such as noise, light, and dust.

Effects from Habitat Removal

The proposed project will result in the disturbance of 191 acres of habitat adjacent to occupied habitat for *Eriogonum tiehmii* where pollinators are likely present. Impacts to pollinator species and community assemblages, abundance, and diversity may occur due to reduced available habitat, which could in turn impact pollination visitation rates of *E. tiehmii*.

Reclamation of habitat will be designed to restore habitat loss for pollinators and will consist of the measures detailed in APCM-6. Quarry highwall benches will be seeded, but no further pollinator habitat reclamation will occur on quarry highwall benches due to safety and inaccessibility after construction of the highwall and benches. The South and Quarry Infill OSF will be graded to their final configuration during operations, with regrading required for construction of the buttresses, in year 18 of operations. The haul road outside of the quarry will be recontoured to match existing grades, with an approximately 16-foot-wide OHV road remaining for monitoring access. All areas of disturbance reclamation within the critical habitat boundary, except the highwall benches and the Cave Springs Road realignment, will receive the full pollinator habitat reclamation specified in APCM-6. The quarry lake, Cave Springs Road

realignment, and OHV road used for monitoring access will remain as unreclaimed features, which amount to a total of 45 acres within the critical habitat boundary.

Although approximately 146 acres will be restored to pollinator habitat or highwall bench reclamation, reclamation of habitat adjacent to *Eriogonum tiehmii* will not begin until year 19 and is not expected to achieve interim success criteria until year 23. Therefore, the disturbance to pollinators within these areas will be long term. Both the long-term and permanent removal of approximately 146 acres and 45 acres, respectively, will impact habitat important to pollinators that support reproduction of *E. tiehmii*. Pollinator habitat that will be disturbed includes: a diversity of native plants whose blooming times overlap to provide insect visitors and pollinator species with flowers for foraging throughout the seasons and provide nesting and egg laying sites; appropriate nest materials; sheltered, undisturbed habitat for hibernation and overwintering of pollinator species and insect visitors. In the following paragraphs, we will discuss how this loss of pollinator habitat will affect the reproduction of *E. tiehmii*.

As mentioned previously, studies that correlate insect visitor frequency with pollinator effectiveness or performance (the ability of a floral visitor to remove and deposit pollen) have not been conducted for *E. tiehmii*. However, during extensive pollinator surveys, WestLand (2023) found that the action area supports diverse pollinator communities, both within and adjacent to habitat occupied by *Eriogonum tiehmii* (*i.e.,* habitat that will either be directly removed or indirectly affected by project-related activities). Pollinator communities within *E. tiehmii* subpopulations differed in overall species composition and abundance from the adjacent habitat and from other occupied subpopulations. WestLand (2023) observed that the differences observed in pollinator communities are driven by species replacement, not by richness differences. This indicates there are generally different species at each subpopulation (species replacement), not differences in the overall number of different species at each subpopulation (richness). They hypothesized that the lack of identifiable ecological differences between sample locations that will drive species replacement suggests that pollinator communities are assembled based on conditions on a local scale. In other words, the local habitat conditions at each subpopulation are the most important features that drive which pollinators will occur there. Further, WestLand (2023) did not identify any regions adjacent to *E. tiehmii* subpopulations that will be of heightened importance for maintaining pollinator diversity for the subpopulations. Therefore, due to the relatively high diversity and local nature of the pollinator communities within *E. tiehmii* subpopulations, the disturbance of habitat outside of subpopulations is not likely to reduce pollinator populations within subpopulations to the extent that seed set for individual plants will be impaired. In addition, the high diversity of pollinator species throughout the action area ensures that a reduction in the abundance of one or a few species resulting from project activities or climate change will not impair reproduction of *E. tiehmii* because many other pollinator species are likely to fill their ecological role. Finally, multiple APCMs will monitor the response of *E. tiehmii* to reduced pollinator populations and Ioneer will implement management actions if biological effects are detected to ensure the effects of the proposed project to *E. tiehmii* are consistent with this analysis (APCM-12, APCM-16, and APCM-18).

Although pollinator habitat will be removed adjacent to *Eriogonum tiehmii* subpopulations long term (*i.e.,* approximately 23 years) and permanently due to the proposed project, habitat with

alternative pollen and nectar sources, and sites for nesting and shelter will remain within each subpopulation and adjacent to each subpopulation such that we expect ecosystem processes will continue to function largely unchanged. A small amount of pollinator habitat will be affected near subpopulations 1, 2, and 8. More pollinator habitat will be removed near subpopulations 3, 4, 5, 6, and 7, but pollinator habitat will primarily remain to the north, south, and west of each of these subpopulations (*i.e.,* impacts from the proposed project will predominantly occur to the east of each subpopulation). Fraga (2024) cited concerns that habitat disturbance could affect pollinators and that sufficient habitat was needed to buffer against these effects. We found that pollinator habitat continues to border each subpopulation on most sides geographically, except to the east. Because research has not found any particular location to be of heightened importance for pollinators and the proposed project will not surround or severely limit any single subpopulation of *E. tiehmii*, we expect plant community dynamics that support pollinators to continue to function largely unchanged within each subpopulation. Although pollinator habitat near the subpopulations will be removed long term and permanently due to the proposed project and those effects are adverse, we do not expect changes in ecosystem functions to such an extent that reproduction in *E. tiehmii* will be appreciably altered.

Effects from Light, Noise, Traffic, and Dust

Increased light, noise, traffic, and dust from the project may also affect *Eriogonum tiehmii* pollinator movement, diversity, and abundance. Sources of noise will include construction of roads and facilities, operations at the processing plant, blasting activities, and vehicular traffic. Areas of increased noise production may affect movement, physiological stressors, or physiological processes of pollinators. However, facilities with the most continuous noise (*e.g.,* processing plant) are located more than 1 mile from *E. tiehmii* subpopulations and are unlikely to have an appreciable effect on pollinator populations in the vicinity of *E. tiehmii*. Regarding the haul roads, traffic will vary by year, with operations in year 11 having the highest roundtrip use occurring; however, the haul road is not adjacent to *E. tiehmii* subpopulations, which will minimize exposure to the stressor. Within the subpopulations, Ioneer will implement APCM-17 to monitor noise levels during peak flowering. Noise monitoring data, along with other biotic and abiotic monitoring data (*e.g.,* noise, light, local weather conditions, and dust deposition) will be used to explore and identify changes in site condition for *E. tiehmii* and year-over-year shifts in potential pollinator/insect visitor diversity and abundance. This measure will assist Ioneer in identifying changes in site conditions which may be caused by the proposed project and to implement measures to further minimize adverse effects to *E. tiehmii.* Because facilities with the highest noise levels (*e.g.,* processing plant) are located further than where we expect local pollinators servicing *E. tiehmii* to be exposed to levels at which population declines will occur, the haul road is not located adjacent to subpopulations, and various APCMs will be implemented to monitor noise and pollinators, we do not expect noise generated from the proposed project to alter pollinator dynamics to such an extent that reproduction in *E. tiehmii* will be appreciably altered.

Sources of light from project-related activities will include lighting for non-daytime work at the quarry, South and Quarry Infill OSF, North OSF and night-time haul truck and vehicular traffic. Areas of increased light production may affect pollinator movement and may attract insects and

associated predators such as bats. Lights that create attractants may also serve as traps, increasing predation. The adverse effects of lighting will be minimized through the implementation of APCM-8. This conservation measure was designed to minimize artificial light and avoid lighting at night, avoid light spill, avoid white and blue wavelengths to reduce insect attraction and filter lights with an amber or red tint to minimize visibility to pollinators and other insects. This will include the use of stationary lights and light plants, with lighting being directed onto the site where operations are occurring and not adjacent areas. The project will use light emitting diode (LED) or organic light emitting diode (OLED) light sources that can be switched off, dimmed easily, aimed well, and shielded to minimize up lighting. When color rendering is determined not critical, lighting will use 500-nanometer filtered LED fixtures or pure narrow-band amber LED lamps or equivalent to limit the use of sub-500-nanometer lighting spectra. Appropriate implementation of the lighting measures detailed in APCM-8 for stationary lighting sources is anticipated to minimize pollinator exposure and response to the stressor of lighting. Lighting impacts from vehicular and haul truck traffic will still occur, but the level of light from haul truck and vehicular traffic will be limited and small in extent relative to the entire action area, and roads are not located within any subpopulations. Therefore, lighting generated from the proposed project is unlikely to alter pollinator dynamics to such an extent that reproduction in *E. tiehmii* will be appreciably altered.

Traffic, particularly haul trucks proximate to subpopulation 3, has the potential to reduce populations of pollinators through direct mortality. Literature on the magnitude of vehicular mortality on insects is limited, but evidence suggests effects are focused to a narrow corridor adjacent to the road, and are influenced by habitat characteristics (*e.g.,* pollinator hotspots), seasonal timing, traffic volume, and road width (Stantec 2024; Phillips *et al.* 2020). Traffic associated with the proposed project will occur in critical habitat along the Cave Springs Road and, starting in year 4, along the eastern edges of subpopulations 3, 4, 5, and 6. Some mortality of pollinators is expected as haul road traffic increases from baseline conditions. However, as stated above, we are not aware of any location of heightened importance for pollinators in the action area where we will expect more collisions with vehicles, and haul road traffic volume will be relatively low (*e.g.,* in comparison to a public highway). The loss of a pollinators from traffic caused by the proposed project is unlikely to alter pollinator dynamics to such an extent that reproduction in *Eriogonum tiehmii* will be appreciably altered.

Dust deposition can result in mortality of insect pollinators. However, the effects depend on the type of dust and vary by species of insect. APCM-9 will be implemented to monitor and manage dust. Should dust monitoring adjacent to *Eriogonum tiehmii* subpopulations result in actual dust deposition exceeding the 4 g/m^2/day threshold, specific management actions will be implemented to reduce dust deposition. As a result, project-related exposure of pollinators to the stressor of dust is unlikely to alter pollinator dynamics to such an extent that reproduction in *E. tiehmii* will be appreciably altered.

