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Environmental Assessment

**Klondex Gold & Silver Mining Company
Fire Creek Mine Project
Lander County, Nevada**

File Number: NVN-091111



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**KLONDEX GOLD & SILVER MINING COMPANY
FIRE CREEK MINE PROJECT
ENVIRONMENTAL ASSESSMENT**

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APPENDICES

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
µg/m ³	micrograms per liter squared
AADT	annual average of daily traffic
ABA	acid base accounting
ACEC	Area of Critical Environmental Concern
amsl	above mean sea level
AUM	animal unit month
AQMA	Air Quality Management Area
AHPA	Archaeological and Historic Preservation Act
ARPA	Archaeological Resources Protection Act
BLM	Bureau of Land Management
BMD	Battle Mountain District
BMP	Best Management Practice
BMRR	Bureau of Mining Regulation and Reclamation
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
BP	Before Present
CEQ	Council on Environmental Quality
CESA	cumulative effects study area
CFR	Code of Federal Regulations
cfs	cubic feet per second
DETR	Department of Employment Training and Rehabilitation
DNA	Determination of NEPA Adequacy
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
ET	evapotranspiration
FCAD	Fire Creek Archaeological District
FLPMA	Federal Land Policy and Management Act
fps	feet per second
GBBO	Great Basin Bird Observatory
GHG	greenhouse gas
GHMA	General Habitat Management Area
GIS	geographic information systems
GLO	Government Land Office
gpm	gallons per minute
GRSG	Greater Sage-Grouse
H:V	Horizontal to Vertical
HAP	hazardous air pollutant
HDPE	high-density polyethylene
HFRA	Healthy Forest Restoration Act
HSW	Hazardous and Solid Waste Amendments
I-80	Interstate 80

Klondex	Klondex Gold & Silver Mining Company
LHD	load-haul-dump
LDPE	low-density polyethylene
LOS	level of service
LR2000	BLM Land and Mineral Legacy Rehost 2000 System
MEA	multi-element analysis
MF	microfiltration
Mining Law	General Mining Law of May 10, 1872
MLFO	Mount Lewis Field Office
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSHA	Mine Safety and Health Administration
Mt	Million tons
MTBA	Migratory Bird Treaty Act
MWMP	meteoric water mobility procedure
NAC	Nevada Administrative Code
NAD	North American Datum
NAG	non-acid generating
NAAQS	National Ambient Air Quality Standards
NDOA	Nevada Department of Agriculture
NAGPRA	Native American Graves and Repatriation Act
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NNHP	Nevada Natural Heritage Program
NHPA	National Historic Preservation Act
NNR	Northern Nevada Rift
NNP	net neutralizing potential
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NvAAQS	Nevada Ambient Air Quality Standards
OHMA	Other Habitat Management Area
NRHP	National Register of Historic Places
PA	Programmatic Agreement
pcf	Pounds per cubic foot
p.z.	precipitation zone
PAG	potentially acid generating
Plan	Fire Creek Mine Plan of Operations NVN-091111
Project	Fire Creek Mine Project
PHMA	Priority Habitat Management Area
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
REA	Rapid Ecoregional Assessment
RFFA	reasonable foreseeable future action

rcybp	radiocarbon years before present
RIB	rapid infiltration basin
RMP	Resource Management Plan
RO	reverse osmosis
ROD	Record of Decision
ROW	Right-of-Way
SARA	Superfund Amendments and Reauthorization Act
SEA	Safe Explosives Act
SFA	Sage Brush Focal Areas
SR	State Route
TDS	total dissolved solids
TIC	total inorganic carbon
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
USACE	United States Army Corps of Engineers
U.S.C.	U.S. Code
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VRM	Visual Resource Management
WPCP	Water Pollution Control Permit
WRR	Waste Rock Repository
WRSF	Waste Rock Storage Facility
WSA	Wilderness Study Area
XRD	X-ray Diffraction

KLONDEX GOLD & SILVER MINING COMPANY FIRE CREEK MINE PROJECT ENVIRONMENTAL ASSESSMENT

1 INTRODUCTION

This Environmental Assessment (EA) has been prepared to analyze Klondex Gold & Silver Mining Company's (Klondex's) Fire Creek Mine Project (Project). The Project involves transitioning the existing authorized operations at the Project from advanced underground and surface exploration to full-production mining. The Project is located on the northeast flank of the Shoshone Mountains, approximately 37 miles east of the town of Battle Mountain and four miles northwest of the town of Crescent Valley, in Lander County, Nevada. The Project is accessed from Interstate 80 (I-80), then traveling south on Nevada State Highway 306, and then west on 10th Street (Fire Creek Road/County Road G-247). Figure 1-1 shows the location of the Project and access route.

This EA is prepared pursuant to Section 102 of the National Environmental Policy Act of 1969 (NEPA), as implemented by the regulations promulgated by the President's Council on Environmental Quality (CEQ) (CEQ, 1978), and the Bureau of Land Management's National Environmental Policy Act Handbook H-1790-1 (BLM, 2008) to ensure compliance with NEPA and CEQ regulations. The objective of NEPA is to ensure that the federal decision-making process recognizes natural and cultural resources and considers the potential environmental impacts of proposed actions before decisions are made and actions are taken.

1.1 Background

In March 2015, Klondex submitted a Mine Plan of Operations (Plan) NVN-091111 to the Mount Lewis Field Office (MLFO), Battle Mountain District (BMD), Bureau of Land Management (BLM) for the Project in accordance with BLM Surface Management Regulations 43 Code of Federal Regulations (CFR) 3809, as amended. Klondex received comments from the BLM on the Plan and a revised document was submitted to the BLM in May 2015, and this revised document was subsequently deemed adequate to begin the NEPA process. The Plan incorporates applicable sections of the authorized 2005 Plan of Operations (surface exploration), 2009 Amendment (underground exploration), and 2014 Modification (additional support facilities) (BLM Case No. NVN-079769) for the Project. Klondex would continue underground and surface exploration and test mining activities as authorized until the Plan is approved at which time BLM Case No. NVN-079769 would be closed and all disturbance and activities would be incorporated into Plan NVN-091111.

1.2 Legal Description and Surface Ownership

The Project is located on both private lands controlled by Klondex and public land administered by the BLM as shown on Figure 1-2. The Project Area, including the existing Plan boundary and proposed Plan boundary expansion areas, measures approximately 3,455 acres of which approximately 1,861 acres are public land administered by the BLM. The approximately 1,594 acres of private land is owned or controlled by Klondex through agreements with land owners. Table 1-1 presents the legal description of the Project Area.

Table 1-1: Legal Description of Project Area

Mount Diablo Base and Meridian		
30 North	47 East	9, 10, 14, 15, 16, 22, 23, and 24
30 North	48 East	19

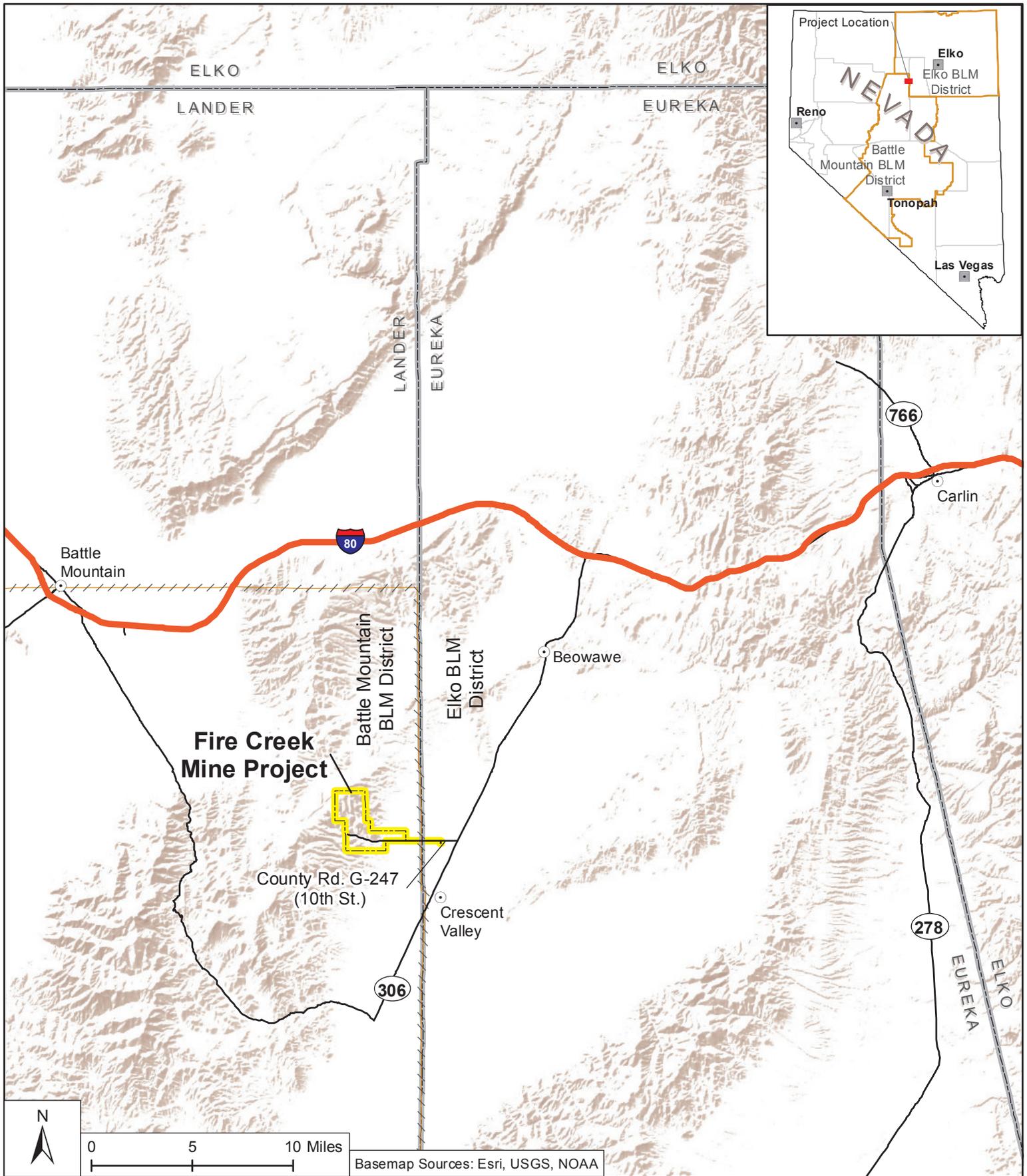
1.3 Project Description

The Project is an existing advanced underground and surface exploration project with 150 acres of currently authorized surface disturbance within an area that measures approximately 1,988 acres. As shown on Figure 1-3, the authorized facilities to support current operations include the following:

- One portal for underground access;
- Underground workings with ventilation and an emergency escape-way;
- An engineered waste rock repository (WRR);
- Three water management ponds (Stormwater Pond #1, Dewatering Storage Pond, and Fire Water/Emergency Pond);
- Stormwater diversion channel;
- A passive dewatering system for the mine workings to manage up to 100 gallons per minute (gpm), including a water treatment plant at the surface;
- Two rapid infiltration basins (RIBs);
- One groundwater production well (PW-1) and nine monitoring wells (GW-1 – GW-9);
- Power infrastructure;
- Administrative, dry, and operations buildings;
- Maintenance and equipment laydown areas;
- Material screening and batch plant;
- Growth media stockpiles;
- Small vehicle roads; and
- Surface exploration drill pads and drill roads.