Additional impacts from air pollution and emissions such as diesel exhaust or hydrocarbons may reduce pollinator foraging efficiency and pollinator visitation rates by affecting chemical cues and therefore decrease pollination rates and pollen flow in flowering plants (Stantec 2024). However, the proposed project will be compliant with primary and secondary National Ambient

Air Quality Standards. Therefore, although pollinators will be exposed to air pollution and emissions, the exposure will be minimized such that it is unlikely to alter pollinator dynamics to such an extent that reproduction in *E. tiehmii* will be appreciably altered.

In conclusion, the loss of pollinators and their habitat and the reduced effectiveness in pollinating *Eriogonum tiehmii* are primary threats posed by the proposed action to the reproduction of *E. tiehmii*. Overall, we expect that the proposed action will not appreciably alter the number of pollinators. We also expect that the proposed conservation measures will reduce the adverse effects of habitat loss, dust, noise, lighting, and traffic on pollinators and the monitoring program will allow Ioneer to adjust management to further reduce adverse effects detected in the future. For these reasons, we conclude that the proposed action is not likely to appreciably reduce the reproduction of *E. tiehmii*.

Effects on Recovery

The proposed project will support the following recovery objectives, described in the recovery outline (Service 2023):

- Objective 2: Continue to fill knowledge gaps on species and population needs, habitat needs, and threats;
- Objective 3: Develop a research program to identify methods to direct seed, transplant, and/or translocate *Eriogonum tiehmii*; and
- Objective 4: Implement long term ex-situ conservation measures.

Ioneer has committed to implement APCM-12 and APCM-18. The Buckwheat Protection Plan further describes how Ioneer, the Service, and BLM will work together to implement these conservation efforts (WestLand 2024a). To summarize, Ioneer will collect demographic and recruitment monitoring data that supports Objective 2 and will develop an ex-situ conservation program which supports Objectives 3 and 4. Elements of the ex-situ program are experimental; it is unclear if the program will ultimately be successful in moving the species status closer to recovery. However, implementing the Buckwheat Protection Plan will not preclude us from recovering the species.

The proposed project will affect our ability to meet Objective 1, which is to work with partners to protect the existing population and critical habitat. Regarding the intent to protect the existing population, individual *Eriogonum tiehmii* plants will not be disturbed or damaged by the proposed action and our ability to protect the physical extent of the existing population will be unchanged. However, regarding the intent to protect critical habitat, the project will result in the permanent loss of 45 acres of critical habitat; this habitat would not be protected or contribute to the recovery of *E. tiehmii* in the future. In addition, 146 acres of critical habitat will be disturbed for 19 years before reclamation begins and is not expected to meet functional (interim) reclamation objectives until year 23 (see Table 1). If the proposed project is implemented, 146 acres of critical habitat that was disturbed could be protected in the future after reclamation, but recovery will be delayed for a significant period of time (*i.e.,* until after year 23). During that time, work towards achieving Objectives 2, 3 and 4 will occur because of Ioneer's obligation to

implement conservation measures as a result of BLM's approval of the plan of operations. The delay in recovery is significant but must be considered in the context of the improving our ability to achieve the other recovery objectives. Overall, we do not expect the proposed project will result in permanent habitat loss or a delay in habitat protection at the scale that our ability to recover the species will be reduced appreciably.

Effects on Critical Habitat

We identified the following project-related stressors as being relevant to designated critical habitat for *Eriogonum tiehmii*: herbicides; spread of nonnative, invasive plants, release of hazardous materials and runoff; greenhouse gas emissions; quarry slope wall failure; fencing; pollinator habitat removal; particulate matter deposition (*e.g.,* dust); changes in hydrology; and effects to pollinators (from lighting, noise, and vibration). We will analyze how the PBFs of critical habitat will respond to exposure to these stressors and, ultimately, how the proposed project may affect the conservation value of critical habitat for *E. tiehmii*.

The proposed project will result in disturbance of approximately 191 acres of critical habitat for *Eriogonum tiehmii,* out of a total of 910 acres designated. This habitat supports the plant community for (PBF 1) and pollinators for *E. tiehmii* (PBF 2). Of this disturbance, approximately 146 acres will be reclaimed, and 45 acres will not. The quarry lake, Cave Springs Road realignment, and OHV road used for monitoring access will remain as unreclaimed features. Although some reclamation activities will begin concurrent with mining, the early reclamation activities will occur outside of critical habitat and will not include pollinator habitat reclamation, except for the experimental test plots that will be conducted on the South and Quarry Infill OSF beginning in year 4 of operations. The experimental test plots will be used to refine and optimize various restoration methods during early phase reclamation efforts, increasing the likelihood that reclamation efforts will ultimately be successful.

Reclamation within critical habitat will not begin until year 19, after the buttresses will be constructed to provide for the long-term stability of the west quarry wall (reducing the risk of exposing critical habitat to wall slope failure). Ioneer anticipates functional (interim) reclamation objectives will be achieved by year 23, four years after pollinator habitat reclamation occurs. Ioneer anticipates achieving long-term reclamation objectives and release of the reclamation bond for reclamation within critical habitat by year 33, ten years after the functional (interim) reclamation objectives are achieved and 14 years after pollinator habitat reclamation occurs. Reclamation in desert environments may take certain vegetation communities up to 30 years or more following reclamation to fully establish (Stantec 2024). Fraga (2024) states that restoration in an arid landscape is challenging and results in high rates of failure. To address this uncertainity, Ioneer will experiment, refine, and optimize various restoration methods during early phase reclamation efforts (APCM-6). Beginning in year 4 of quarry operations, experimental test plots for habitat restoration will be implemented on areas outside of *E. tiehmii* critical habitat to better inform pollinator habitat reclamation within critical habitat when it begins. Reclaimed sites will be assessed both qualitatively and quantitatively. The protocols and procedures to evaluate enhanced reclamation methods to achieve the reclamation objectives

outlined in this plan will be developed in collaboration with the Service and BLM prior to year 2 of the project and will include interim and final success criteria.

The implementation of APCM-6 increases the likelihood that reclamation efforts will ultimately be successful, such that permanent loss of the 146 acres of reclaimed habitat is not reasonably certain to occur. However, as pollinator habitat reclamation will not fully occur until year 19, with reclamation establishing over a period of 14 years or potentially longer, some adverse effects to the PBF #1 and PBF #2 will be long term.

In addition to the area of critical habitat that will be disturbed or removed by project facilities, dust deposition and other project effects could alter the function of PBFs, such as the plant community and pollinators. Consequently, our analysis in this biological opinion is broader in scope than just the areal extent of impacts and related to how the project will affect the conservation value of designated critical habitat.

As we stated previously in this biological opinion, the "destruction or adverse modification" of critical habitat means "a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02). This regulatory definition focuses on how the proposed action will affect the physical and biological features of the critical habitat under consideration in the biological opinion. For that reason, we used those PBFs as the basis to assess the overall effect of the proposed action on the species.

PBF 1: Plant Community

PBF 1 is "a plant community that supports all life stages of *Eriogonum tiehmii.*" The proposed project may affect PBF 1 through particulate matter deposition (*e.g.,* dust); habitat removal; changes in hydrology; exposure to hazardous materials and runoff; herbicide application; greenhouse gas emissions; quarry slope wall failure; and spread of non-native plants.

The plant community is important to the conservation of *Eriogonum tiehmii* primarily within each existing subpopulation. For example, PBF 1a and 1b describe the microhabitat conditions where E. *tiehmii* individuals have limited competition for resources, and where other plant species are present to provide important plant to plant interactions and ecosystem resiliency. The stressors of changed hydrology and exposure to hazardous materials and runoff are not likely to adversely affect PBF 1 because these stressors occur far away or lower in elevation, and conservation measures are in place to contain spills and runoff, such that exposure is unlikely for the plant communities.

As stated previously in *Effects on Eriogonum tiehmii*, greenhouse gas emissions have been linked with accelerated global climate change. As a result, the proposed project may contribute to climate change to some extent. Although the emissions likely to be emitted from the proposed project can be quantified, the Service cannot determine the extent to which the plant communities in critical habitat will be exposed to the emissions and how the plant communities will respond to that specific exposure. That is, we cannot quantify the level of impact the greenhouse gas emissions from this individual project will have on global climate change, how

that impact will translate to climatic changes within the action area, and how PBF 1 will respond to the stressors from the proposed mine. Adverse effects to PBF 1 caused by project-related emissions are not reasonably certain to occur.

Quarry slope failure, should it occur, may adversely affect PBF 1 by habitat loss. However, Ioneer designed the construction of the quarry and modeled slope stability over the long term to acceptable levels to minimize risks associated with slope failure (APCM-2). Therefore, the risk of wall slope failure has been minimized, and adverse effects to PBF 1 from wall slope failure are discountable (Geo-Logic Associates 2023, WestLand 2024a). An architect/civil engineer with the Service reviewed the Supplemental Geotehnical Report prepared by Geo-Logic Associates and found it to be acceptable (Johns 2023; Geo-Logic Associates 2023). Given the proposed design of the quarry walls (APCM-2), and ongoing monitoring of their stability during operations (APCM-3), failure of the wall slope is not reasonably certain to occur. Consequently, PBF 1 is not expected to be exposed to this stressor.

The stressor of particulate matter deposition and herbicide application could reduce the fitness or reproductive success of the other plant species within critical habitat that are serving this important role (PBF 1b); however, adverse effects from particulate matter deposition will be minimized because Ioneer will implement APCM-9 to monitor and minimize dust levels and APCM-12 to help detect changes in demographics or recruitment in *Eriogonum tiehmii*. Adverse effects to PBF 1b from herbicide application will be minimized because Ioneer will implement multiple actions, as part of APCM-7, to reduce the risk of exposure, such as utilizing a 50-foot-wide buffer from *E. tiehmii* subpopulations for herbicide application and measures to reduce herbicide drift. Weed control within the 50-foot-wide buffer will be accomplished using hand pulling or other approved hand-operated mechanical methods. All herbicide applicators will be state certified, receive site-specific training, and either be qualified as or accompanied by a biological monitor. Herbicide application will meet all product label requirements. Therefore, we do not expect that plants serving the role of PBF 1b will experience reduced fitness or reproductive success due to herbicide application.

The stressor of spreading nonnative invasive plants may increase the vegetation and cover within occupied critical habitat, adversely affecting PBF 1a and 1b through decreased fitness and reproductive success of *Eriogonum tiehmii* and other native plant species. Fraga (2024) claims that nonnative, invasive plants "are likely to spread, especially along haul roads, due to the large amounts and high frequency of water application that is proposed to occur to reduce fugitive dust" and "this amount of water is significant and would increase the spread of invasive plant species across the Project area that might otherwise be limited to Cave Spring." Ioneer will implement a non-native, noxious, and invasive weed species control program through the life of the project, until final reclamation success criteria have been achieved and the bond has been released to minimize project-related adverse effects from non-native species (APCM-7). A noxious weed monitoring and control plan will be developed prior to implementation of project construction in coordination with the BLM and the Service. The plan will include measures for the use of herbicides, trained staff, and routine monitoring. With the implementation of APCM-7, we do not expect PBF 1a and 1b to be adversely affected by the spread of nonnative invasive plants. .

PBF 1c describes the conservation value of having a diversity of native plants whose blooming times overlap to provide insect visitors and pollinator species with flowers for foraging throughout the seasons and to provide nesting and egg-laying sites; appropriate nest materials; and sheltered, undisturbed habitat for hibernation and overwintering of pollinator species and insect visitors. The long-term and permanent removal of 146 acres and 45 acres, respectively, of habitat containing PBF 1c is likely to adversely affect the conservation value of critical habitat for *E. tiehmii.*

A small amount of PBF 1c will be affected near subpopulations 1, 2, and 8. Critical habitat that supports PBF 1c near subpopulations 3, 4, 5, 6, and 7 will primarily remain to the north, south, and west of each subpopulation (*i.e.,* impacts from the proposed project will predominantly occur to the east of each subpopulation). Because each subpopulation will continue to be bordered by PBF 1c on most sides geographically (except for critical habitat to the east), and the proposed project will not surround or severely limit any single subpopulation, plant community dynamics that support pollinators are expected to continue to function within each subpopulation. In addition, the area that will be disturbed does not contain any unique feature that is not found in the remaining critical habitat. We expect that Ioneer's efforts to restore most of the long-term disturbed areas will ultimately be successful. Although habitat containing PBF 1c will be removed long term and permanently due to the proposed project and those effects are adverse, we do not expect the effects to rise to the scale that appreciably diminishes the function of this PBF.

PBF 2: Pollinators and insect visitors

PBF 2 describes the need for sufficient pollinators and insect visitors, particularly bees, wasps, beetles, and flies, to be present for the successful reproduction and seed production of *Eriogonum tiehmii*. The proposed project may expose PBF 2 to the stressor of effects to pollinators (*e.g.,* lighting, noise, particulate matter deposition, traffic, and vibration).

Increased sources of lighting, noise, particulate matter deposition, traffic and vibration may affect *Eriogonum tiehmii* through impacts to pollinator movement, diversity, and abundance. Sources of noise will include construction of roads and facilities, operations at the processing plant, blasting activities, and vehicular traffic. Areas of increased noise production may affect movement, physiological stressors, or physiological processes of pollinators. However, facilities with the most continuous noise (*e.g.,* processing plant) are located more than 1 mile from *E. tiehmii* subpopulations and are unlikely to have an appreciable effect on pollinator populations.

Regarding the haul road, traffic will vary by year, with Year 11 having the highest roundtrip hauling occurring. The haul road for transport of ore to the processing plant and overburden to the North OSF is located to the east side of the quarry, The haul road is mostly located outside of critical habitat, other than where it occurs along the eastern side of the quarry footprint, and where it exits the quarry to get to the processing plant and North OSF. The haul road is located away from subpopulations, within the quarry footprint, and lower in elevation than critical habitat nearby that will not be disturbed as part of the proposed project. These elements of the project design will minimize exposure of pollinators servicing *E. tiehmii* and therefore reduce the

adverse effects to the conservation value of PBF 2. However, adverse effects to PBF 2 will remain, including increased noise, light, traffic, and dust.

Within critical habitat and the subpopulations, Ioneer will implement APCM-17 to monitor noise levels during peak flowering. Noise monitoring data, along with other biotic and abiotic monitoring data (*e.g.,* noise, light, local weather conditions, and dust deposition), will be used to explore and identify changes in site conditions within critical habitat and year-over-year shifts (if any) in potential pollinator/insect visitor diversity and abundance. The goal of this measure is to assist Ioneer in identifying changes in site conditions that may be caused by the proposed project and to implement measures to further minimize adverse effects to critical habitat. Because Ioneer will implement several APCMs to monitor noise and pollinators and implement management measures if needed, we do not expect the effects from sound to rise to the scale that appreciably diminishes the function of this PBF.

Sources of light from project-related activities will include lighting for non-daytime work at the quarry, South and Quarry Infill OSF, North OSF and night-time haul truck and vehicular traffic. Areas of increased light production may affect pollinator movement and may attract insects and associated predators such as bats. Lights that create attractants may also serve as traps, increasing predation. The adverse effects of lighting to PBF 2 will be minimized through the implementation of APCM-8. This conservation measure was designed to minimize artificial light and lighting at night, avoid light spill, avoid white and blue wavelengths to reduce insect attraction, and filter lights with an amber or red tint to minimize visibility to pollinators and other insects. This will include the use of stationary lights and light plants, with lighting being directed onto the site where operations are occurring and not adjacent areas. LED or OLED light sources will be used and can be switched on or off, dimmed easily, aimed well, and shielded to minimize up lighting. When color rendering is determined not critical, lighting will use 500-nanometer filtered LED fixtures or pure narrow-band amber LED lamps or equivalent to limit the use of sub-500 nanometer lighting spectra. Appropriate implementation of the lighting measures detailed in APCM-8 for stationary lighting sources is anticipated to minimize pollinators exposure and response to the stressor of lighting, minimizing adverse effects to PBF 2. Lighting impacts from vehicular and haul truck traffic will still occur, but the level of light from haul truck and vehicular traffic will be limited and small in extent relative to the entire action area. Therefore, lighting generated from the proposed project is unlikely to alter pollinator dynamics to such an extent that it appreciably diminishes the function of this PBF.

Traffic within critical habitat has the potential to reduce populations of pollinators through direct mortality, adversely affecting PBF 2. Literature on the magnitude of vehicular mortality on insects is minimal, but limited evidence suggests effects are focused to a narrow corridor adjacent to the road, and are influenced by habitat characteristics (*e.g.,* pollinator hotspots), seasonal timing, traffic volume, and road width (Stantec 2024; Phillips *et al.* 2020). Some mortality of pollinators is expected as haul road traffic increases from baseline conditions. However, we are not aware of any location of heightened importance for pollinators in the action area where we will expect more collisions with vehicles, and haul road traffic volume will be relatively low (*e.g.*, in comparison to a public highway). We expect the loss of a small number of pollinators from traffic caused by the proposed project (Stantec 2024). The loss of pollinators

from traffic is unlikely to alter pollinator dynamics to such an extent that it appreciably diminishes the function of this PBF.

Dust deposition can result in mortality of insect pollinators. However, the effects depend on the type of dust and vary by species of insect. To minimize adverse effects for PBF 2, Ioneer will implement APCM-9 to monitor and manage dust, including seven on-site dust monitors to mitigate fugitive dust. Should dust monitoring adjacent to *Eriogonum tiehmii* subpopulations result in actual dust deposition exceeding the 4 g/m^2/day threshold, specific management actions will be implemented. As a result, project-related exposure of pollinators to dust are expected to be minimized such that adverse effects (*e.g.,* decrease in seed set or genetic diversity) at the population level for *E. tiehmii* are not expected. Additional impacts from air pollution and emissions such as diesel exhaust or hydrocarbons may reduce pollinator foraging efficiency and pollinator visitation rates by affecting chemical cues and therefore decrease pollination rates and pollen flow in flowering plants. However, the proposed project will be compliant with primary and secondary National Ambient Air Quality Standards. Therefore, although pollinators will be exposed to dust deposition, air pollution, and emissions, the exposure will be minimized such that it is unlikely to alter pollinator dynamics to such an extent that appreciably diminishes the function of this PBF.

We expect that Ioneer's efforts to restore a majority of the critical habitat will ultimately be successful and will function to support pollinators after reclamation. Pollinators will be adversely affected by project disturbance and habitat loss and, we do not understand if differences in effectiveness exist among the pollinator species. However, studies have demonstrated that the pollinators and insect visitors of *Eriogonum tiehmii*, are abundant and composed of a variety of species, and the areas of critical habitat that will be disturbed by the proposed project do not support a unique assemblage of pollinators and insect visitors. We do not expect the effects to rise to the scale that appreciably diminishes the function of this PBF.

PBF 3: Hydrology

PBF 3 is hydrology that is suitable for *Eriogonum tiehmii*. The stressor of changed hydrology may affect PBF 3. Critical habitat will be exposed to changed hydrology from facilities such as the quarry, quarry infill area, access roads, and fencing. In particular, fencing construction (APCM-4 and APCM-9) will involve construction within areas of critical habitat where surface water flows support PBF 3, which could affect the conservation value of critical habitat for *E. tiehmii*. All other project elements will be at lower elevations such that changes in surface water flows from the proposed project are not expected to affect the conservation value of PBF 3. To minimize adverse effects from fence construction (*e.g.,* digging soils which can change surface flows), vegetation and soil disturbance will be limited to the smallest amount necessary. Monitoring of the fenced areas will occur during the quarterly critical habitat monitoring (APCM-15) and will minimize potential adverse effects from modifying the flow of existing hydrology in the area to insignificant levels. We expect the proposed project will not change the hydrology supporting *E. tiehmii* at the scale that appreciably diminishes the function of this PBF.

PBF 4: Suitable soils

PBF 4 is soils that are suitable for *Eriogonum tiehmii*. Current research suggests that *E. tiehmii* is a soil specialist, so the soils where individuals currently occur are the most important for the conservation of the species. The proposed project may affect PBF 4 due to exposure to hazardous materials, runoff, and subsidence. If PBF 4 is exposed to hazardous materials and runoff, soils may be rendered unsuitable for *E. tiehmii*. However, suitable soils contributing to the conservation value of critical habitat to *E. tiehmii* are unlikely to be exposed to this stressor because equipment containing petroleum, or other hazardous wastes will not be used within or above critical habitat where spills could expose and damage suitable soils. Because we do not expect critical habitat will be exposed to hazardous materials or runoff, those potential stressors will not appreciably diminish the function of this PBF.