Klondex is proposing to transition the Project to a full-scale mining level and establish an ore production rate, which is projected to increase the mine life by approximately four years based on current economics. No ore processing facilities are proposed and the ore would continue to be transported for off-site processing to the existing Midas Mine, owned by Klondex, located in Elko County, Nevada. To support the increased production rate and also to further the definition of the mineral resource, Klondex is proposing to:

- Develop additional underground workings for mining and continued exploration within a defined mining zone;
- Construct and operate, in phases, a new Waste Rock Storage Facility (WRSF) that would incorporate a Class-III waived landfill;
- Install stormwater diversion channels and water management facilities around the WRSF, including two ponds (Seepage Collection Pond and Stormwater Pond #2);
- Construct and operate a new water management pond (Treated Water Pond);
- Construct additional underground portals, ventilation raises, and service holes;
- Install a lined ore storage pad on the existing WRR and near the additional portals;



Basemap Sources: Esri, USGS, NOAA

LEGEND

-  Project Area
-  BLM District Boundary
-  Town
-  County Boundary

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



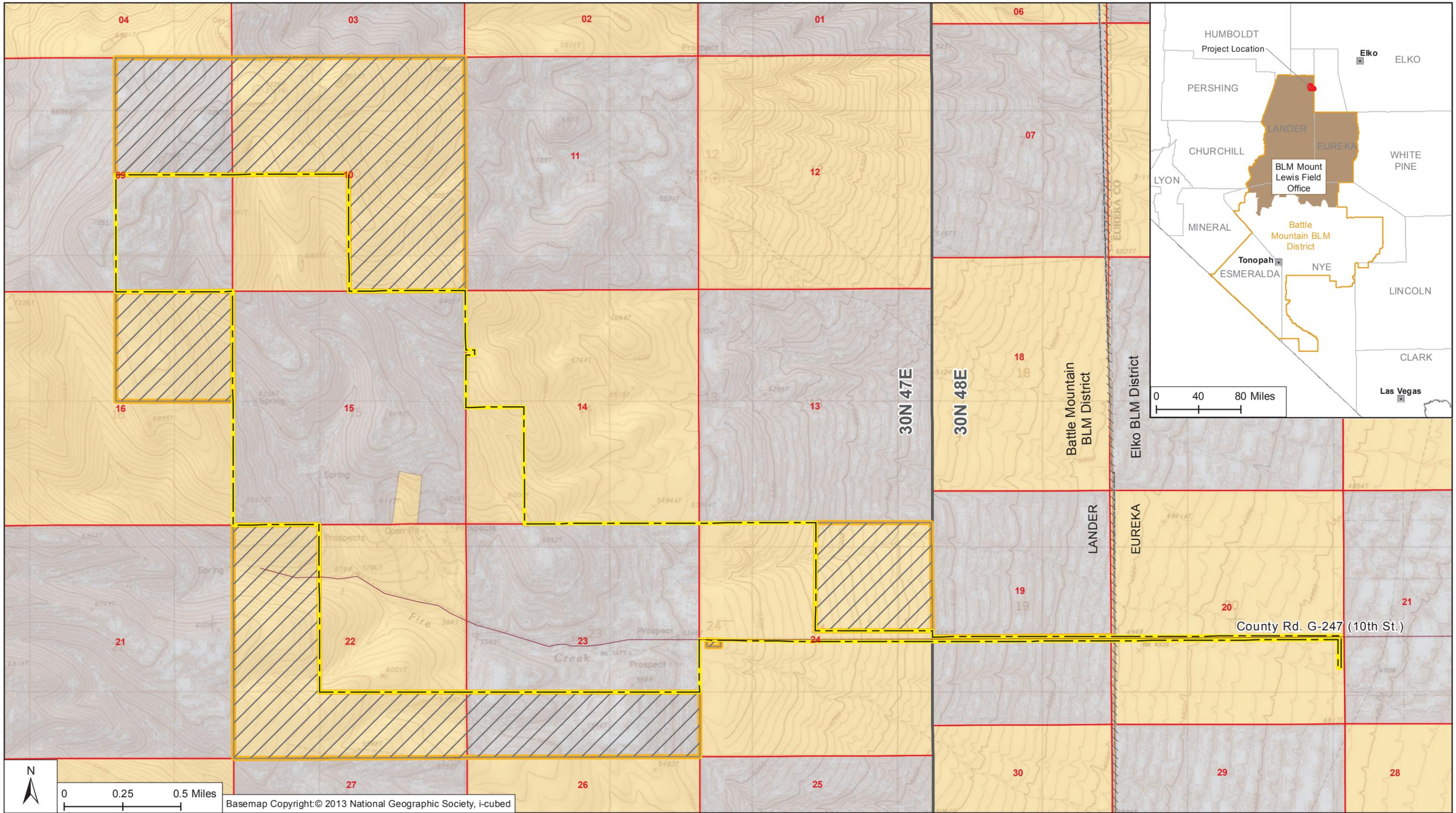
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 Project Location and Access

Figure 1-1
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LEGEND

Authorized Project Boundary	BLM District Boundary	Bureau of Land Management	Township/Range
Proposed Project Boundary Expansion	County Boundary	Private	Section
County Rd. G-247 (10th St.)			

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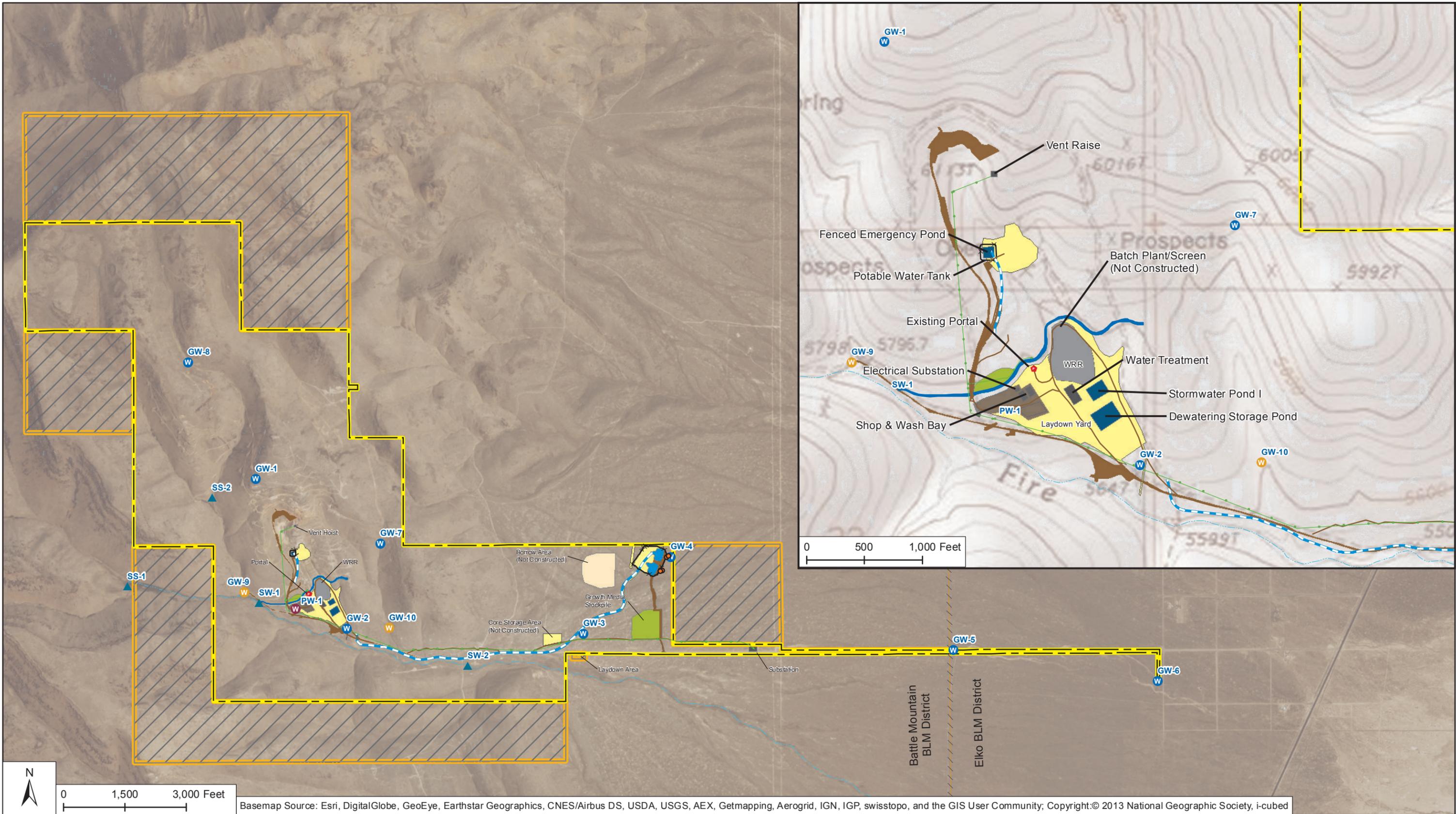
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 Project Area and Land Status

Figure 1-2
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Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; Copyright:© 2013 National Geographic Society, i-cubed

LEGEND

- Authorized Project Boundary
- Proposed Project Boundary Expansion
- BLM District Boundary
- Portal
- Piezometer Location
- Existing Monitoring Well
- Authorized Monitoring Well
- Production Well
- Surface Monitoring Station
- Fence
- Powerline
- Water Pipeline
- Fire Creek Drainage
- Project Access Road
- Small Vehicle Road
- Stormwater Channel
- Ancillary Use Area
- Borrow Area
- Building/Foundation
- Diversion/Drainage Ditch
- Growth Media Stockpile
- Laydown Area
- Pond
- Rapid Infiltration Basin
- Waste Rock Storage Facility

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 Authorized & Existing Mine Facilities
 Figure 1-3
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- Reconfigure existing and construct new support facilities;
- Install additional monitoring wells and stream gauges;
- Build additional facility access and haul roads;
- Install communication infrastructure; and
- Conduct additional surface exploration activities in phases within the existing and expanded Plan boundary as embodied in the Plan (NVN-091111) dated March 2015.

The Plan boundary would increase by approximately 1,467 acres for a total of approximately 3,455 acres as shown on Figure 1-2, primarily to accommodate proposed surface exploration activities and underground mine ventilation. The Plan boundary expansion is necessary to incorporate these proposed exploration activities and new mine facilities associated with the continued Project operations and are located within a 1-mile distance from the existing Plan boundary. Therefore, it would not be appropriate to process these activities under a separate Notice-level action in order to ensure that the activities in the expansion area are evaluated under this EA and have the same environmental protection measures and stipulations applied.

The proposed activities described in the Plan would result in a total of approximately 184.44 acres of additional surface disturbance, bringing the Project total to approximately 334.44 acres. The planned disturbance would be conducted in phases with the proposed WRSF being constructed in phases along with surface exploration, hydrogeological data collection activities, vent raises, and service holes.

A summary of the approved and proposed surface disturbance acreage for the Project by land status is provided in Table 1-2. The authorized disturbance acreage in Table 1-2 represents the surface disturbance acreage included in the 2009 and 2014 Plans of Operation (NVN-079769) and described further in Section 2.2 of this EA. The existing disturbance acreage in Table 1-2 represents what has actually been disturbed onsite to date. Some facilities previously authorized were not constructed and all acreage listed in the Proposed Phase I and Proposed Future Phase columns in Table 1-2 represents new disturbance outside of the existing disturbance footprint. This acreage has been redistributed accordingly and accounted for in the Project Total column.

Table 1-2: Summary of Surface Disturbance Acreage

Land Status	Authorized	Existing	Proposed Phase I	Proposed Future Phases	Total Proposed	Project Total¹
Private	32.63	67.27	46.17	46.39	90.19	157.46
Public	117.37	82.73	48.79	56.35	94.25	176.98
Total	150	150	94.96	97.64	184.44	334.44

Note: 1 – Project Total includes existing disturbance as redistributed and total proposed.

Under the Plan, the following would remain the same as currently authorized:

- Passive dewatering of the mine workings would continue and not exceed an average discharge rate of 100 gpm;
- The pumping rate from the onsite groundwater production well would remain the same with no increase in water rights or proposed usage;

- The same underground ore extraction techniques would continue to be used just would transition to full mining production;
- The same waste management practices would be employed, including backfilling mined areas and placement of waste rock on engineered storage facilities; and
- Ore would continue to be shipped off site and no processing would occur on site.

1.4 Purpose and Need for the Proposed Action

The General Mining Law of May 10, 1872 (Mining Law), as amended (30 U.S. Code [U.S.C.] 22-54 and 611-615) allows citizens of the U.S. the opportunity to explore for, discover, claim, and produce certain valuable mineral deposits on those federal lands that are open for mining claim location (open to mineral entry).

The BLM's purpose and need for the Proposed Action is to facilitate the opportunity to explore, locate, and delineate precious metal (gold and silver) deposits on its mining claims on public lands, as provided under the Mining Law. The need for the action is established by the BLM's responsibility under Section 302 of the FLPMA and the BLM Surface Management Regulations at 43 CFR 3809, to respond to a plan of operations to allow an operator to prospect, explore, and assess locatable mineral resources on public lands, and to take any action to prevent unnecessary or undue degradation of the public lands.

1.5 Decision to be Made

The BLM Field Manager's decision to be made pertaining to the Plan (NVN-091111) submitted by Klondex includes the following options:

- 1) Approve the Plan with no modifications; or
- 2) Approve the Plan with additional environmental protection measures and conditions needed to prevent unnecessary or undue degradation of public lands.

1.6 BLM Responsibilities and Relationship to BLM and Non-BLM Policies, Plans, Programs, and Land Use Plan Conformance

The BLM has the responsibility and authority to manage the surface and subsurface resources on public lands, including the public lands within the Fire Creek Mine Project area that are open for mineral location. In the Battle Mountain District Record of Decision (ROD) for the Shoshone-Eureka Resource Management Plan (RMP) (BLM, 1986), the BLM states objectives 1 and 2 under Minerals that the BLM would:

- "Make available and encourage development of mineral resources to meet national, regional, and local needs consistent with national objectives for an adequate supply of minerals;" and
- "Assure that mineral exploration, development, and extraction, are carried out in such a way as to minimize environmental and other resource damage and to provide, where legally possible, for the rehabilitation of lands."