Lowering of a water table by dewatering or water production (groundwater drawdown) may result in subsidence, which can degrade soil and vegetation, but these effects are not well studied and are difficult to apply to the action area. Subsidence within *Eriogonum tiehmii* critical habitat is expected to be minimal (*i.e.,* 6 inches or less; Stantec 2024; HydroGeoLogica 2020). The Service cannot determine how *E. tiehmii* critical habitat will respond to this minimal amount of subsidence. Adverse effects to *E. tiehmii* critical habitat caused by project-related subsidence are not reasonably certain to occur.

CUMULATIVE EFFECTS

Cumulative effects are "effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Because the action area is located entirely on Federal land administered by the BLM, no cumulative effects are associated with the proposed action.

CONCLUSION

After reviewing the current status of *Eriogonum tiehmii* and its critical habitat, the environmental baseline for the action area, the effects of the proposed activities, and the cumulative effects, we have determined that the activities considered in this biological opinion are not likely to jeopardize the continued existence of *E. tiehmii* or result in the destruction or adverse modification of its critical habitat. We have reached these conclusions for the following reasons.

Eriogonum tiehmii

The proposed project is not likely to reduce appreciably the survival and recovery of *Eriogonum tiehmii* in the wild by reducing the numbers, distribution, reproduction or recovery of the species. The proposed action will not result in the loss or removal of any *E. tiehmii* plants (*i.e.,* numbers), or decrease its distribution. The proposed project will have adverse effects on the species' reproduction because of effects to pollinators and their habitats for approximately 23 years, and due to the permanent loss of a smaller portion of habitat. However, these effects will be

minimized, monitored, and reduced with the implementation of the APCMs. Further, we do not expect effects to pollinators and their habitats to appreciably disrupt the ecosystem services that the pollinators provide to *E. tiehmii*. We do not expect to see an appreciable reduction in the reproduction, numbers, or distribution of *E. tiehmii*; additionally, recovery objectives for the species will remain attainable.

***Eriogonum tiehmii* Critical Habitat**

The proposed project is not likely to appreciably diminish the value of critical habitat as a whole for the conservation of *Eriogonium tiehmii*. The proposed project will result in adverse effects to the first and second physical and biological features of critical habitat. Although the proposed project will result in the long-term disturbance (approximately 23 years) of 146 acres of the plant community that is the basis of PBF 1, and the permanent loss of 45 acres, we do not expect the adverse effects to appreciably diminish the value of critical habitat as a whole because: Ioneer's efforts to restore a majority of the disturbed areas will ultimately be successful; over the 23 years that critical habitat is disturbed, enough habitat will remain and be in a favorable configuration that plant-pollinator interactions will continue to function; and the area that will be disturbed does not contain any unique feature that is not found in the remaining critical habitat. Although the proposed project will result in long-term disturbance to pollinators, PBF 2, we do not expect the adverse effects to diminish the value of critical habitat as a whole because: Ioneer's restoration of the plant community will also restore the pollinator community; studies have demonstrated that the pollinators and insect visitors of *E. tiehmii*, are abundant and composed of a variety of species; and, as with the plant community, the disturbed areas of critical habitat do not support a unique assemblage of pollinators and insect visitors. Project effects to hydrology and soils will be minor and have insignificant effects on PBFs 3 and 4, respectively.

INCIDENTAL TAKE STATEMENT

"Take" as defined in section 3(19) of the Act applies only to listed animal species. Therefore, this biological opinion does not include an incidental take statement.

Ioneer should be aware that section 9(a)(2)(B) of the Act states that it is unlawful to, among other actions related to their transport or sale, "remove and reduce to possession any (endangered plant) species from areas under Federal jurisdiction; maliciously damage or destroy any such species on any such area; or remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any law or regulation of any State or in the course of any violation of a State criminal trespass law."

If Ioneer wishes to collect *Eriogonum tiehmii* plants, seeds, or other parts of the plant from areas under BLM jurisdiction, it should apply to the Service for a for an enhancement of propagation or survival permit pursuant to section 10(a)(1)(A) of the Act.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened

species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The conservation recommendations below are described in further detail in the recovery outline for *Eriogonum tiehmii* (Service 2023) and have been limited to those that the Service believes to be within the authority of BLM; however, additional conservation actions may be considered by BLM to support the conservation of *E. tiehmii*. We recommend that BLM consider implementing the following actions to support the conservation of *E. tiehmii:*

1. Utilize regulatory authorities to permanently conserve *E. tiehmii* occupied and critical habitat.
2. Conduct and support research on *E. tiehmii* insect visitors (*e.g.,* observations of visitation frequency) and pollinator effectiveness or performance (*e.g.,* pollen collection from insects visiting flowers) to better understand important pollinators for the species.
3. Contribute to and support an ex-situ seed storage program at a Service-approved seedbank through the collection of *Eriogonum tiehmii* seed and following the collection guidelines in Center for Plant Conservation *Best Plant Conservation Practices to Support Species Survival in the Wild* (2019).

REINITIATION NOTICE

Reinitiation of consultation is required and must be requested by the Federal agency, where discretionary Federal involvement or control over the action has been retained or is authorized by law and:

1. If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
2. If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or
3. If a new species is listed or critical habitat designated that may be affected by the identified action.

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APPENDIX

Several documents regarding specific protocols and procedures are detailed in the biological assessment (Stantec 20204) and Buckwheat Protection Plan (WestLand 2024a) but have yet to be developed. Table 1 in this Appendix provides a list of the stand-alone documents that will be prepared for the Applicant-Proposed Conservation Measures (APCMs), as described in the *Conservation Measures* section of this biological opinion. These documents will provide the protocols and procedures required to implement the conservation plans provided in this document as APCMs. These protocols and procedures will be reviewed and approved by the USFWS and BLM, as described in Table 1. These stand-alone documents are intended to facilitate implementation of the APCMs by outlining the specific protocols and procedures for each plan. All APCMs discussed in the following sections have been taken directly from the Buckwheat Protection Plan (WestLand 2024a).

Table 1 Monitoring and Implementation Plan Schedule and Requirements

Protocol and Procedures and Applicable APCMs	Due Date	Protocol/Procedure Description	Qualifications of Plan Author
Geotechnical Slope Management and Monitoring Procedures and Protocols Documentation/APCM-2 and APCM-3	Draft due three months prior to start of construction	In accordance with standard mining geotechnical protocol and MSHA requirements identifying the specific procedures that will be used to implement APCM-2 and ACPM-3 will be documented. Elements of the site-specific implementation procedures will include more specific description of the monitoring protocols described in APCM-3 and provided in the geotechnical reports prepared for the Action (Geo-Logic Associates 2022 and 2023), as well as the timing of the inspections and internal and external reporting requirements.	Ioneer will be responsible for funding the ongoing professional services contract. It is anticipated that a professional geotechnical and engineering firm will be retained to prepare and implement the monitoring procedures and protocol document. The preparation of the document shall be overseen and approved by a Professional Geotechnical Engineer with 10 or more years of relevant experience
Native Seed Collection and Propagation Protocols and Procedures (to support APCM-6)	Draft due third quarter of 2024	This protocol will be developed in coordination with the Great Basin Ecoregional Coordinator at the BLM Nevada State Office and the USFWS. It will provide guidance for venders and contractors that Ioneer will work with to accomplish the objectives of APCM-6. The protocol shall identify specific seed zones suitable for seed collection for the species in **Section 3.9.5** of this document, their propagation and use for the Action, estimate anticipated quantities of seed and plants needed per year, and outline planned seed collection and propagation schedules to ensure that sufficient locally sourced plants are available for experimental studies and reclamation needs. These procedures will utilize, as appropriate, the standard	Ioneer will fund the development of the procedures and protocols document and implementation of this aspect of APCM- 6. Ioneer anticipates that a qualified contractor selected for the preparation of the procedures and protocols document may include team members that have training as a horticulturalist, reclamation/restoration ecologist, or biologist and will benefit from participation in the BLM Arid Lands Reclamation Course. Ioneer will select a qualified contractor or individual to prepare the procedures and protocols document and Ioneer shall provide its recommendation to BLM and USFWS for review and confirmation that the contractor or individual meets the requirements set forth here. Such confirmation shall not be unreasonably withheld.

Protocol and Procedures and Applicable APCMs	Due Date	Protocol/Procedure Description	Qualifications of Plan Author
		techniques, such as those outlined in the BLM's Seeds of Success Technical Protocol (BLM 2024) for collection from native plant species.	
Pollinator Habitat Reclamation Experimentation and Optimization Study Procedures and Protocols (APCM-6)	Draft due Year 2 of operations	APCM-6 requires implementation of study plots to evaluate reclamation methods outlined in the conservation measure. Several methods to optimize the procedures provided to establish pollinator habitat vegetation within disturbed portions of critical habitat will be evaluated during the early phases of concurrent reclamation, through Year 18. These methods will include, but may not be limited to, soil amendments to facilitate establishment of the soil biome, enhanced (diversity and quantity) seed mixes based on the species identified in APCM-6, containerized plantings, supplemental irrigation approaches to support containerized plants used in reclamation until establishment, and the use of salvaged succulents. The procedures and protocols for implementation of the study plots called for in APCM-6 will lay out an experimental design that includes the treatments above, the monitoring and analytical approach for evaluation of the treatments identified and reporting requirements to optimize the pollinator habitat reclamation program.	Ioneer will fund the development of the procedures and protocols document and implementation of APCM-6. Ioneer anticipates that a qualified contractor selected for the preparation of the procedures and protocols document may include team members that have training as a restoration/reclamation ecologist or biologist with at least 10 years of relevant experience and participation in Center for Plant Conservation Rare Plant Academy courses. The development of the document will benefit from the participation of a pollinator ecologist familiar with the ecology and participation in BLM Arid Lands Reclamation Course by document preparers. Ioneer will select a qualified contractor or individual(s) to prepare the procedures and protocol document and Ioneer shall provide its recommendation to the BLM and the USFWS for review and confirmation that the contractor or individual meets the requirements set forth here. Such confirmation shall not be unreasonably withheld.
Pollinator Habitat Reclamation Implementation and Monitoring Protocols and Procedures (APCM-6)	Draft due three months prior to start of construction.	Using the plan provided in APCM-6, a stand-alone Pollinator Habitat Reclamation Implementation and Monitoring Protocols and Procedures document will be developed in coordination with the Great Basin Ecoregional Coordinator at the BLM Nevada State Office and USFWS in support of Ioneer's implementation of plan requirements in APCM-6 and its coordination and communication with vendors and contractors that may be retained to execute the work described in APCM-6. Specific monitoring protocols for annual quantitative sampling, including sampling design, field methods, data reduction, and statistical analysis to document progress towards success criteria are outlined in APCM-6 and will be included in the stand-alone protocol and procedures document. The stand-alone protocol and procedures document will outline the requirements for planning, implementation, and agency coordination for specific reclamation campaigns that will be implemented for the life of the Action. As appropriate, new information learned during test plot experimentation, lessons learned during ongoing monitoring activities, and/or general advances in reclamation science	Ioneer will fund the development of the procedures and protocols document and implementation of the pollinator habitat reclamation and implementation plan outlined in APCM-6. We anticipate that a qualified contractor selected for the preparation of the procedures and protocol document may include team members that have training as a horticulturalist, reclamation/restoration ecologist or biologist with 10 years of relevant experience. The development of the document will benefit from the participation of a pollinator ecologist and participation in the BLM Arid Lands Reclamation Course by document preparers. Ioneer will select a qualified contractor or individual(s) to prepare the procedures and protocols document and Ioneer shall provide its recommendation to the BLM and the USFWS for review and confirmation that the contractor or individual meets the requirements set forth here. Such confirmation shall not be unreasonably withheld.

Protocol and Procedures and Applicable APCMs	Due Date	Protocol/Procedure Description	Qualifications of Plan Author
		will be incorporated into the stand-alone protocol and procedure document, as appropriate. For planned pollinator habitat reclamation activities anticipated in Year 2, detailed implementation plans will be prepared as part of this effort.	
Non-Native, Invasive, and Noxious Species Management and Monitoring Protocols and Procedures (APCM-7)	Draft due three months prior to start of construction	A stand-alone noxious weed monitoring and control procedures and protocols guide will be developed in coordination with the Weeds Coordinator at the BLM Nevada State Office and USFWS. The procedures and protocols guide will build on the plan outlined in APCM-7 to provide specific guidance to field personnel for implementation and monitoring activities, including the frequency of monitoring efforts, data collection to track distribution of invasive and noxious plant species, control efficacy, and reporting requirements.	Ioneer will fund the development of the detailed procedures and protocols documentation and implementation of APCM-7. Ioneer anticipates that a qualified contractor selected for the preparation of the procedures and protocol document may include team members that include qualified biologist familiar with biology and identification of the targeted noxious and invasive plant species and Tiehm's buckwheat, who have completed the Nevada weed identification training or have completed comparable training protocols or have relevant experience/expertise, in conjunction with a certified weed applicator. Ioneer will select a qualified contractor or individual(s) to prepare the procedures and protocol document and Ioneer shall provide its recommendation to BLM and USFWS for review and confirmation that the contractor or individual meets the requirements set forth here. Such confirmation shall not be unreasonably withheld.
Light Monitoring Protocols and Procedures (APCM-8)	Draft due third quarter of 2024	Specific procedures and protocols will be developed to aid operations with the implementation of APCM-8. The procedures and protocols will provide the operations and maintenance requirements for the light monitors to be deployed, detailed data reduction, and reporting protocols.	Ioneer will fund the development of the detailed procedures and protocols documentation and implementation of APCM-8. It is anticipated that a qualified contractor selected for the preparation of the procedures and protocol document may include team members that include a qualified biologist familiar with light and its impacts on biological resources and knowledge of industrial lighting. Ioneer will select a qualified contractor or individual(s) to prepare the procedures and protocol document, and Ioneer shall provide its recommendation to the BLM and the USFWS for review and confirmation that the contractor or individual meets the requirements set forth here. Such confirmation shall not be unreasonably withheld.

Protocol and Procedures and Applicable APCMs	Due Date	Protocol/Procedure Description	Qualifications of Plan Author
Dust Monitoring Protocols and Procedures (APCM-9)	Draft due third quarter of 2024	Specific procedures and protocols will be developed to aid operations with the implementation of the plan outlined in APCM-9. The procedures and protocols will provide the design of the dust monitors to be deployed, and detailed sampling and reporting protocols.	Ioneer will fund the development of the detailed procedures and protocols document to implement the plan outlined in APCM-9. Procedures and protocols document development will be led by an air quality specialist with 10-plus years of experience in the monitoring and modeling of air resources. Ioneer will select a qualified contractor or individual to prepare the procedures and protocols document and Ioneer shall provide its recommendation to the BLM and the USFWS for review and confirmation that the contractor or individual meets the requirements set forth here. Such confirmation shall not be unreasonably withheld.
Study Design to Refine Trigger Thresholds for Dust Deposition on Tiehm's Buckwheat Subpopulations (APCM-9)	Draft due Year 1	The study design will lay out the statistical design including the treatments proposed, means and methods to administer the treatments, sample size, specific physiological parameters to be measured, and schedule. The experimental design will include, to the extent authorized by the USFWS, in situ experiments on individual Tiehm's buckwheat within the subpopulations.	Ioneer will fund the development of the study and its implementation. The lead researcher overseeing the study will be a plant ecologist/biologist with appropriate expertise in the ecophysiology of plants and will have access to lab facilities and field equipment necessary to conduct the study. Ioneer will select a qualified contractor or individual to prepare the study plan and Ioneer shall provide its recommendation to the BLM and the USFWS for review and confirmation that the contractor or individual meets the requirements set forth here. Such confirmation shall not be unreasonably withheld.
Tiehm's Buckwheat Demographic and Recruitment Monitoring Protocols and Procedures (APCM-12)	Draft due three months prior to start of construction	The procedures and protocols document will provide a stand-alone document to guide long-term implementation of APCM-12. It will provide an opportunity to refine and enhance the procedures currently being used. The annual quantitative monitoring component of the plan will document the specific sampling protocols and data analysis to track and monitor subpopulation demographics and recruitment.	Ioneer will be responsible for funding the preparation of the procedures and protocols document. Ioneer anticipates that a qualified contractor selected for the preparation of the procedures and protocols document may include team members that have an advanced degree in plant ecology or allied ecological field, 10 years of relevant experience, and participation in available courses offered by the Center for Plant Conservation Rare Plant Academy (note: only one of the nine training modules is complete at this time [March 15, 2024]). Ioneer will select a qualified contractor or individual to prepare the procedures and protocols document and Ioneer shall provide its recommendation to the BLM and the USFWS for review and confirmation that the contractor or individual meets the requirements set forth here. Such confirmation shall not be unreasonably withheld.
Tiehm's Buckwheat-Specific Environmental Awareness Program (APCM-13)	Draft due three months prior to start of construction	The training module will focus on general awareness (including identification and natural history) and restrictions put in place to protect Tiehm's buckwheat.	Ioneer will fund the development of the awareness program and its implementation. The program will be prepared by Ioneer personnel or contractors familiar with the requirements of the Buckwheat Protection Plan (WestLand 2024a)/APCMs and the final Biological Opinion issued by the USFWS, and the Record of Decision issued by the BLM.

Protocol and Procedures and Applicable APCMs	Due Date	Protocol/Procedure Description	Qualifications of Plan Author
Operation-Specific Training Modules (APCM-13)	Draft due three months prior to start of construction	These modules will be developed in addition to the Tiehm's buckwheat-specific environmental awareness program and will be tied to specific operational disciplines (*e.g.,* general maintenance staff responsible for lighting systems, autonomous haul truck operators, water truck operators, OSF managers, supervisors, and foreman responsible for any field operations within or proximate to critical habitat) at the mine that interface with the requirements of this Buckwheat Protection Plan (WestLand 2024a)/APCMs. These training modules will be updated, as necessary.	Ioneer will fund the development of the work plan and its implementation. The program will be prepared by Ioneer personnel or contractors familiar with the requirements of the Buckwheat Protection Plan (WestLand 2024a)/APCMs and the final Biological Opinion issued by the USFWS. Those implementing the awareness program will be supported by personnel with specific operations expertise.
Stormwater Management Plan Monitoring and Reporting Procedures and Protocols for Action Operations Within or Having Potential to Discharge to Designated Critical Habitat (APCM-14)	Draft due three months prior to start of construction	To facilitate focused reporting on stormwater management activities in and proximate to critical habitat to the USFWS and the BLM a stand-alone document will be prepared. This document will include descriptions and mapping of the stormwater plan elements established within or proximate to critical habitat and a description of monitoring and reporting protocols based on the stormwater plan provided in the Plan of Operations (Ioneer 2022).	Ioneer will fund the development of this stand-alone document and implementation of stormwater plan requirements. The stand-alone stormwater document will be prepared by an individual familiar with the requirements of stormwater management in industrial operations, and preparation will be at the direction of a registered professional engineer or surface water hydrologist. Ioneer will select a qualified contractor or individual to compile the stand-alone stormwater document included in the Plan of Operations, and Ioneer shall provide its recommendation to the BLM and the USFWS for review and confirmation that the contractor or individual meets the requirements set forth here. Such confirmation shall not be unreasonably withheld.
Critical Habitat Monitoring Protocols and Procedures (APCM-15)	Draft due three months prior to start of construction	This monitoring protocol and procedures document will outline specific quarterly monitoring elements required by APCM-15 including the planned location of long-term monitoring photo points. The protocol and procedures document will also include required skill sets/training for biological monitors conducting quarterly monitoring activities and monitoring of Project development activities within or adjacent to critical habitat.	Ioneer will be responsible for funding the preparation of the critical habitat monitoring procedures and protocol document. Ioneer anticipates that a qualified contractor selected for the preparation of the procedures and protocol document may include team members that have an advanced degree in plant ecology or allied ecological field, 10 years of relevant experience, and participation in available courses offered by the Center for Plant Conservation Rare Plant Academy. Ioneer will select a qualified contractor or individual to prepare the monitoring procedures and protocols document and Ioneer shall provide its recommendation to BLM and USFWS for review and confirmation that the contractor or individual meets the requirements set forth in the Buckwheat Protection Plan (WestLand 2024)/APCMs. Such confirmation shall not be unreasonably withheld.
Insect Visitors and Pollinator Monitoring (APCM-16)	Draft due three months prior to start of construction	The monitoring procedures and protocols document will outline the specific methods and protocols for establishing insect sampling sites, collecting field data, data retention and storage, data analysis, and reporting requirements.	Ioneer will be responsible for funding the preparation of the insect and pollinator abundance and diversity monitoring procedures and protocols document. It is anticipated that a qualified contractor selected for the preparation of the procedures and protocols document may include team members that have an