The management decisions applicable to these objectives are as follows (BLM, 1986):

- Locatable minerals: “All public lands in the planning areas will be open for mining and prospecting unless withdrawn or restricted from mineral entry;” and
- Current mineral production areas: “Recognize these areas as having a highest and best use for mineral production and encourage mining and minimum environmental disturbance. Make thorough examinations of all sites proposed for other Bureau (BLM) programs in these areas.”

The management decisions and actions in the BMD, Shoshone-Eureka RMP (BLM, 1986a) have been reviewed and the Plan is in conformance with the RMPs. Lander County’s Policy 13-8 states that the Secretary of the Interior should use all means to encourage the exploration and development of the mineral resource (Lander County, 2005).

The project is also in conformance with the Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (ARMPA) (BLM 2015). The following Management Decisions (MD) for Mineral Resources (MR) under Locatable Minerals are applicable to the Proposed Action:

- MD MR 15: Review Objective SSS 4, and to the extent allowed by law, apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat
- MD MR 18: Subject to valid and existing rights and applicable law, authorize locatable mineral development activity, by approving plans of operation and apply mitigation and best management practices that minimize the loss of PHMAs and GHMAs or that enhance GRSG habitat by applying the “avoid, minimize and compensatory mitigation” process through an applicable mitigation system, such as the Nevada Conservation Credit System and exemplified in the Barrick Nevada Sage-Grouse Bank Enabling Agreement (March 2015).

1.7 Other Applicable Authorizations and Environmental Analyses

The Fire Creek area underwent various stages of small-scale prospecting dating back to the early 1930s prior to the 1975 acquisition of the property by Klondex Mines Ltd., the Canadian parent company to Klondex. Klondex has been exploring the property and leasing the property to other exploration and mining companies to date. In 2008, the BLM prepared an EA (#NV063-EA07-141) that analyzed the Plan of Operations (NVN-079769) for the existing underground and surface exploration activities. The 2008 EA analysis is incorporated herein by reference and tiered to as applicable. Table 1-3 summarizes the list of permit authorizations associated with the Project.

Table 1-3: Previous Exploration and Mining Authorizations

Document & Case File	Date	Operator	Description	Permitted Disturbance (acres)
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Document & Case File	Date	Operator	Description	Permitted Disturbance (acres)
Notice #NV-061-NOI-69	5/1981	Klondex Mines Ltd.	Construct and operate a test 200-foot by 200-foot leach pad, ponds, tank, for approximately 2,000 tons of ore, excavate ore from two surface outcrops.	3
Notice # NV-061-NOI-69 Amendment #1	9/1982	Klondex Mines Ltd.	Extend existing leaching area.	3
Notice # NV-061-NOI-69 Amendment #2	12/1982	Minex	Drill 60 exploration holes and associated drill roads.	1
Notice # NV-061-NOI-69 Amendment #3	3/1983	Minex	Open pit mine, upgrade existing leach pad, pilot scale leaching of 36,000 tons of ore.	5
Notice # NV-061-NOI-69 Amendment #4	8/1986	AAM	Drill 30 to 40 exploration holds and associated drill roads.	1
Plan of Operations N-66-87-09P Amendment #1	9/1988	Black Beauty Gold	Exploration drilling. (Exploration approved under a withdrawn mine plan of operations.)	0.75
Plan of Operations N-64-87-09P	10/1989	Black Beauty Gold	Exploration drilling.	6
Plan of Operations	1993	North Mining	Exploration drilling.	2.5
Notice# NVN-078048	2004	Klondex	Exploration drilling.	4.62
Plan of Operations NVN-079769/Nevada Reclamation Permit #0241	2005	Klondex	Exploration drilling. (BLM EA #NV063-EA05-57)	50
Plan of Operations NVN-079769/Nevada Reclamation Permit #0241 - Amendment #1	11/2009	Klondex	Exploration drilling and underground exploration and test mining. (BLM EA #NV063-EA07-141)	100
Plan of Operations NVN-079769/Nevada Reclamation Permit No. 0241- Modification	2014	Klondex	RIBs, water pipeline, monitoring wells, site investigations, site facilities. (BLM Determination of NEPA Adequacy [DNA] # DOI-BLM-NV-B010-2013-0072-DNA)	0 (within authorized 150 acres)
Plan of Operations NVN-079769/Nevada Reclamation Permit No. 0241- Modification	9/2014	Klondex	Increase the height of the existing waste rock storage facility by 10 feet which would accommodate and additional 10,000 cubic yards.	0 (within authorized 150 acres)

1.8 Scoping and Identification of Issues

The Project was presented to the BLM by Klondex per BLM Instruction Memorandum No. NV-2014-019, and baseline studies were identified to support proposed operations. On February 27, 2014, Klondex received a signed Baseline Needs Assessment Form from the BLM outlining the required information. Additional detailed information on the physical, human, and biological environment of the Plan boundary and surrounding area is included in baseline reports prepared by contractors as used to support this EA.

Following the adequacy review of the baseline data studies and Plan, internal scoping for the EA was conducted during an interdisciplinary team meeting held at the BMD-BLM office on June 17, 2015. Resource specialists discussed the Plan and potential environmental issues were identified related to the resources present.

The BLM interdisciplinary team determined that the following resource issues have the potential to occur and therefore are either discussed or analyzed in the EA:

- Air Quality – fugitive dust, equipment emissions;
- Cultural Resources – potential impacts to existing resources and unanticipated discoveries within the context of the Fire Creek Archaeological District;
- Migratory Birds – loss of, or disturbance, to habitat;
- Native American Religious Concerns – properties of religious importance;
- Noxious Weeds, Invasive, and Non-native Species – establishment and/or spread, prevention, and control measures;
- Wastes, Hazardous or Solid – handling and disposal;
- Water Quality – Surface Water and Groundwater – sedimentation, flow, potential for contamination;
- Wetlands and Riparian Zones – disturbance, change in function;
- Geology and Mineral Resources – geologic setting, relationship to proposed action;
- Grazing Management – change/loss of Animal Unit Months (AUMs);
- Recreation – altering of existing opportunities;
- Soils – potential degradation or loss (erosion);
- Social Values and Economics – change in baseline conditions;
- Special Status Species (Animals) – potential mortality, disturbance, habitat loss/change;
- Transportation, Access, and Public Safety – potential for cumulative traffic volumes exceeding highway capacity on ore transportation route;
- Vegetation – change in community composition, reclamation;
- Visual Resources – compliance with existing visual management class; and
- Wildlife – disturbance (noise/human presence), habitat loss/change.

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2 PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

Klondex is proposing the activities and operations described in this section in order to expand the underground operations, increase the mining rate, and conduct additional surface exploration. To support the increased production rate and further the definition of the mineral resource, Klondex would undertake the following:

- Develop additional underground workings for mining and continued exploration within a defined mining zone;
- Construct and operate in phases a new WRSF that would incorporate a Class-III waived landfill;
- Install stormwater diversion channels and water management facilities around the WRSF, including two ponds (Seepage Collection Pond and Stormwater Pond #2);
- Construct and operate a new water management pond (Treated Water Pond);
- Construct additional underground portals, ventilation raises, and service holes;
- Install a lined ore storage pad on the existing WRR and additional portals;
- Reconfigure existing and construct new project support facilities;
- Install additional monitoring wells and stream gauges;
- Build additional facility access and haul roads;
- Install communication infrastructure; and
- Conduct additional surface exploration activities in phases within the existing and expanded Plan boundary.

Figure 2-1 shows the proposed surface support facilities and Figure 2-2 shows the proposed facilities along with the existing facilities in the proposed final configuration, excluding any originally proposed facility that would not be constructed. The following sections provide a description of the proposed surface disturbance, operations, and facilities.

2.1.1 Proposed Surface Disturbance

Klondex is proposing approximately 184.44 acres of additional surface disturbance associated with the proposed operations discussed in this Plan, of which approximately 94.25 acres would occur on public land and approximately 90.19 acres on private land. This would bring the total Project-related disturbance to approximately 334.44 acres with approximately 176.98 acres on public land and approximately 157.46 acres on private land.

Table 2-1 presents a summary of authorized disturbance, proposed disturbance, and the total disturbance. The incremental change column represents the adjustment between authorized and existing disturbance in each category. The proposed disturbance takes into account the reclassification of disturbance acreage where proposed facilities are located on existing or authorized disturbance.

2.1.2 Project Phases

Certain components of the proposed Project would be implemented in phases. Most of the proposed activities would occur in the first phase of the Project, but the future phases would give Klondex the ability to locate exploration drill targets based on results of the Phase I drilling and additional operational flexibility if extra waste rock material is generated during mining and to allow construction lead time for the anticipated continuation of mining at the Project. If Klondex decides to advance the mining beyond the activities described in the Plan, and authorized by the Water Pollution Control Permits (WPCPs), future activities would be included in an Amended Plan of Operations and analyzed under the NEPA separately. The general phasing of activities is presented below:

Phase I

- Includes approximately 81.70 acres of surface disturbance.
- Construct the majority of the surface support facilities, facility roads, and water management ponds and conveyances.
- Construct a portion of the WRSF to store approximately 0.5 Million tons (Mt) of waste material associated with the mining operations presented in the Plan (NVN-091111) analyzed in this EA.
- Construct a secondary underground portal with haul roads.
- Conduct an initial phase of surface exploratory drilling within the existing and expanded Plan boundary.

Future Phases

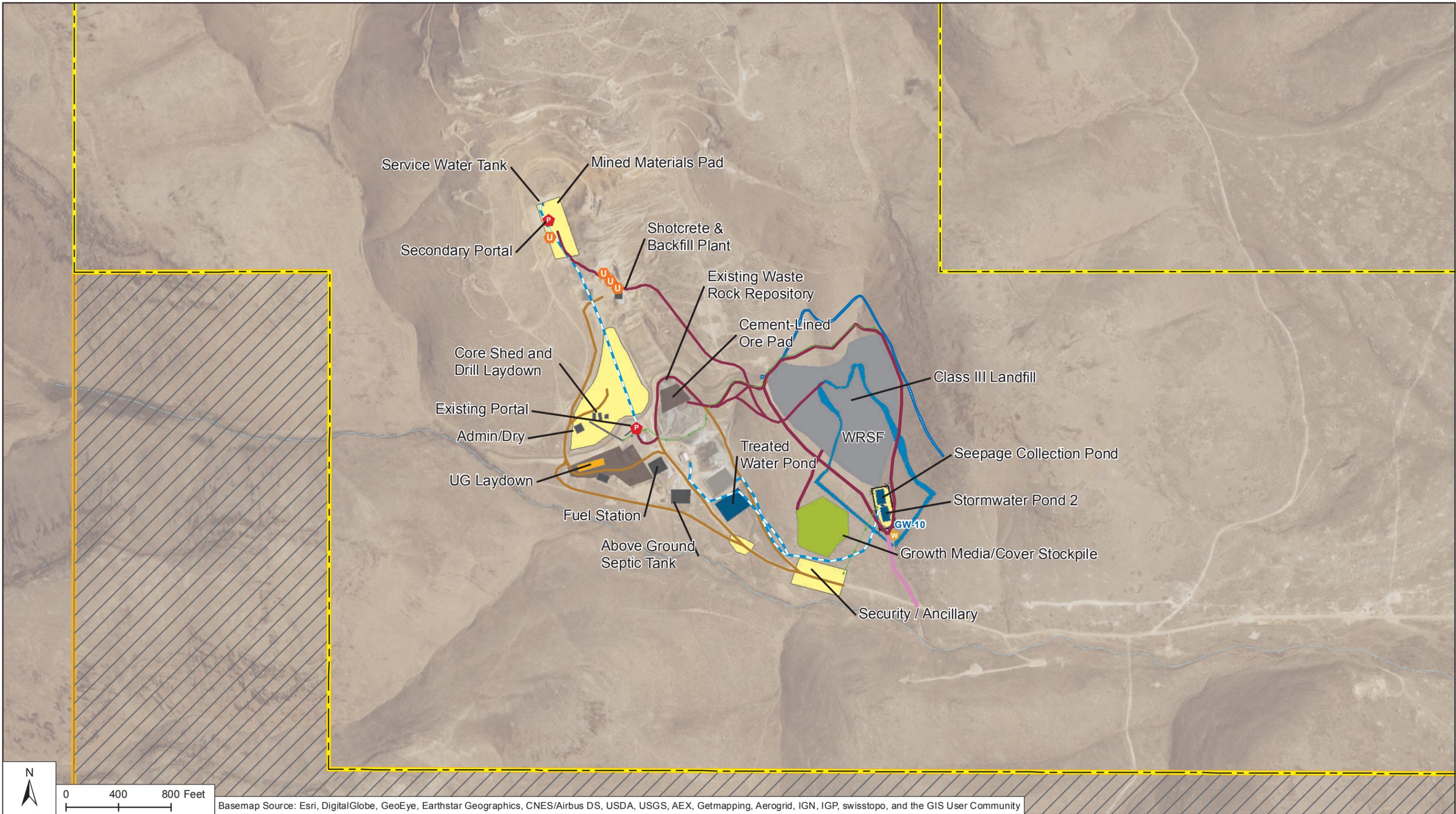
- Includes approximately 102.74 acres of surface disturbance.
- Install additional ventilation raises and underground service holes in locations to be determined as the underground development and mining progresses.
- Construct an additional underground portal as mine development progresses.
- Build out the WRSF to an ultimate capacity of approximately 3.0 Mt on private land to support future mining operations at the site.
- Conduct additional phases of surface exploratory drilling in locations determined by the results of ongoing surface and underground exploration.
- Install additional groundwater monitoring wells to support further characterization of hydrogeological conditions at the site.