Protocol and Procedures and Applicable APCMs	Due Date	Protocol/Procedure Description	Qualifications of Plan Author
			advanced degree in entomology or allied ecological field with demonstrated taxonomic skills and 10 years of relevant experience. Ioneer will select a qualified contractor or individual to prepare the monitoring procedures and protocols document, and Ioneer shall provide its recommendation to the BLM and the USFWS for review and confirmation that the contractor or individual meets the requirements set forth in the Buckwheat Protection Plan (WestLand 2024a)/APCMs. Such confirmation shall not be unreasonably withheld.
Noise Monitoring Proximate to Tiehm's Buckwheat Subpopulations (APCM-17)	Draft due three months prior to start of construction	The monitoring procedures and protocols document will outline the specific methods and protocols for establishing noise monitoring sites, collecting field data, data retention and storage, data analysis, and reporting requirements.	Ioneer will be responsible for funding the preparation of the noise monitoring procedures and protocols document. It is anticipated that a qualified contractor selected for the preparation of the procedures and protocols document may include team members that have a minimum of 10 years of relevant experience monitoring and analyzing noise data. Ioneer will select a qualified contractor or individual to prepare the monitoring procedures and protocols document, and Ioneer shall provide its recommendation to the BLM and the USFWS for review and confirmation that the contractor or individual meets the requirements set forth in the Buckwheat Protection Plan (WestLand 20245)/APCMs. Such confirmation shall not be unreasonably withheld.
Develop an Ex-Situ Conservation Program in Cooperation with the USFWS and BLM (APCM-18)	Draft due in Year 1 of operations	Specific procedures and protocols to implement and monitor the studies outlined in this APCM will be documented in conformance with the requirements of the USFWS Policy Regarding Controlled Propagation of Species Listed under the ESA (65 FR 56916).	Ioneer will be responsible for funding the preparation of the procedures and protocols documents that conform with the requirements of 65 FR 56916 It is anticipated that a qualified contractor selected for the preparation of this document may include team members that have an advanced degree in plant ecology or allied field, experience in endangered species conservation, 10 years of relevant experience, and participation in available courses offered by the Center for Plant Conservation Rare Plant Academy. Ioneer will select a qualified contractor or individual to prepare the ex-situ conservation procedures and protocols document, and Ioneer shall provide its recommendation to the BLM and the USFWS for review and confirmation that the contractor or individual meets the requirements set forth in the Buckwheat Protection Plan (WestLand 2024a)/APCMs. Such confirmation shall not be unreasonably withheld.

Appendix F: Impact Definitions

Attribute	Intensity				Duration				Context	
	Negligible	Minor	Moderate	Major	Temporary	Short-Term	Long-Term	Permanent	Localized	Regional
Air Resources	Air emissions effects would not be measurable.	Air emissions would increase as a result of the Project; however, effects fall within all applicable air quality standards and would not exceed NAAQS or NVAAQS.	Air emissions would increase as a result of the Project; however, implementation of ACEPMs and/or mitigation measures would reduce effects to a level that would fall within all applicable air quality standards and would not exceed NAAQS or NVAAQS. If mitigation were required, mitigation would not require careful coordination with local, state, and federal agencies to be effective.	Air emissions would increase significantly as a result of the Project and would exceed applicable NAAQS and NVAAQS regardless of ACEPMs. Mitigation would be required. To be effective, mitigation would have to be carefully coordinated and planned with local, state, and federal agencies if a permit to proceed were to be issued.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Changes are perceived at the location of the activity but dissipate within a specified extent.	Changes are perceived throughout the area of analysis.
Cultural Resources	**No Historic Properties Affected** No measurable change to the current condition of cultural resources would result from Project construction, operation, or reclamation. There would be no effect to the existing NRHP qualities of individual historic properties.	**No Adverse Effect** There would be a measurable change to the current condition of historic properties as a result of Project construction, operation, or reclamation. While a change to a historic property would occur, it would not affect any of the NRHP qualities of individual historic properties, and the eligibility of the property to the NRHP would not be altered.		**Adverse Effects** A large, easily measurable change in the current conditions would result in significant effects to historic properties as a result of construction, operation, or reclamation of the Proposed Action or action alternatives, and would substantially alter the NRHP qualities and eligibility status of individual historic properties.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would occur within the APEs.	Effects would extend beyond the APEs.
Environmental Justice	There would be no identifiable environmental, health, or socioeconomic effects of the Project or other alternatives that would affect minority, low-income, or Indigenous communities disproportionately relative to effects on the total population of the area of analysis.	Environmental, health, or socioeconomic effects on minority, low-income, or American Indian or Alaska Native communities would occur, but effects would be localized with minimal identifiable differences between effects on minority, low-income, or American Indian or Alaska Native populations compared to effects on the population at large.	Environmental, health, or socioeconomic effects on minority, low-income, American Indian or Alaska Native groups would occur, would be readily apparent, and would be measurable, but localized with moderate consequence. The Project would noticeably affect minority, low-income, or American Indian or Alaska Native communities disproportionate to the total population of the area of analysis.	Environmental, health, or socioeconomic effects would be predominantly born by minority, low-income, or American Indian or Alaska Native communities, and the population at large of the area of analysis would not experience the effects to a reasonably proportionate degree.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would occur within the area of analysis with primary emphasis on eastern Esmeralda County and the Tonopah community.	Effects would occur across all of the area of analysis counties.
Geology and Minerals	Effects to geologic or mineral resources would occur, but they would be so slight as to not be measurable using normal methods.	Effects to geologic or mineral resources would occur but would be small and just measurable using normal methods.	Effects to geologic resources would occur and would be readily detectable.	Effects are considered significant. Effects to geologic or mineral resources would occur and would be large, measurable, and easily recognized by a human observer.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would occur within the Area of Analysis or the general vicinity of the Plan boundary.	Effects would extend beyond the Plan boundary and local area boundaries.

Attribute	Intensity				Duration				Context	
	Negligible	Minor	Moderate	Major	Temporary	Short-Term	Long-Term	Permanent	Localized	Regional
Hazardous Materials	A negligible spill of hazardous materials or fuels would be one that is quite small, easily, and quickly contained, and has no measurable effect on any natural resource.	A minor spill of hazardous material or fuels would be one that has a measurable effect on soil or water resources but is quickly contained and remediated so that the duration and the extent of the spill are limited and there is no residual effect.	A moderate spill of hazardous material or fuels would be one that has a measurable effect over a large area, or a spill into a water resource. A moderate spill would have residual long-term effects even after containment and remediation.	A major spill of hazardous material or fuels would be one that has extensive measurable effects to water resources and requires the involvement of state and federal agencies to assess the effect and supervise the containment and remediation. This type of spill would have long-term effects on natural resources and would require state and federal agency oversight for an extended period of time to ensure proper protection of critical resources and habitats.	Effects are anticipated to last no longer than one year.	A spill that can be contained and remediated in less than four years.	A spill whose effects to water, soil, or aquatic resources last more than four years but less than 23 years.	A spill whose effects to water, soil, or aquatic resources remain unchanged indefinitely, including after reclamation (i.e., 23 years or more).	A spill effecting an area the size of a small park, a parking lot, or an area consisting of less than 10 acres.	A spill effecting an area greater than 10 acres, or a flowing water body, or a lake.
Land Use and Access	Effects to land use, access, realty actions, and existing established communities would either not occur, or effects would be so slight as to not be measurable or perceptible. No access restrictions to existing land use authorizations would occur. The Proposed Action or action alternatives would not result in any inconsistencies with existing land use plans, goals, and policies, or any inconsistencies could be resolved without modifications to land use plans.	Effects to land use, access, realty actions, and existing established communities would be measurable and perceptible, but would be small and would not affect the validity of existing land use authorizations, nor the ability to implement future realty or land use authorizations. Access to existing land use authorizations would be maintained. The Proposed Action or action alternatives would not result in any inconsistencies with existing land use plans, goals, and policies, or any inconsistencies could be resolved without modifications to land use plans. ACEPMs would effectively minimize effects to land use, access, and realty.	Effects to land use, access, realty actions, and existing established communities would be readily apparent and measurable, and they may affect the validity of existing land use authorizations, and the ability to implement future realty or land use authorizations. The Proposed Action or action alternatives would conflict with land use plans, goals, and policies, and may require modifications to these plans for conformance. Additional mitigation measures beyond ACEPMs may be required to minimize effects to land use, access, and realty, but these measures likely would be successful.	There would be significant conflicts with existing land uses, realty actions, and existing established communities, as well as the ability to implement future realty or land use authorizations. The Proposed Action or action alternatives would result in significant conflicts with land use plans, goals, and policies and modifications to these land use plans would be required. Mitigation measures beyond ACEPMs may be required to minimize effects to lands use, access, and realty, and these measures would have to be monitored to determine their effectiveness.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects on land uses, realty actions, and access would be limited to the area of analysis (i.e., area of analysis), or to one community.	Effects on land uses, realty actions, and access would extend to multiple communities and outside the area of analysis.
Livestock Grazing	Effects to livestock and grazing would be slight and no reductions to AUMs or change in livestock management would be required. There would be no change or loss of water availability that measurably affects livestock grazing or distribution.	Effects to livestock and grazing may alter the availability of resources that livestock depend on (i.e., water availability; forage), and/or small reductions to AUMs may be necessary. No adjustments to grazing management should be required beyond small AUM reductions.	Effects to livestock and grazing directly affect livestock access to limiting resources (i.e., water availability; forage). Reductions to AUMs are necessary and adjustments to authorized livestock grazing should be considered. Adverse effects would be minimized with implementation of ACEPMs, but reclamation would require long-term monitoring and maintenance.	Effects to livestock and grazing effect livestock management on an allotment level. Reductions in AUMs and a significant change in authorized use would be required. Adverse effects could be minimized with implementation of ACEPMs, but reclamation would require long-term monitoring and maintenance.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would be limited to the Plan boundary.	Effects would occur beyond the Plan boundary; multiple permittees or allotments may be affected.

Attribute	Intensity				Duration				Context	
	Negligible	Minor	Moderate	Major	Temporary	Short-Term	Long-Term	Permanent	Localized	Regional
Native American Traditional Values	There would be no change to the current condition of areas of concern to tribes as a result of construction, operation, or reclamation of the Proposed Action or action alternatives. There would be no effect to the existing access of specific areas. Prehistoric or ethnohistoric cultural resources, areas of elevated spiritual concern, TCPs, or sacred sites would not be affected.	There would be no measurable change to the current condition of areas of concern to tribes as a result of construction, operation, or reclamation of the Proposed Action or action alternatives. While a change to the existing access of specific areas may occur, it would not affect that access. Prehistoric or ethnohistoric cultural resources, areas of elevated spiritual concern, TCPs, or sacred sites would not be affected to a measurable degree.	An easily discernable and measurable change to the current condition of areas of concern to tribes as a result of construction, operation, or reclamation of the Proposed Action or action alternatives would occur. Changes to existing access would occur. Prehistoric or ethnohistoric cultural resources, areas of elevated spiritual importance, TCPs, or sacred sites would be affected to a measurable degree.	A large, easily measurable change in condition to areas of concern to tribes would occur as a result of construction, operation, or reclamation of the Proposed Action or action alternatives. Changes to existing access would occur. Prehistoric or ethnohistoric cultural resources, areas of elevated spiritual importance, TCPs, and/or sacred sites would be substantially altered.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would be limited to prehistoric sites or properties of tribal importance within the area of analysis.	Effects would occur to prehistoric sites or properties of tribal importance outside of the area of analysis.
Recreation	Recreationists would not notice changes to the recreational setting, and proposed activities would not affect their experience. The quality, quantity, and use of recreation areas would not be effected to a measurable or detectable level. There would be no conflicts with existing federal, state, and local statutes or management plans.	Recreationists may notice changes in recreational setting and the availability of recreational opportunities, and these changes may affect the recreational experience. Effects to the quality, quantity, and use of recreation areas may be measurable and detectable, and displacement of recreationists to areas outside of the area of analysis would likely occur. However, overall access to recreational opportunities, and the ability to find comparable recreation experiences would not be affected. ACEPMs would effectively minimize effects to recreational uses in the area.	Changes to the recreational setting and availability of recreation opportunities would be measurable and detectable within the area of analysis. Effects to the quality, quantity, and use of recreation areas within the area of analysis would be apparent, and would potentially restrict access to recreational areas, reduce recreational opportunities, and\or reduce the quality of recreational areas. Displacement of recreationists to areas outside of the area of analysis would occur, but it would not affect overall access to recreational opportunities outside of the area of analysis. Mitigation measures beyond ACEPMs may be necessary to offset adverse effects, but these measures would likely be successful.	Changes to the recreational setting and availability of recreation opportunities would be measurable and detectable within and outside of the area of analysis. Effects to the quality, quantity, and use of recreation areas within and outside of the area of analysis would be apparent. There would likely be restricted access to recreational areas, reduced recreational opportunities, and\or reduced quality of recreational areas. Displacement of recreationists to areas outside of the area of analysis would occur, and it would affect quality and quantity of recreational opportunities outside of the area of analysis. Mitigation measures beyond ACEPMs may be necessary to offset adverse effects, and these measures would need to be monitored to determine their effectiveness.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would occur within the area of analysis or the general vicinity of the area of analysis.	Effects would extend beyond the area of analysis or the general vicinity of the area of analysis.
Social and Economic Values	There would be a small and unnoticeable effect on the local and regional economy, population, government revenues and/or expenditures, and on public services and infrastructure demands. The consequences of the action would have little to no measurable effect on the social or economic environment.	There would be a small but noticeable effect on the local economy, population, government revenues and/or expenditures, and on public services and infrastructure demands, but there would be minimal to no effect on the regional social or economic environment.	There would be a measurable effect on the local and regional economy, population, government revenues and/or expenditures, and on public services and infrastructure demands. Adverse and beneficial effects would not prove significant enough to result in long-term effects to the socioeconomic environment.	There would be a substantial effect on the local and/or regional economy, population, government revenues and/or expenditures, and on public services and infrastructure demands. Effects would reverberate throughout the socioeconomic environment, significantly altering existing conditions, in beneficial or adverse ways.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would occur at a locally focused scale within the area of analysis.	Effects would occur across a broader area, beyond the area of analysis.

Attribute	Intensity				Duration				Context	
	Negligible	Minor	Moderate	Major	Temporary	Short-Term	Long-Term	Permanent	Localized	Regional
Soil Resources	Effects to soils would be so slight as to not be measurable.	Effects to soils may occur, and would be detectable, but small and of little consequence to soil quality and productivity. Effects would occur within the area of analysis. Effects would be minimized with implementation of ACEPMs, BMPs, and reclamation of the Proposed Action or action alternatives.	Effects to soils would occur and would be measurable and would occur over a larger area. Effects to soil quality and productivity may occur. However, effects likely would still occur within the area of analysis. Mitigation beyond the ACEPMs and BMPs may be necessary, but these measures would most likely be effective.	Effects on soils would occur both within and outside of the area of analysis and would be measurable and apparent. Effects to soil quality and productivity likely would occur within and outside of the area of analysis. Mitigation beyond the ACEPMs and BMPs may be necessary, and these measures would need to be monitored to determine their effectiveness.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would occur in the area of analysis.	Effects would occur beyond the area of analysis.
Threatened and Endangered Species	Effects on threatened and endangered species populations would be so small they would not be measurable or perceptible. Critical habitat would not be altered and there would be no effect on the biological value of the critical habitat.	Effects on threatened and endangered species populations may be detectable, measurable, and perceptible. Effects would not affect the overall biological value of the critical habitat. Effects would be minimized with implementation of ACEPMs, best management practices (BMPs), and reclamation of the Proposed Action or action alternatives.	Effects on threatened and endangered species populations would be readily apparent, measurable, large, and of consequence. Effects may occur to the overall biological value of the critical habitat. Mitigation beyond the ACEPMs and BMPs may be necessary, but these measures would most likely be effective.	Effects would include the removal of threatened and endangered species populations or substantial alteration of critical habitat. Mitigation beyond the ACEPMs and BMPs may be necessary, but these measures would need to be monitored to determine their effectiveness.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Affecting the area of analysis.	Affecting an area beyond the area of analysis.
Transportation and Access	Effects on traffic conditions and access in the area of analysis would either not occur or would be so slight as to not be noticeable by most motorists. No access restrictions to existing, authorized land uses would occur. There would not be a perceptible effect from traffic generation on current traffic conditions.	Effects on traffic flows and access would be measurable and may be noticeable to typical motorists but would be small and would not adversely affect traffic conditions. Access to existing land uses would be maintained. ACEPMs would effectively minimize effects to the area transportation network.	Effects on traffic flows and access would be measurable and readily apparent to typical motorists but would not exceed state standards. There would be a readily apparent, measurable traffic increase on the access road and paved highway. Additional mitigation measures beyond ACEPMs may be required to minimize adverse effects on transportation, but such measures likely would be successful.	Effects on traffic flows and access would be measurable and would be readily apparent to all motorists. Mitigation measures beyond ACEPMs may be required to minimize effects to transportation, and such measures would have to be monitored to determine their effectiveness.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects on traffic generation would be limited to the area of analysis.	Effects on traffic safety and traffic generation would extend beyond the area of analysis.
Vegetation Resources	Effects on vegetation resources would be so small it would not be measurable or perceptible. Plant communities would not be extensively altered and there would be no effect on the biological value or distribution of plant communities.	Effects on vegetation resources would be detectable, measurable, and perceptible, but would occur within the area of analysis and would not affect the overall biological value or distribution of plant communities. Effects would be minimized with implementation of ACEPMs, best management practices (BMPs), and reclamation of the Proposed Action or action alternatives.	Effects on vegetation resources would be readily apparent, measurable, large, and of consequence, but would occur within the area of analysis. Effects may occur to the overall biological value or distribution of plant communities. Mitigation beyond the ACEPMs and BMPs may be necessary, but these measures would most likely be effective.	Effects on vegetation resources would occur and would substantially change the biological value or distribution of plant communities. Mitigation beyond the ACEPMs and BMPs may be necessary, but these measures would need to be monitored to determine their effectiveness.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Affecting the area of analysis.	Affecting an area beyond the area of analysis.