2.1.3 Underground Mining

2.1.3.1 Underground Workings

A secondary portal would be constructed in the location of the former open pit area, which was previously disturbed. This portal would provide access to existing and proposed underground workings. The portal would measure approximately 16 feet by 16 feet.

The proposed approximate four-year mine plan includes approximately five miles of additional workings, excluding ore development, that extend to a depth of 798 feet below the existing portal elevation (4,989 feet above mean sea level [amsl]). The majority of mining would occur in a defined structural compartment bounded by major faults.



LEGEND

- | | | | | |
|-------------------------------------|--------------------------|---------------------|--------------------------|-----------------------------|
| Authorized Project Boundary | Proposed Monitoring Well | Powerline | Diversion/Drainage Ditch | Waste Rock Storage Facility |
| Proposed Project Boundary Expansion | Road | Water Pipeline | Growth Media Stockpile | Permanent Drainage Channel |
| Portal | Haul Road | Fire Creek Drainage | Laydown Area | |
| Utility Hole | Light Vehicle Road | Ancillary Use Area | Pond | |
| | Fence | Building/Foundation | Vent Raise | |

Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



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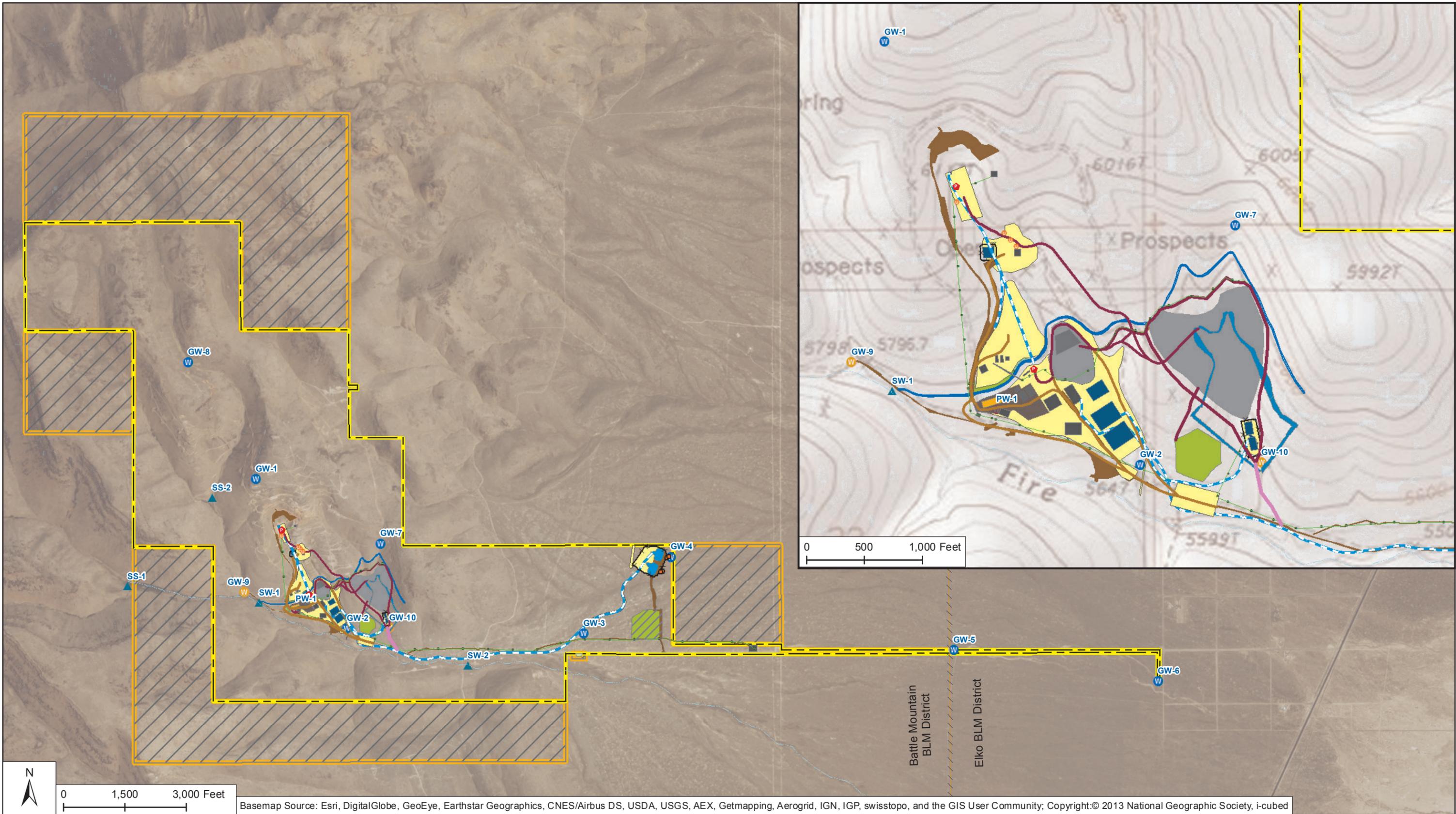
FIRE CREEK MINE PROJECT
Environmental Assessment
DOI-BLM-NV-B010-2015-0062-EA

Proposed Mine Facilities

Figure 2-1
 10/23/2015

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

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LEGEND

- | | | | | | |
|-------------------------------------|----------------------------|--------------------|----------------------------|--------------------------|-----------------------------|
| Authorized Project Boundary | Existing Monitoring Well | Haul Road | Fire Creek Drainage | Diversion/Drainage Ditch | Waste Rock Storage Facility |
| Proposed Project Boundary Expansion | Authorized Monitoring Well | Light Vehicle Road | Permanent Drainage Channel | Growth Media Stockpile | |
| BLM District Boundary | Production Well | Fence | Ancillary Use Area | Laydown Area | |
| Portals | Surface Monitoring Station | Powerline | Borrow Area | Pond | |
| Utility Hole | Road | Water Pipeline | Building/Foundation | Vent Raise | |

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 Proposed and Existing Facilities
 (Final Configuration)
 Figure 2-2
 10/23/2015

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Table 2-1: Project Surface Disturbance Acreage by Facility Type

Facility Type/ Disturbance Class												
Waste Rock Facilities	4.74	0	4.74	-2.20	0	-2.20	1.60	23.27	24.87	4.14	23.27	27.41
Ponds	4.04	0	4.04	-0.15	0	-0.15	0.80	0.26	1.06	4.69	0.26	4.95
Water Management Facilities	9.70	0	9.70	-3.19	0	-3.19	0	6.80	6.80	6.51	6.8	13.31
Stockpiles	12.79	0	12.79	-1.80	0	-1.80	0.80	3.10	3.90	11.79	3.10	14.89
Borrow Area	14.70	0	14.70	-14.70	0	-14.70	14.70	0	14.70	14.70	0	14.70
Ancillary Facilities	10.70	9.97	20.67	14.90	-1.81	13.09	13.99	1.02	15.01	38.64	11.00	49.64
Wells and Gauges	0.61	0	0.61	-0.56	0.12	-0.44	6.00	6.00	12.00	6.05	6.12	12.17
Facility and Access Roads	10.23	4.38	14.61	3.77	-2.24	1.53	2.03	4.13	6.16	21.41	9.18	30.59
Exploration Drill Roads	26.98	7.87	34.85	-14.13	24.59	10.46	27.38	18.05	45.43	40.23	50.51	90.74
Exploration Drill Pads (includes sumps)	22.88	10.41	33.29	-16.58	13.98	-2.60	22.52	22.83	45.35	28.82	47.22	76.04
TOTAL	117.37	32.63	150	-34.64	34.64	0	89.82	85.46	184.44	176.98	157.46	334.44

Notes:

1 – Incremental Change represents the difference between Authorized Disturbance acreage and Existing Disturbance.

2 – Proposed Disturbance calculations take into account proposed facilities that are located within an existing disturbance footprint and the reclassification of this disturbance.

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Access to the various mining areas from the portals and workings would be from haulage drifts. Drifts would range from 12 to 15 feet wide and 13 to 17 feet high on average, and vary from – 15% to + 15% grade to reach desired elevations. Secondary drifts and vertical raises would connect the haulage drifts to provide a pathway for ventilation and support infrastructure to the surface and serve as a secondary escape route.

2.1.3.2 Mining Methods

Mining at the Project would be completed using any one or a combination of the following three mining methods: long-hole stoping; cut and fill stoping; and shrinkage stoping. Cut and fill stoping and shrinkage stoping are used in areas where the ore is steeply dipping and is extracted in horizontal drifting slices or from the ceiling of the stope, respectively. Long-hole stoping is used everywhere else. The final choice of mining method would depend upon the geometry of the stope block, proximity to main access ramps, ventilation and escape routes, the relative strength or weakness of the ore and adjacent wall rock, and finally the value or grade of the ore. The choice of mining method would not be made until after the stope delineation and additional definition drilling is completed.

Once the ore excavation reaches the stope boundary, the stope would be backfilled to the level of the intact vein and the process repeated. The backfill used in this method would contain maximum aggregate sizes of up to 3-inch minus and would be blended with any combination of the following: cement, fly ash, and an air entraining additive mixture. The purpose of the additive mixture is to entrap micro air bubbles in the mix and lower the overall backfill density. The backfill would be mixed on the surface and pumped underground.

2.1.4 Ore Storage and Hauling

A portion of the WRR would be lined with a concrete pad constructed within the existing footprint of the WRR. Currently ore is stored in this location prior to shipment, but the concrete pad would create a more efficient means of storing the ore and reduce dilution. The quantity of ore stored at one time onsite would not exceed the currently authorized 36,000 tons. The ore would be stockpiled daily to be shipped offsite to the Midas Mill for processing. There would be an average of ten round-trip truck shipments daily, not to exceed a maximum of 19 trips. Average ore production over the life of the four years of mine-life in this Plan is approximately 114,000 tons annually, but may vary depending on economic and operational conditions.

2.1.5 Waste Rock Management

No change in waste management practices are proposed under this Plan and waste rock would continue to be used as backfill and placed on an engineered storage facility. The existing WRR is expected to reach capacity by the end of 2015, within the authorized operations. The WRR is an engineered facility and would continue to be used for ore storage. Therefore, all waste generated under this Plan would be placed on the WRSF, which is designed to the same standards as the existing WRR and described further in Section 2.1.7.2. Table 2-2 summarizes the projected waste rock development per year. Klondex maintains a Waste Rock Management Plan document for operations that guides the sampling analysis, and placement of waste rock to ensure compliance with permits and that no waters of the State are impacted.

Table 2-2: Projected Waste Rock Development by Mine Year

Development					
Waste Footage	7,800	10,500	7,200	7,700	39,200
Waste Tons	151,918	195,737	133,864	144,554	626,093

Note: 1 – 2015 includes waste to be placed on existing WRR and new WRSF in 4th Quarter 2015

2.1.6 Water Management Practices

No changes to the Project’s water management practices are proposed under this Plan. The existing water treatment system would be used or a similar system to ensure water quality meets permit requirements. The underground workings would continue to be passively dewatered at a rate not to exceed 100 gpm and water would be stored, treated, and discharged as currently authorized. The only exception is the construction of an additional pond as described in Section 2.1.7.5 to allow for additional storage of treated water to support operations.

2.1.7 Proposed Mine Facilities

The following sections describe the proposed mine facilities.

2.1.7.1 Underground Openings

Portals

A secondary portal would be constructed north of the existing emergency pond to provide additional underground access and ventilation comply with Mine Safety and Health Administration (MSHA) regulations. The portal would have an opening measuring approximately 16 feet wide by 16 feet high and would extend approximately 9,000 feet. The portal construction would generate approximately 180,000 tons of waste rock. The operations area around this portal would measure approximately one acre. One additional portal is included in a future phase, if needed.

Ventilation Raise and Hoist

Up to an additional nine ventilation raises would be installed in future phases and in locations determined by the active mine workings. Each ventilation raise would be installed by boring a 12-foot hole and completing the opening to ten-feet wide. At each ventilation raise, a concrete pad would be installed, measuring approximately 25 feet wide by 15 feet long, within a 500-square foot disturbance area.

Service Holes

Up to 15 service holes would be installed within vent raises and other infrastructure disturbances. The holes may or may not be lined with steel casing to provide access for supplies and utilities underground. The dimensions of these holes would not exceed 18 inches in diameter and would average a depth of approximately 500 to 1,000 feet deep. The holes would have restricted access for safety and wildlife protection. Four service holes would be constructed during Phase I and then ten during future phases. These first four holes would measure approximately 445 feet deep each.

2.1.7.2 Waste Rock Storage Facility

The WRSF would be located immediately east of the existing operations area and is situated in an existing drainage formed by two ridges to the east and west primarily on private land. Other locations were evaluated for the placement of the WRSF; however, this location was determined to have the smallest surface area needed due to the natural topography and also was the furthest from sensitive biological and cultural areas. The WRSF is needed to manage waste rock generated from the development of new underground workings and continued extraction of mineralized material. The WRSF was designed to store approximately 0.5 Mt (314,197 cubic yards) of waste rock in its initial phase with an ultimate capacity of 3.0 Mt (1,942,391 cubic yards).

The WRSF height in the first phase is approximately 95 feet at its maximum section (elevation 5,727 feet amsl) and includes 1.6Horizontal: 1Vertical (H:V) downstream slopes. The downstream slope of the ultimate facility includes two benched sections with 40-foot widths. One of the benches (elevation 5,709 feet amsl) is included in the initial phase, and the other (elevation 5,759 feet amsl) would be constructed as part of the ultimate facility. The size and footprint of the facility was based on an assumed waste rock unit weight of 120 pounds per cubic foot (pcf). The closure details of the WRSF are described in Section 2.1.12.4.

Foundation preparation for the WRSF would include clearing and grubbing the facility footprint of any debris greater than three inches in diameter. Topsoil removed during site preparation would be stockpiled for later use in reclamation. A low-permeability layer, one-foot thick, would then be constructed over the prepared footprint of the WRSF, and would be constructed by reworking and compacting the in-situ materials. A five-foot thick layer of crushed limestone may be placed over the reworked and compacted in-situ material to serve as a filtration layer prior to any seepage entering the seepage collection system. This layer would serve to help neutralize any seepage.

The WRSF is designed to the same specifications as the existing WRR and engineered to store potentially acid generating (PAG) material; however, only a portion of the waste rock is expected to be PAG, while the remaining is expected to be non-reactive basalt, with a slight net neutralizing potential (NNP). As NDEP regulations do not specify the use of a geomembrane liner system or regulate the containment system required for a waste rock facility, the WRSF was designed according to the best engineering practices and standards for similar facilities in the state of Nevada. As such a waste storage containment system using a 1-foot thick low-permeability layer with a specified permeability of less than 1×10^{-6} centimeters per second was selected. This containment system design, while not regulated, meets NAC 445A Section 437 permeability design criteria for tailings impoundment liner systems and would ensure Waters of the State are not impacted (Tierra Group International, 2015).

A Class III-waivered landfill facility is proposed to be managed within the footprint of the WRSF. Stormwater controls and a seepage collection system are included in the WRSF design and described in the following sections. The complete Waste Rock Facility Design Report prepared by Tierra Group International, Ltd. is included as Appendix B of the Plan.

2.1.7.3 Class III-Waivered Landfill

A Class III-waivered landfill to manage debris generated onsite would be operated in the active area of the WRSF as it is constructed. This landfill allows for waste to be buried on a weekly basis. No hazardous or regulated wastes would be placed in this facility.

2.1.7.4 Drainage and Sediment Control Structures

As required by Nevada Administrative Code (NAC) 445A.433(1).(c), stormwater from up gradient of the watershed is diverted around the Project utilizing designed diversion ditches and sediment control basins.

Interim surface water diversions were designed around the perimeter of the 0.5 Mt WRSF to inhibit the flow of stormwater runoff onto the WRSF. A larger diversion channel was also designed that would accommodate the WRSF for future expansion up to a maximum storage capacity of 3.0 Mt.

Stormwater runoff from upland drainage areas reporting to the WRSF would be diverted around the facility and its ancillary structures via the main diversion channel. Meteoric water that falls between main diversion and the WRSF would be diverted by interim diversions that would divert the flow around the WRSF and discharge the water into the existing drainage downstream of the facility. Runoff that falls within the limits of the WRSF and surrounding hillsides below the interim diversions would report to a stormwater pond located down gradient of the WRSF. The proposed design for each stormwater control structure is described below.

Main Diversion Channel

Stormwater runoff from upland drainage areas reporting to the main diversion would be conveyed to the west and ultimately around the WRSF. The main diversion would outfall into an existing drainage channel that would then convey the runoff away from the mine operations area.

The total upland basin area reporting to the main diversion channel was determined to be 0.30 square mile. Implementing the methods found in the *Hydraulic Design of Flood Control Channels* (United States Army Corps of Engineers [USACE], 1994), it was determined that the average velocity in the channel would be 4.7 feet per second (fps). At this velocity, the in-situ material is sufficient and the channel would not require additional riprap protection.

Interim Diversions

Meteoric water that falls between the main diversion and the WRSF would be diverted around the facility by three-foot high interim diversions that would be abandoned as the facility progresses to its ultimate 3.0 Mt capacity. Beyond the facility limits, an overflow weir cut into the sides of the diversions and chutes with appropriate riprap end treatments would convey flows into a natural drainage south of the proposed stormwater collection pond. Due to the temporary nature of the berms and appurtenant structures, all components were sized according to the 25-year, 24-hour precipitation event.

The basin areas reporting to the east and west interim diversions were determined to be approximately 0.015 square mile for each diversion. The east and west diversion chutes discharging into the natural drainage were evaluated according to the USACE steep slope method (USACE, 1994), and require nine-inch D₅₀ riprap. Due to high velocities at the outlet, a combined riprap apron is required in the natural drainage to protect the toe of the chute and the natural drainage from erosion.

2.1.7.5 Water Management Ponds

Three ponds are proposed to increase the water management capacity of the existing water management system and to support the WRSF.

Seepage Pond

The seepage collection system is associated with the WRSF and consists of collection pipes, inlets, gravel drains, and a seepage consolidation berm. Seepage water from this system is directed through an impermeable solid wall pipe into the seepage collection pond located downgradient from the WRSF.

The total volumetric flow rate from the seepage collection system design criteria used a seepage rate of two gpm, which equals 2,880 gallons of seepage water per day. This flow rate is considered conservative by Tierra Group as no seepage has been documented from the existing WRR. In addition, the stormwater diversion design and closure design would limit water entering the WRSF (Tierra Group, 2014). The seepage collection pond was graded to store a minimum of two days of seepage water or approximately 6,000 gallons of water with one foot of freeboard. To facilitate construction, the size of the pond was increased resulting in a storage capacity of 14,710 gallons. To control possible overflow from the seepage collection pond, a weir was sized in the downstream crest of the pond with the minimum width and flow depth required to pass runoff from a 25-year, 24-hour storm event with a minimum freeboard of one foot.

Lining for the seepage collection pond includes a double-lined system with leak detection. The liner system would consist of a secondary 60-mil liner made of low-density polyethylene (LDPE) AGRU Drain Liner™. This liner system is designed to provide conveyance of any leakage through the primary liner to the leakage collection sump, which is overlain by the primary 60-mil smooth LDPE liner. A leakage collection sump would be incorporated into the liner system to allow any leakage to be collected and pumped back into the Seepage Pond to prevent a potential release to the environment.

Once in the seepage collection pond, the water would be monitored for quality and either be stored and pumped out for consumption by other uses at the site or released through the stormwater collection pond and then into a natural drainage if the water meets Nevada Division of Environmental Protection (NDEP) Profile I reference values.

Stormwater Pond #2

The double-lined Stormwater Pond #2 was designed to store the 25-year 24-hour stormwater runoff volume from the WRSF and small adjacent watershed basins. The pond was sized in a previous iteration of the design for a drainage area of 0.05 square miles, which then decreased with subsequent design. The modeled runoff reporting to the stormwater collection pond is therefore conservatively over-estimated. The stormwater collection pond sized to contain 228,095 gallons (0.7 acre-feet) with one foot of freeboard. In the event of a storm with a magnitude greater than the 25-year 24-hour storm event, an overflow weir was designed on the south end of the pond to convey the runoff volume of the 25-year 24-hour storm event with one foot of freeboard. A four-inch pipeline would be installed connecting the Stormwater Pond #2 and Seepage Collection Pond to the existing water treatment ponds or facilities. This pipeline measures approximately 1,700 feet long.

Treated Water Pond

A pond located adjacent to the existing Dewatering Storage Pond #1 and Stormwater Pond #1 would be constructed to store treated water or in a storm event it could be used to temporarily store excess water not initially meeting Profile I standards prior to treatment. Water in this pond would be treated to NDEP Profile I reference values and stored for use in drilling operations, underground mining operations, dust control, or discharged to the RIBs, if not used for operations. The existing water treatment plant onsite would be used to treat the water. The pond would be graded at a 2H:1V slope while not impinging upon the existing roads and treatment pond (located upgradient from the proposed pond). Pond grading would maintain a five-foot crest for access and a nine-foot bottom width for constructability. The pond would have a capacity of approximately 7.77 acre-feet with two-foot residual freeboard. Under the operations proposed in this Plan, the pond would only store water, but the pond would be constructed with a double liner and leak detection to have the potential to store process fluids should future operations require this type of fluid management.

2.1.7.6 Stockpiles and Borrow Area

Growth Media Stockpiles

Soil would be salvaged from new areas of surface disturbance prior to construction by bulldozing a minimum of two feet of material directly into stockpiles adjacent to disturbances. These stockpiles would be clearly identified as to their content using signs and other barriers to prevent access by motorized equipment. Growth media stockpiles would be graded and seeded with the reclamation seed mix proposed for this Project to ensure weed management, stabilization, and erosion control.

Topsoil from the footprint of the WRSF would be removed and stockpiled adjacent to the facility for future use in reclamation. The footprint surface disturbance acreage for this growth media stockpile represents the 3.0 Mt surface area. The existing topsoil pile located immediately north of the existing office trailers would remain in the same location.

Borrow Area

The permitted borrow area was located west of the RIB area and was not constructed, as this material would be used for facility closure and reclamation. The permitted acreage associated with the borrow area was allotted to other facilities and, therefore, the borrow area is now included in the proposed facilities and would be constructed in a future phase. The location of the borrow area would move as the authorized location has culturally sensitive areas in its vicinity. The borrow area would be located immediately under the existing RIB growth media stockpile and would extend approximately 3.5 feet below grade, representing 54,000 cubic yards of borrow material for reclamation activities.

2.1.7.7 Buildings and Structures

Administrative and Dry Building

The administrative building would be constructed on a concrete foundation and would be wood-framed construction. This building would also include a dry facility with lockers and showers to support the mine workers.

Core Shed

A temporary building would be erected to house a central core storage and logging location. The original authorized core storage facility located by the RIBs was not constructed. Currently, some core samples are being stored adjacent to the RIB facility.

Fencing

Fencing would be installed around the Seepage Pond and Stormwater Pond #2, at the toe of the WRSF, to keep wildlife out of this area. Fencing would also be used to block access to service holes and other underground openings as needed and secure ore storage areas. Fencing would comply with BLM standards. It is estimated that approximately 1,000 feet of fence would be installed.

Man Bridge

Due to the topographical relief between the relocated Administrative Building and Dry, a steel man bridge would be constructed to allow for pedestrian access between these facilities and the other facilities in the existing operations area and portal area.

Operations Area Concrete Pad

A concrete pad would be poured within the existing operations area. This would be done in a future phase and the specific details of the pad would be provided in a work plan and reclamation bond estimate update for BLM and NDEP-BMRR approval prior to construction. The approximate size of this pad would measure up to two acres and the general location of this pad is shown in Figure 2-1.

Fuel Station

An engineered fuel station is proposed within the footprint of the existing operations area and would include three above-ground storage tanks. All three tanks would be double-walled for self-containment and additional secondary containment structures would be included in the design. The tanks would include one 10,000-gallon capacity bio-diesel tank, one 10,000-gallon regular diesel fuel tank, and one 5,000-gallon unleaded gasoline tank. The fuel station would be designed to meet all state and federal regulations and standards pertaining to fuel distribution systems of this nature.

Septic Tank

An above-ground septic tank would be installed to replace the existing drain field. The septic tank would be located within the main operations area. Klondex would hire a contractor to pump the septic tank and transport the waste offsite for proper disposal.

Miscellaneous Concrete Pads

Additional disturbance has been included to account for any communication facilities, utilities, footings, and tank pads that may be needed.

2.1.7.8 Storage Areas/Laydown

Underground Laydown

A centralized underground laydown yard would be located in the existing operations area. This area may eventually be located within the concrete pad area. This storage area would be used to store underground equipment, including mining and drilling materials.