Attribute	Intensity				Duration				Context	
	Negligible	Minor	Moderate	Major	Temporary	Short-Term	Long-Term	Permanent	Localized	Regional
Visual Resources	Effects would not result in any perceptible changes to existing viewsheds or the scenic quality of the existing characteristic landscape. Modifications to the scenic quality of the existing landscape would be consistent with VRM class objectives.	Effects would result in changes to the viewshed and the scenic quality of the existing characteristic landscape, but these effects would not result in a significant degree of contrast with the existing landscape. Modifications to the scenic quality of the existing landscape would be consistent with VRM class objectives. Effects would be minimized with implementation of ACEPMs and additional mitigation measures.	Changes to the viewshed and the scenic quality of the existing characteristic landscape would be readily apparent, which would result in a noticeable degree of contrast with the existing landscape. Visual effects may not be consistent with VRM class objectives. Mitigation beyond the applicant committed ACEPMs may be necessary, but these measures most likely would be effective.	The Proposed Action or action alternatives would result in significant effects to the viewshed and the scenic quality of the existing characteristic landscape, and it would introduce a strong degree of contrast with the existing landscape. Visual effects would not be consistent with VRM class objectives. Mitigation beyond the applicant committed ACEPMs may be recommended to reduce adverse effects, and these measures would need to be monitored to determine their effectiveness.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Activities would affect the viewshed within the area of analysis but would not be visible outside of the area of analysis.	Activities would affect the viewshed within the area of analysis, as well as outside of the area of analysis.
Water Resources	Effects to water resources and geochemistry could occur, but they would be so slight as to not be measurable or distinguishable from natural fluctuations.	Effects to water resources and geochemistry would occur; but would be small and just measurable using normal methods. Effects are unlikely to affect beneficial uses of the receiving water.	Effects to water resources and geochemistry would occur and would be readily detectable and could affect the beneficial uses of the surface or groundwater resources.	Effects to water resources and geochemistry would be large, measurable, and easily detected and would substantially change beneficial uses of surface or groundwater resources, or hydrologic regime over the area.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would occur at specific site(s) or within the area of analysis.	Effects would extend beyond the area of analysis.
Wetland and Riparian Resources	The wetland and riparian resources within the area of analysis would not be affected, or effects would not be measurable. Any effects on the wetland and riparian resources would be slight and short-term. Chemical, physical, or biological changes to water quality would not be affected, or effects would not be measurable and would not affect the health of the aquatic resources. Any effects would be minimized with implementation of ACEPMs, best management practices (BMPs), and reclamation of the Proposed Action or action alternatives.	Effects on wetland and riparian resources, such as an increase or decrease in surface flow, loss of wetland acres, or changes in wetland vegetation would be detectable. Chemical, physical, or biological changes to water quality would be detectable. Effects would be minimized with implementation of ACEPMs, BMPs, and reclamation of the Proposed Action or action alternatives.	Effects on wetland and riparian resources would result in detectable effects. These changes would not be permanent, and the resource would rebound to pre-effect conditions after one season. Chemical, physical, or biological changes to water quality would be detectable, but the desired water quality conditions would only be temporarily degraded. Mitigation beyond the ACEPMs and BMPs may be necessary, but these measures would most likely be effective.	Effects on wetlands and riparian areas would be readily apparent and would substantially change the functional value of the wetland and riparian areas in the context of the area of analysis. Effects on wetland and riparian resources would result in detectable effects which would likely result in long-term to permanent changes and would affect associated resources such as the biotic community, water quality, water availability, and habitat quality. In extreme cases, biological resources may be extirpated from the area due to loss of habitat. Chemical, physical, and biological changes to water quality would represent a significant degradation from the historic baseline water quality conditions. Mitigation beyond the ACEPMs and BMPs may be necessary to reduce adverse effects, and these measures would need to be monitored to determine their effectiveness.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would occur within the area of analysis.	Effects would extend beyond the area of analysis.

Attribute	Intensity				Duration				Context	
	Negligible	Minor	Moderate	Major	Temporary	Short-Term	Long-Term	Permanent	Localized	Regional
Wildlife Resources	Wildlife would not be affected, or effects would not result in a loss of individuals or habitat. Effects to habitat would not be perceptible or measurable.	Effects to wildlife would be measurable or perceptible; however, the overall viability of the population or subpopulation would not be affected, and the population would recover. Effects to wildlife or wildlife habitat would be detectable. Effects would be minimized with the implementation of ACEPMs and reclamation.	Effects would be sufficient to cause a change in the population or subpopulation (e.g., abundance, distribution, quantity, or viability). The change would be measured and perceptible, but the negative effects could be reversed. Mitigation beyond the ACEPMs may be necessary, but these measures would most likely be effective.	Effects would be substantial, highly noticeable, and could be permanent in their effect on population or subpopulation survival without active management. Mitigation beyond the ACEPMs may be necessary to reduce adverse effects, and these measures would need to be monitored to determine their effectiveness.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would occur within the area of analysis or be confined to a small part of a population, habitat, or range.	Effects would occur outside the area of analysis or affect a widespread area of suitable habitat, or a large part of the population or range of a species.
Wild Horses and Burros	Effects would not result in any perceptible changes to wild horse and burro habitat utilization (e.g., foraging, breeding), distribution, and/or habitat.	Effects would result in minimally observable and/or measurable changes to wild horse and burro utilization, distribution, or habitat. The Proposed Action or action alternatives could result in a temporary displacement of animals.	Effects would result in observable and/or measurable changes to wild horse and burro utilization, distribution, health, or habitat.	Effects would result in marked changes to wild horse and burro utilization, distribution, health, or habitat. The Proposed Action or action alternatives could result in displacement of some or all of the animals.	Effects are anticipated to last no longer than one year.	Effects would last through construction (i.e., four years).	Effects would occur through active quarrying and processing and would remain during reclamation and closure activities (i.e., four to 23 years).	Effects would remain after reclamation and closure is completed (i.e., 23 years or more).	Effects would occur within the area of analysis.	Effects would extend beyond the area of analysis.

Appendix G: List of Preparers

Table G-1 BLM Interdisciplinary Team

Name	Title and/or Document Area of Responsibility
Perry Wickham	Field Manager – TFO
Daltrey Balmer	Assistant Field Manager – TFO
Scott Distel	Project Manager/NEPA Compliance
Randy Martin	Public Outreach
Sandra Brewer	Toxicologist
Ana Ingstrom	Technical Lead/Mine Law Administration/Mine Engineer
Andrew Monastero	Cultural Resources/Paleontological Resources
David Dick	Cultural Resources
Prudence Crampton	Native American Coordination and Consultation
Matthew Fockler	Social and Economic Values/Environmental Justice
Katerina St. Claire	Lands and Realty
Kenner Vorheis	Recreation/Visual Resources/Wilderness
Melissa Jennings	Geology and Minerals
Gabrielle Buttermore	Wildlife/Migratory Birds/Special Status Species/Threatened and Endangered Species
Justin Ferris	Surface Hydrology/Floodplains/ Wetlands/Riparian/Water Quality/ Groundwater Hydrology
Thomas Mendoza	Livestock and Grazing Resources/Vegetation/Soils
Quinn Young	Vegetation, including Special Status Species, Noxious Weeds, and Invasive Species, Non-native Species/Threatened and Endangered Species
Frank Giles	Air Quality and Climate Change
Jensen Reese	Hazardous Materials and Solid Waste
Robert Burdick	Forestry/Forests/Fire Management

Table F-2 Cooperating Agencies

Name	Title	Document Area of Responsibility
U.S. Department of Energy		
Todd Stribley	Environmental Protection Specialist	NEPA
David Oster	Environmental Protection Specialist	NEPA
Aydin Johnson	Environmental Protection Specialist	NEPA
U.S. Environmental Protection Agency		
Spencer Quam	Environmental Reviewer	NEPA
U.S. Fish and Wildlife Service		
Justin Barrett	Ecological Services	Threatened and Endangered Species
Sarah Kulpa	Ecological Services	Threatened and Endangered Species
Joe Barnes	Migratory Bird Program	Bald and Golden Eagles, Wildlife Resources, Including Special Status Species and Migratory Birds, Threatened and Endangered Species

Name	Title	Document Area of Responsibility
Nevada Department of Wildlife		
Tracy Kipke	Southern Region Habitat Biologist	Wildlife Resources, Including Special Status Species and Migratory Birds, Vegetation Resources, Including Noxious Weeds and Special Status Plant Species, Wetland and Riparian Resources, and Water Resources and Geochemistry
Jasmine Kleiber	Wildlife Staff Specialist	Wildlife Resources, Including Special Status Species and Migratory Birds, Vegetation Resources, Including Noxious Weeds and Special Status Plant Species, Wetland and Riparian Resources, Threatened and Endangered Species, and Water Resources and Geochemistry
Nevada Division of Forestry		
James Steed	Resource Program Manager	Vegetation Resources, Including Noxious Weeds and Special Status Plant Species, Wetland and Riparian Resources, Threatened and Endangered Species, and Water Resources and Geochemistry
Esmeralda County		
Ralph Keyes	County Commissioner	NEPA
Nancy Boland	County Assigned Representative	NEPA
Nye County		
Megan Labadie	County Assigned Representative	NEPA
Lorinda Wichman	County Assigned Representative	NEPA

Table F-3 Third Party NEPA Contractor

Name	Company	Title and/or Document Area of Responsibility	Degree and Experience
Ben Veach	Stantec Consulting Services Inc. (Stantec)	Principal-in-Charge	BS Forestry 38 years' experience
Kristi Schaff	Nexus Environmental Consultants, Inc. (Nexus)	Senior NEPA Advisor	BS Land Rehabilitation 20 years' experience
Diana Eck	Nexus	Project Manager, Wetlands and Riparian Areas, Visual Resources	BS Wildlife Biology 14 years' experience
Charli Sperry	Nexus	Assistant Project Manager, Wildlife, including Migratory Birds, Special Status Wildlife Species, Recreation	BS Wildlife Ecology and Conservation 10 years' experience
Steve Morton	Stantec	QA/QC	BA General Studies 21 years' experience
Rixey Jenkins	Nexus	Lead Author, Livestock and Grazing, Wild Horses and Burros, Vegetation Including Noxious and Invasive Non-native Weed Species, Soils, Transportation and Access	BS Rangeland Ecology and Management 16 years' experience
Gianni Giuliano	Stantec	Project Coordinator, Environmental Justice, Land Use and Access, Social and Economic Values, and Cumulative Effects	BS Environmental Science 4 years' experience
Dulcy Engelmeier	Nexus	Technical Editor	29 years' experience
Katie Stough	Nexus	Technical Assistance	BS Biology 2 years' experience
Ian Holl	Stantec	GIS Specialist	BA Biology and Environmental Studies 8 years' experience

Name	Company	Title and/or Document Area of Responsibility	Degree and Experience
Jenni Prince-Mahoney	Stantec	Cultural Resources/Native American Traditional Values	Graduate Certificate NEPA BA Anthropology 32 years' experience
Walt Martin	Stantec	Geology and Minerals	MS Geology BS Geological Sciences 40 years' experience
Nancy Lightfoot	Stantec	Hazardous Materials and Solid Waste	BS Geology 30 years' experience
Eric Clark	Stantec	Air Quality	MS Civil Engineering BS Environmental Science 18 years' experience
Ian Dudley	Stantec	Threatened and Endangered Species	MS Biology BS Wildlife and Conservation 13 years' experience
George Fennemore	Stantec	Water Resources, Geochemistry	PhD Applied Mathematics MS Applied Mathematics BS Mathematics 28 years' experience
Tina Davis	Stantec	Administrative Record	BA Humanities/English 23 years' experience

Table F-4 Proponent – Ioneer Rhyolite Ridge LLC

Name	Title
Rebecca Sawyer	Environmental and Community Relations Director
Matt Weaver	Senior Vice President Engineering and Operations
Sasha Meyer	Director of Mining Operations
Bernard Rowe	Managing Director
Sandra Carson	Environmental Professional
Devin Harbke	Environmental Manager
Chad Yeftich	Vice President Corporate Development

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