Ore Storage Pads

Two concrete-lined ore storage pads would be constructed to temporarily store ore material prior to being transported offsite. One ore storage pad would be located on the WRR once it has been fully built out. The second ore storage pad would be located near the secondary portal. The ore storage areas would be fenced for security.

2.1.7.9 Power Supply

Powerline extensions would be installed to service the hoists in each ventilation raise (nine total) and portals. In addition, a powerline extension would be installed along the perimeter road on the west side of the WRSF to service light plants and pond pumps. The total powerline alignment included within Phase I measures approximately 4,700 linear feet with a 20-foot wide construction corridor and is located entirely within the Plan boundary.

2.1.7.10 Water Supply

No change to the usage rates or water rights would occur for the existing production well PW-1. However, the existing PW-1 is proposed to transition into a safe drinking water supply for mine employees. A chlorinated treatment system would be installed, if required by the State of Nevada, to treat water to drinking water standards. The necessary testing would be conducted and permits would be filed with the NDEP and Bureau of Safe Drinking Water.

A service water tank would be installed north of the secondary portal to supply water to underground mining operations. Water would be pumped to this tank via a pipeline running from the tank to the operations area.

2.1.7.11 Monitoring Wells and Stream Gauges

Ten additional monitoring wells are proposed to be constructed within the current and expanded Plan boundary. The purpose of these wells is to gather additional hydrogeologic data to support future environmental analysis for mining operations as the Project progresses and for water quality monitoring associated with the WRSF. The locations of these wells have not been determined yet and are dependent on the results of the proposed exploration activities that would identify potential mining targets.

Three stream flow gauges are proposed to be installed within the Fire Creek drainage on public land to gather precise and seasonal flow data. The locations of the proposed gauges would correspond to the existing stream monitoring locations along Fire Creek. The installation of the gauges would be done in a future phase and the specific details of the gauges would be provided in a work plan and reclamation bond estimate update for BLM and NDEP approval prior to installation.

2.1.7.12 Roads

Haul Roads

Haul roads would be constructed to provide access to the WRSF and additional portals. In Phase I, approximately 5,200 feet of haul roads would be constructed around the perimeter of the WRSF and provide access from the operations and portal areas. Approximately 4,000 feet of

haul road would be installed in Phase I to provide access from the proposed secondary portal to the WRSF. An additional 1,335 feet of haul roads connect the various facilities in Phase I. Future phases include approximately 10,000 feet of haul roads that would be installed to service an additional portal if needed and other facilities. These roads would be approximately 35 feet wide and meet MSHA berm and road design requirements.

Small Vehicle Roads

Small vehicle roads are proposed to provide access to the new office areas and an underground service hole. Approximately 180 feet of small vehicle roads would be constructed and provide access to various facilities; however, these roads would be located on existing disturbance. These roads would be approximately 25 feet wide and meet MSHA berm and road design requirements. Exploration roads are discussed in Section 2.1.8.2.

Access Road Improvements

The Project access road is proposed to be widened in certain segments to accommodate two-way truck traffic. Due to the increase in ore shipping, having areas to allow for safe passing of trucks traveling to and from the Project is needed. The width of the increased segments would measure approximately 25 feet wide and it is estimated that a total of approximately 5,000 feet of road would need to be widened. All of the portions of the road subject to widening are contained within the 3809 Plan boundary and would not require a separate BLM right-of-way permit. If the road segment outside of the 3809 Plan boundary would need to be expanded, Klondex would submit a separate right-of-way application subject to additional NEPA analysis. Klondex would continue to coordinate with the Lander County and Eureka County road superintendents prior to any maintenance or improvements to the Project access road.

2.1.8 Surface Exploration

The limits of the ore body are not fully defined, therefore Klondex would continue surface exploration and development work on the Project claims to further delineate the ore zones and to target potential mineralized resource areas. Klondex would continue to conduct exploration and development throughout the active mine life. Klondex would use the same or similar drilling methods, as well as the same or similar types of equipment that are presently employed. New drill sites would be established, with other selected drill sites being concurrently reclaimed, as drill targets are evaluated. Surface exploration would be conducted in phases to allow for the location of future drill pads and roads to be determined as the drilling program progresses and targets are further defined.

The proposed Phase I drill pads and roads are shown in Figure 2-3. All Phase I drill pads and drill roads are located within areas that have had a Class-III cultural inventory performed and the proposed drill site and road locations have been adjusted in coordination with the BLM to avoid any known cultural resource sites. Klondex would submit work plans for future surface exploration phases.

2.1.8.1 Operations

Reverse-circulation and core drill rigs would continue to be used. Drilling support equipment includes water trucks, crew trucks, portable mud tanks, pipe trucks or skids, light plants, portable generators, motor graders, excavators, dozers, and product storage pallets. Designated equipment storage areas have been established at the Project within the existing operations area.

A typical drill crew consists of a drill operator and two helpers. The helpers remove and box the recovered core samples, mix drilling fluids, and operate the water truck. Standard drilling procedures typically require a geologist to be involved with all drilling activities. The duties of a geologist normally include ensuring compliance with environmental protection measures including the avoidance of sensitive areas, monitoring the progress of drilling activities, logging each drill hole according to the geologic features encountered, determining the maximum depth of each hole, and advising the drill operator as necessary. The geologist travels to the site in a separate four-wheel drive vehicle.

Water and non-toxic approved drilling fluids are, and would continue to be, utilized during drilling. Drilling water and water used for dust control during drill site construction would be obtained from PW-1, UCD-1, the Treated Water Pond, or purchased from other existing sources (Crescent Valley, local ranches).

2.1.8.2 Drill Roads

Exploration roads would be located and constructed as needed, using standard construction practices for temporary mineral exploration roads to minimize surface disturbance, erosion, and visual contrast as well as to facilitate reclamation. Road construction would be implemented using a Cat D8L or equivalent when the area is accessible. The proposed exploration roads and spurs would be bladed to an average width of 30 feet including side cast material.

The surface disturbance calculations are for a 40-foot width to account for roads in steep areas that would require a larger area for cut and fill. Water bars would be installed on drill roads as needed. Klondex would make an effort to construct drill roads with a grade at ten percent or less.

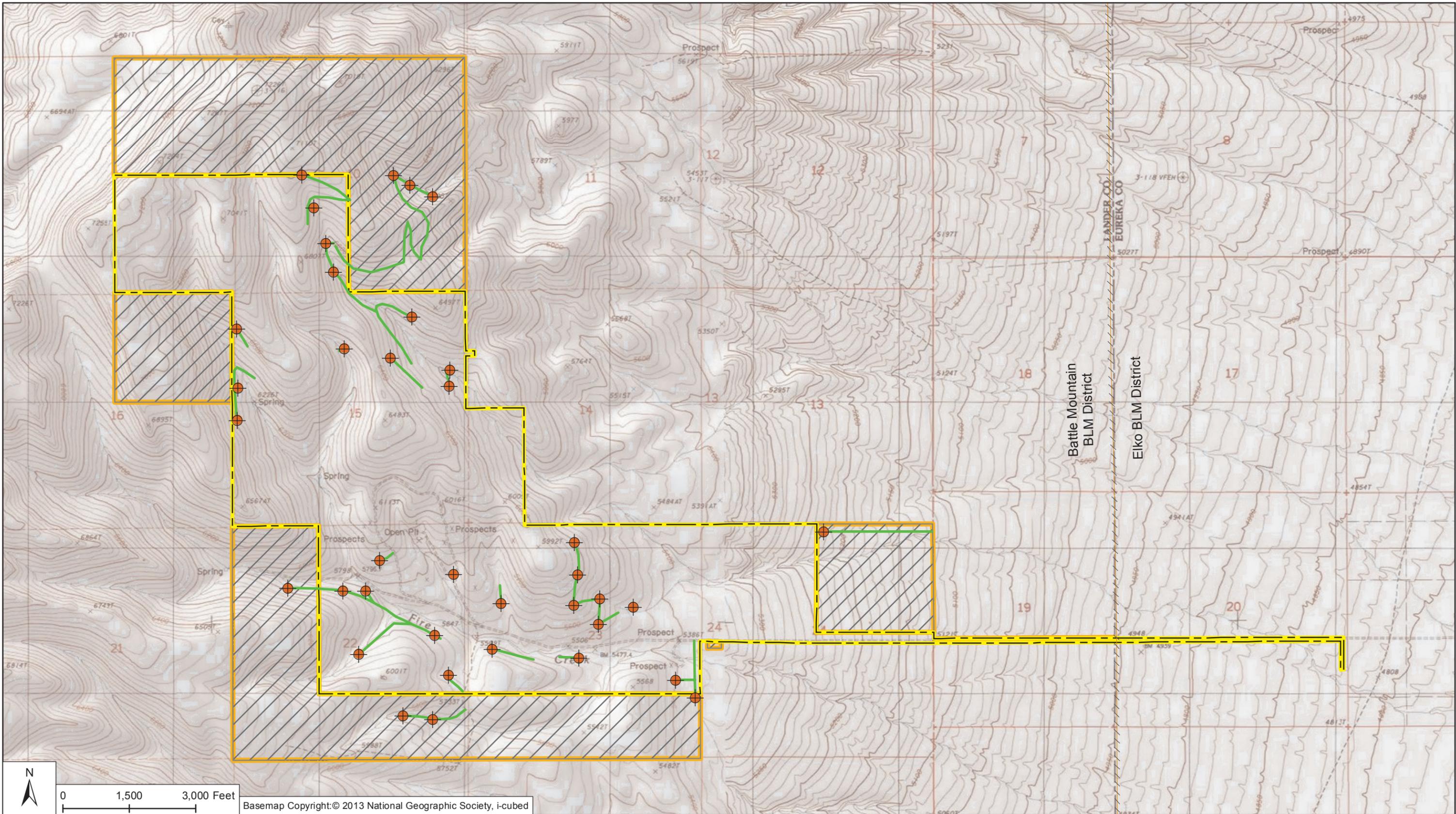
Balanced cut and fill construction would be used to the extent possible to minimize the exposed cut slopes and the volume of material. Since the depth of the cut would be minimized, growth media removed during construction would be stockpiled as the fill slope to be used during reclamation. Drill road maintenance activities would consist of smoothing ruts, filling holes with fill material, grading, and reestablishing water bars when necessary.

The Phase I drill program would require a total of approximately 34,704 feet of constructed drill road, which would result in a total of approximately 39.83 acres of surface disturbance. Depending on site conditions, overland travel may be used instead of constructing a road when feasible.

2.1.8.3 Drill Pads

New drill pad disturbance would be kept to the minimum necessary for safe access and working area for equipment and crews. Drill pads typically require a working area of approximately 40 feet by 60 feet (0.14 acre). Sediment basins (sumps) are included in the drill pad disturbance calculation and may be constructed either within the drill pad or immediately adjacent to the drill pad. The sumps are used to collect drill cuttings and to manage and circulate drilling fluids. Typical dimensions for a sump are approximately ten feet wide by ten feet long and eight feet deep. Sumps would be constructed to allow for ingress and egress of wildlife to prevent entrapment.

The Phase I drill program would consist of 37 drill pads with 18 pads located on public land and 19 on private land totaling approximately 5.18 acres of surface disturbance.



- LEGEND**
- Authorized Project Boundary
 - Proposed Project Boundary Expansion
 - BLM District Boundary
 - Proposed Drill Pad
 - Proposed Drill Road



BUREAU OF LAND MANAGEMENT
FIRE CREEK MINE PROJECT
Environmental Assessment
DOI-BLM-NV-B010-2015-0062-EA
 Proposed Phase I Surface
 Exploration Disturbance
 Figure 2-3
 10/23/2015

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

BATTLE MOUNTAIN DISTRICT OFFICE
 Mount Lewis Field Office
 50 Bastian Road
 Battle Mountain, Nevada 89820

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2.1.8.4 Drill Holes

Some drill holes would reach 2,000 feet or more, but the average drill hole depth would typically range from 500 to 1,500 feet. A maximum of ten pre-collared rotary holes may be left open at any time prior to resuming drilling with core-drilling equipment. Drill holes would be abandoned per NAC 534.4369 and 534.4371. If groundwater is encountered, the hole would be plugged pursuant to NAC 534.420. All drill holes would be plugged prior to the drill rig leaving the site.

2.1.9 Workforce

The proposed operations would require the addition of 97 personnel for a total of 190 employees as outlined in Table 2-3. This level of employment represents the average employment for the four-year Project life. There may be an initial increase of site workers during the construction of the new support facilities.

Table 2-3: Projected Employment by Job Type

Job Classification	Number of Employees
Operations	100
Geology/Engineering	30
Administration	10
Contractors: mining, maintenance, drilling, security	50
Total	190

2.1.10 Equipment

The types and quantity of equipment used at the Project would remain relatively the same. A list of the additional equipment types and quantities to support the increased underground mining rate are listed in Table 2-4.

Table 2-4: List of Proposed Project Equipment Types and Quantities

Type of Equipment	
Underground Equipment	
Cement Remix Truck	2
Cement Spraymec Truck	1
Scissor Lift Truck	1
AD 30 Haul Truck	4
Scooptram	6
414 Cat Tractor	1
Kubota Mancarrier	5
Surface Equipment	
Road Grader	1
Snow Plow	1
Skid Steer Loader	1
966 Loader	1

2.1.11 Solid and Hazardous Waste Material Management

Klondex would continue to use the same types of fuels and reagents at the Project. If generated, all petroleum-contaminated soil would be placed directly into roll-off bins and shipped offsite to an authorized facility. Table 2-5 presents a summary of the proposed fuels and reagents. The materials to be stored at the fuel station described in Section 2.1.7.7 are included in the table below.

Table 2-5: Summary of Proposed Fuels and Reagent Usage

Type	Storage Amount	Storage Method	Use
Bio-diesel	10,000 gallons	Above-ground storage tank	Equipment, vehicles
Diesel Fuel	5,000 gallons	Above-ground storage tank	Equipment, vehicles, mix with explosives
Unleaded Gasoline	5,000 gallons	Above-ground storage tank	Light vehicles
Motor Oil	275 gallons	55-gallon drums	Equipment, vehicles
Hydraulic Oil	275 gallons	275-gallon tote	Equipment, vehicles
90W Oil	275 gallons	275-gallon tote	Equipment, vehicles
50 W Oil	275 gallons	275-gallon tote	Equipment, vehicles
30W Oil	275 gallons	275-gallon tote	Equipment, vehicles
Lubricants/Grease	1,000 pounds	On drill rigs	Equipment, vehicles
Propane	5,000 gallons	2, 2,500-gallon tanks	Mine ventilation support facilities
Antifreeze	275 gallons	55-gallon drum	Equipment, vehicles
Sodium bisulfate	330 gallons	330-gallon tote	Water treatment plant
Antiscalent	110 gallons	55-gallon drums	Water treatment plant
Sulfuric acid	110 gallons	55-gallon drums	Water treatment plant

2.1.12 Reclamation Plan

Disturbed area reclamation resulting from activities outlined in the Plan would be completed in accordance with BLM and NDEP regulations and to the standards described in 43 CFR 3809.420 and NAC 519A. Reclamation would meet the reclamation objectives as outlined in the U.S. Department of Interior Solid Minerals Reclamation Handbook #H-3042-1 (BLM, 1992), Surface Management of Mining Operations Handbook H-3809-1 (BLM, 1989), and revegetation success standards per BLM/NDEP “Nevada Guidelines for Successful Revegetation for the Nevada Division of Environmental Protection, the Bureau of Land Management, and the United States Forest Service,” as included as Attachment A of the Project’s reclamation permit.

2.1.12.1 Post-Project Land Use

Reclamation would be designed to achieve post-exploration land uses consistent with the BLM's land use management plans for the area, which are outlined in the BLM’s Shoshone-Eureka Resource Management Plan and Final Environmental Impact Statement, October 1986. Reclamation is intended to return disturbed land to a level of productivity comparable to pre-Project levels. Post-mining land use includes wildlife habitat, livestock grazing, hunting, and dispersed recreation. The same post-project land use is anticipated for the private lands.

2.1.12.2 Mine Support Facilities and Underground Workings Reclamation

Upon permanent cessation of activities, Klondex would undertake reclamation activities for Project facilities and disturbance. Additional mine reclamation details for existing facilities are included in the 2009 Plan of Operations and the 2014 Plan of Operations.

Buildings, Foundations and Ancillary Facilities

All structures and facilities located on public land would be demolished or removed from the Project. Unless there is ongoing post-mining beneficial use, site structures on private land would also be removed. Some facilities may temporarily remain to facilitate mine closure, including the administrative building and shop areas. Salvageable materials, equipment, instrumentation, and furniture would be removed from the site prior to demolition activities.

During demolition, building material and debris would either be placed in the Class III-waivered landfill within the WRSF prior to reclamation of that facility or taken offsite for disposal in a regulated landfill. Materials that would be excluded from the Class III-waivered landfill are the following: hazardous waste (as defined by NRS 459.7024); liquid wastes (as defined by the paint filter test); laboratory wastes; undrained, used oil filters; hydrocarbon-contaminated soil exceeding 100 parts per million Total Petroleum Hydrocarbons; wipers and rags contaminated with unacceptable chemicals or solvents or are oil-soaked with liquid present; florescent light bulbs; polychlorinated biphenyls wastes; vehicle batteries; unpunctured aerosol cans; putrescible wastes (including dead animals); asbestos; acids; acid sludge; unacceptable chemicals or cleaning solvents; friable asbestos; gasoline and other petroleum products; insecticides or pesticides; and thinners and solvents.

Concrete pads and building foundations would be broken and buried. The burial of these materials would occur prior to final contouring and would be a depth suitable to ensure that the materials are not exposed in the future. A minimum of five feet of cover would be placed over the concrete. Should the concrete be subjected to a hazardous substance or petroleum product during operations, a cleaner or polymer would be applied to neutralize any deleterious residue.

2.1.12.3 Pipelines and Powerlines

Pipelines and powerlines would be decommissioned when no longer required for site operations and closure activities or required by private land holders within the Project Area. All piping material and electrical equipment would be removed from the Project Area for recycling or reuse. Klondex would coordinate the powerline decommissioning activities with NV Energy to ensure that other users of the power supply are not affected. All transformers and electrical equipment containing oil would be drained, and the oil disposed of at a regulated facility prior to decommissioning. The pipeline and powerline maintenance roads would be reclaimed as described in Section 2.1.12.9.

2.1.12.4 Waste Rock Storage Facility

WRSF closure would be performed after the ultimate storage capacity has been achieved. The downstream benched face of the facility would be re-graded to a constant 3H:1V slope. The entire surface of the facility would be covered with three feet of non-reactive, non-acid generating (NAG) cover material. The thickness of the cover would be consistent with that previously permitted at the Project for the closure of the existing WRR. Cover material serves the purpose of promoting surface vegetation and, as a method of infiltration reduction to limit the amount of meteoric water entering the waste rock and ultimately reporting to the seepage collection pond. In the short term, the lined seepage collection pond would remain to collect and allow monitoring of the seepage water.

2.1.12.5 Operations Area/Ancillary Use Area

General use and operation areas would be ripped to uncompact the surface and regraded to match surrounding natural contours. If petroleum-contaminated soils were detected during this process, they would be characterized and transported offsite for disposal at a certified facility.

2.1.12.6 Pond Reclamation

During final operations, water piped to the ponds would be minimized to the extent practicable. Water in the ponds meeting NDEP Profile I standards would be sent to the RIBs. Any sediment remaining in the ponds would be tested prior to decommissioning and would be either placed on the WRSF, or disposed in accordance with state and federal regulations, or left in place after seeking authorization from the NDEP and BLM. All pond liners would be folded down over the bottom of the pond. The ponds would be backfilled with fill, regraded to shed runoff away from the pond footprint, and the surfaces would be revegetated. The placement of fill material and regrading would be completed in a manner that promotes runoff and inhibits infiltration.

At closure, Stormwater Collection Pond #2 would not be reclaimed as described above, but would be converted to an evapotranspiration (ET) cell that would treat any remaining flow. Based on a transient seepage analysis performed by Tierra Group International (2015), flow from the WRSF is expected to report to the ET cell within 12 months of closure. After this expected drain down period, it is anticipated that no flow would report from the WRSF's underdrain system to the ET cell and the ET cell would be decommissioned.

2.1.12.7 Stormwater Drainage Channels

A portion of the temporary drainage ditch associated with the 0.5 Mt WRSF build-out would be covered up with the construction of the larger 3.0 Mt facility. The upgradient channels around the WRR and WRSF would remain in place in perpetuity to channel water away from these facilities. Segments of the channel not needed for permanent water conveyance would be filled and regraded.

Klondex proposes to convey runoff from reclaimed areas and upstream undisturbed areas through the Project Area in a manner that would protect the reclaimed areas and prevent degradation of downstream water quality. The drainage and sediment control plan is designed to require no maintenance. Natural drainages would be reestablished, and existing natural channels would be used.

2.1.12.8 Rapid Infiltration Basins

The reclamation of the RIBs is described in detail in the 2014 Plan of Operations and design report and only a summary is provided herein for reference. Soil and growth media was stripped from the RIB area and stockpiled during construction. Any remaining stockpiled material that was not used for construction activities, would be used in final reclamation. Reclamation of the RIBs would involve the removal of all conveyance and distribution piping and fencing. The RIBs would be reclaimed by replacing any remaining stockpiled material and overburden, then the area would be regraded with a Cat D8 bulldozer or equivalent. Lastly the RIBs would be backfilled and sufficient soil and growth media would be applied to the recontoured areas to ensure adequate vegetative cover.

2.1.12.9 Facility and Haul Road Reclamation

Small vehicle mine roads and haul roads without a defined post-mining use would be reclaimed concurrently when they are no longer needed for access. Haul and small vehicle roads required during closure would be reclaimed when they were no longer needed. The primary reclamation objectives for the roads would be long-term stabilization and surface water management.

All roads scheduled for reclamation would be recontoured to approximate original topography or in a manner consistent with the final surrounding topography. This would be completed by pulling in road safety berms, ripping the road surface, removing any culverts, and reestablishing drainage. Where roads were constructed by cutting, the edge berm and fill would be pulled back against the inside cut of the road. Ditches that would no longer be required would be regraded. Since roads are constructed with near surface soils, which would be replaced on the road surface during reclamation activities, no growth media would be needed prior to seeding with the reclamation seed mix.

2.1.12.10 Mine Reclamation Schedule

Project activities, including operations and reclamation, would occur over approximately eight years. Reclamation and mine closure activities are anticipated to take four years following the cessation of mineral extraction activities. Revegetation activities are limited by the time of year during which they could be effectively implemented. Site conditions and/or yearly climatic variations could require that this schedule be modified to achieve revegetation success. Fluid management and ET cell maintenance is currently included as an ongoing task that would extend 12 months beyond mine closure. A more detailed closure study would be completed by Klondex.

Table 2-6 outlines the anticipated reclamation schedule on a quarterly basis, which would be followed to achieve the reclamation goals set forth above.

Table 2-6: Anticipated Mine Surface Support Facilities and Underground Workings Reclamation Schedule

Reclamation Activity	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4												
Buildings/Concrete Pads																
Pipelines																
Powerlines																
Portal and Vent Raise Plug																
Waste Rock Storage Facilities																
Operations Areas																
Ponds																
RIBs																
Wells																
Facility and Haul Roads/Utility Routes																
Waste Rock Storage Facilities																
Operations Areas																
Ponds																
RIBs																
Facility and Haul Roads/Utility Routes																

Reclamation Activity	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4												
Wells																

2.1.12.11 Surface Exploration Reclamation

Drill Pad and Drill Road Reclamation

Drill pads and roads would be reclaimed in a similar manner as described in Section 2.1.12.9.

Concurrent Reclamation

Concurrent reclamation would be conducted whenever feasible during operations. Drill pads and roads that are no longer needed would be reclaimed during the appropriate time of year.

Drill Hole Plugging

Drill holes would be plugged in accordance with NAC 534.4369 and NAC 534.4371, and guidance from the BLM. In the event that ground water is encountered, drill holes would be plugged pursuant to NAC 534.420. No drill holes would be left open at the end of the Project.

2.1.12.12 Well Abandonment

For groundwater wells or if casings are set in a borehole during surface exploration, they would be plugged pursuant to NRS 534.420 or the casings would be completely removed from the boreholes once they are no longer needed for post-closure monitoring. The upper portion of the borehole may be permanently cased if the annulus is completely sealed from the casing shoe to surface pursuant to NAC 534.380. If the casing cannot be broken free from the bottom of the well and the borehole is permanently cased, the well driller would perforate the casing from the bottom of the well to not less than 50 feet above the top of the uppermost saturated groundwater stratum or to the surface of the well, pursuant to NAC 534.420(5)(b).

In addition, the mine service holes would be plugged in accordance with these methods.

Surface Exploration Reclamation Schedule

Following the cessation of mining activities, the final surface exploration disturbance reclamation would start within the following calendar year and completed within two years as outlined in Table 2-7.

Table 2-7: Ongoing Surface Exploration Reclamation Schedule

Reclamation Activity	1Q		3Q		
Regrading Drill Roads and Pads					Within 2 years of Project completion
Seeding					Within 2 years of Project completion
Revegetation monitoring					3 years beyond regrading and reseeding

2.1.12.13 Regrading and Revegetation Procedures

Disturbed areas would be contoured and graded to blend into the surrounding topography and terrain.

2.1.12.14 Regrading and Contouring

Regrading and reshaping all constructed drill sites, including sumps, water well sites, monitoring well sites, constructed roads, and other constructed disturbance, would be completed to blend with the surrounding topography. Fill material would be pulled onto the roadbeds to fill the road cuts and restore the slope to natural contours. Roads and drill sites would be regraded and reshaped with an excavator. Engineering mine facilities would be regraded as described in Section 2.1.12.9 or to a 3:1 H:V slope. Road-related disturbance would be scarified if necessary and recontoured to meet the surrounding topography.

2.1.12.15 Growth Media Handling

Soil and growth media would be stripped and stockpiled during construction of new facilities and drill sites and roads. Any remaining stockpiled material not used for construction activities would be used in final reclamation. Soils capable of serving as a growth media would be salvaged and stockpiled as the fill slope. In addition to the soils, as much of the soil organic matter as possible would be salvaged to minimize compaction and promote aeration. Soil amendments are not considered necessary in those areas where sufficient growth media are available.

Chemical and physical changes can occur in stockpiled growth medium material. Following its replacement, growth medium samples would be analyzed for pH, nitrogen, phosphorus, and potassium to determine its fertility in nutrient status.

2.1.12.16 Seeding, Planting, and Mulching

Generally, seedbed preparation and seeding would take place in the fall after regrading of disturbed areas. All reclaimed areas would be broadcast seeded either with a cyclone-type bucket spreader or a mechanical blower. Broadcast seed would be covered by harrowing, raking, or other site-specific appropriate methods as necessary to provide seed cover and enhance germination. Reclaimed surfaces would be left in a textured or rough condition (i.e., small humps, pits, etc.) to enhance moisture retention and revegetative success while minimizing erosion potential.

Timing of revegetation activities is critically important to the overall success of the program. Seeding activities would be timed to take advantage of optimal climatic periods and would be coordinated with other reclamation activities. In general, earthwork and drainage control would be completed in the summer or early fall. Seedbed preparation would generally be completed in the fall, either concurrently with or immediately prior to seeding. Seeds would be sown in late fall to take advantage of winter and spring precipitation and optimum spring germination. Early spring seeding may be utilized for areas not seeded in the fall. In either case, seeding would not be completed when the ground is frozen or snow covered.

The seed list in Table 2-8, provided by the BLM, is based on known soil and climatic conditions and was selected to establish a plant community that would support the post-exploration land use. The mix is designed to promote plant species that can exist in the environment of northern Nevada, are proven species for revegetation, or are native species found in the plant communities prior to disturbance. Broadcast seeding would be at a rate of approximately 19.35 pounds per acre. The seed mixture would be certified pure live seed and weed free. Straw bales used for erosion control would also be certified as weed free.

Table 2-8: BLM-Approved Reclamation Seed Mix

Species		Application Rate (pounds of pure live seed per acre)
Common Name	Scientific Name	
Shrubs (select four at the listed application rates)		
Wyoming big sagebrush	<i>Artemisia tridentata wyomingensis</i>	0.10
Fourwing saltbush	<i>Atriplex canescens</i>	2.00
Spiny hopsage	<i>Grayia spinosa</i>	1.00
Forage kochia	<i>Kochia prostrata</i>	0.25
Low sagebrush	<i>Artemisia arbuscula</i>	4.00
Forbs (select three at the listed application rates)		
Scarlet globemallow	<i>Sphaeralcea coccinea</i>	0.50
Palmer penstemon	<i>Penstemon palmeri</i>	0.50
Lewis flax	<i>Linum lewisii</i>	1.00
Sweetvetch	<i>Hedysarum boreale</i>	2.00
Grasses (select three at the listed application rates)		
Crested wheatgrass	<i>Agropyron cristatum</i>	2.00
Indian ricegrass	<i>Achnatherum hymenoides</i>	2.00
Great Basin wildrye	<i>Elymus cinereus</i>	2.00
Bottlebrush squirreltail	<i>Elymus elymoides</i>	2.00
Total		19.35

Note: Prior to seeding, the final seed mix and application rates would be coordinated with the BLM and the BMRR.

2.1.12.17 Surface Facilities or Roads Not Subject to Reclamation

A portion of the existing pre-1981 Project access road would not be reclaimed. Areas that were widened or improved for the Project would be restored back to pre-project widths and conditions.

The stormwater diversion ditches upgradient of both the WRR and WRSF would be left in place permanently to prevent stormwater from entering these facilities.

Klondex may choose to leave the powerline, communications tower, and some buildings within the private land areas should they provide post-mining beneficial use and as per agreements with private land owners. If applicable, Klondex would coordinate with the BLM and the NDEP on the final facilities to remain. At this time, all facilities are assumed to be removed and reclaimed.

2.1.12.18 Post-Reclamation Monitoring and Maintenance

Yearly visits to the site would be conducted to monitor the success of the revegetation for a period of up to three years or until revegetation success has been achieved.

All reclamation work, with the exception of revegetation monitoring, would be completed no later than four years after the completion of activities under this Project. Klondex would conduct concurrent reclamation of disturbed areas once it is determined that the disturbance is no longer required for Project activities.

Access and maintenance roads would be ripped and recontoured as necessary. All disturbances would then be seeded with an approved certified weed-free seed mix at the appropriate time of year for optimum seed sprouting and plant growth. Seed would be broadcast or drilled at an appropriate rate and then raked. The reclaimed surfaces would be left in a textured or rough condition.

2.1.12.19 Isolation, Removal, or Control of Acid-Forming, Toxic, or Deleterious Materials

All refuse generated by the Project would be disposed at an authorized landfill facility off site, consistent with applicable regulations. No refuse would be disposed on site. Water or nontoxic drilling fluids, including abantonite, Alcomer 120L, bentonite, EZ-mud, polyplus, and super plug, would be utilized as necessary during drilling and would be stored at the Project.

Hazardous materials utilized at the Project Area would include bio-diesel fuel, diesel fuel, gasoline, and lubricating grease. Up to 10,000 gallons of bio-diesel fuel, 10,000 gallons of diesel fuel, and 5,000 gallons of unleaded gasoline would be stored in above-ground fuel tanks onsite. Approximately 100 pounds of lubricating grease would be stored on the drill rigs or transported by drill trucks. All containers of hazardous substances would be labeled and handled in accordance with the Nevada Department of Transportation (NDOT) and MSHA. In the event that a reportable quantity of hazardous or regulated materials, such as diesel fuel, is spilled, measures would be taken to control the spill, and the NDEPEmergency Response Hotline and the BLM MLFO Field Manager would be notified, as required. If any oil, hazardous material, or chemicals are spilled during operations, they would be cleaned up in a timely manner. After clean up, the oil, toxic fluids, or chemicals and any contaminated material would be removed from the site and disposed at an approved disposal facility.

Any seepage from the WRR and WRSF would be monitored and treated as necessary. The seepage containment system is lined and engineered to handle water with acidic characteristics. During final permanent closure planning for the Project, Klondex would evaluate the actual material placed on the waste storage facilities and develop a monitoring and treatment plan to manage seepage from the waste storage facilities.

2.1.12.20 Removal or Stabilization of Building, Structures, and Support Facilities

All equipment and supplies would be removed following completion of the Project. Materials, including scrap, trash, and unusable equipment, would be removed on a daily or weekly basis and disposed in accordance with federal and state regulations and laws.

2.1.12.21 Post-Closure Management

Post-closure management would commence on any reclaimed area following completion of the reclamation work for the area. Post-closure management would extend either until the reclamation of the site or component has been accepted by both the BLM and the BMRR. A three-year post-closure management period is assumed following completion of reclamation construction on any site. For sites reclaimed early in the operations, management of the reclaimed sites would occur concurrently with operational site management. Annual reports showing reclamation progress would be submitted to the BLM and the BMRR.

2.1.13 Period of Operation

The operations in this Plan would extend the Project life for four years related to underground mineral exploration and extraction and surface exploration. The transport of ore to an offsite facility for processing would continue for six months following the cessation of ore extraction. Reclamation and closure activities at the Project would take approximately four years. Post-closure management of seepage fluids from the WRR and WRSF would extend for approximately 12 months, although no seepage has been documented from the existing WRR.

2.1.14 Use and Occupancy

Under 43 CFR 3715.01, occupancy means full or part-time residence on the public lands. It also means activities that involve residence; the construction, presence, or maintenance of temporary or permanent structures that may be used for such purposes; or the use of a watchman or caretaker for the purpose of monitoring activities. Residence or structures include, but are not limited to, barriers to access, fences, tents, motor homes, trailers, cabins, houses, buildings, and storage of equipment or supplies.

Surface occupancy activities associated with this Project, including those activities covered under 43 CFR 3715, may include the following:

- Office trailers and temporary structures;
- Power infrastructure;
- Buildings;
- Storage areas;
- Groundwater wells; and
- Fencing around various facilities.

2.1.15 Applicant-Committed Environmental Protection Measures

Klondex would commit to the following environmental protection measures to prevent unnecessary or undue degradation during construction, operation, and reclamation of the Project. These measures are derived from the general requirements established in the BLM's Surface Management Regulations at 43 CFR 3809 and BMRR mining reclamation regulations, as well as water, air quality, and other environmental protection regulations.

Air Quality

- Emissions of fugitive dust from disturbed surfaces would be minimized by utilizing appropriate control measures. Surface application of water from a water truck is the current method of dust control.

Water Quality

- All drill holes would be surveyed and plugged as an operational procedure immediately after completion of drilling. Drill holes would be plugged in accordance with NRS 534, NAC 534.4369 and NAC 534.4371. If groundwater is encountered, the hole would be plugged pursuant to NAC 534.420.
- Stormwater Best Management Practices (BMPs) would be used at construction sites to minimize storm water erosion.

- Drill pads, sumps, and trenches would be reclaimed as soon as practicable after completion of logging and sampling.
- Drill cuttings would be contained on site and fluids managed utilizing appropriate control measures. Sediment traps would be used as necessary and filled at the end of the drill program.
- Klondex would follow the Stormwater Management Plan included in the Plan as Appendix D.
- Klondex would follow the Spill Prevention and Control Plan included in the Plan as Appendix E.
- Only non-toxic fluids would be used in the drilling process.
- Klondex would not conduct new activities causing surface disturbance within 100 feet of any active drainage, seep, or spring, with the exception of installing stream flow monitoring gauges, which would be used after consultation with the BLM.
- Regulated wastes would be removed from the Project Area and disposed in a state, federal, or local designated area.

Cultural and Paleontological Resources

- In the event that cultural resources would be discovered and impacted, Klondex would consult BLM and will comply with the regulations.
- Pursuant to 43 CFR 10.4(g), Klondex would notify the appropriate authorized BLM officer, by telephone, and with written confirmation, immediately upon the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony (as defined in 43 CFR 10.2). Further, pursuant to 43 CFR 10.4 Klondex would immediately stop all activities in the vicinity of the discovery and not commence again until a notice to proceed is issued by the authorized BLM officer.
- Any cultural resource discovered by Klondex, or any person working on their behalf, during the course of activities on federal land would be immediately reported to the authorized officer by telephone, with written confirmation. The permit holder would suspend all operations in the immediate area of such discovery and protect it until an evaluation of the discovery can be made by the authorized officer. This evaluation would determine the significance of the discovery and what mitigation measures are necessary to allow activities to proceed. Klondex would be responsible for the cost of evaluation and mitigation. Operations would resume only upon written authorization to proceed from the authorized officer.
- Klondex would not knowingly disturb, alter, harm, or destroy any scientifically important paleontological deposits. In the event that previously undiscovered paleontological resources are discovered by Klondex during the performance of any surface disturbing activities, the item(s) or condition(s) would be left intact and immediately brought to the attention of the authorized BLM officer. If significant paleontological resources are found, avoidance, recordation, and/or data recovery would be required.
- All eligible or unevaluated cultural resources would be avoided.

Migratory Birds

- To prevent violation of the Migratory Bird Treaty Act, Klondex would either conduct new surface disturbing activities outside the migratory bird nesting season (March 1 through July 31) or employ a qualified biologist to survey prospective work areas prior to surface disturbance during the nesting season. If active nests are found, the BLM would be notified to determine the appropriate disturbance buffer for the particular species' nest until the nest has fledged.

Greater Sage-Grouse

- From March 1 through May 15 of each year, Klondex would not conduct any surface disturbing activities within a 3.1-mile radius of any known active sage grouse lek/strutting ground.
- Annual lek surveys would continue to be conducted by a qualified biologist for the two Horse Heaven leks, both located within four miles of the Project Area.
- The disturbance to Greater Sage-Grouse habitat within the Project Area shall be coordinated with the BLM and NDOW and would follow current guidance from the BLM Nevada State Office. The mitigation shall be developed by resource agencies and included in the Decision Record.
- Klondex would mitigate disturbance to GRSG GHMA by applying the “avoid, minimize, and compensatory mitigation” process through an applicable mitigation system (MD MR 18). Further NEPA documentation will be prepared if necessary.

Wildlife

- All trenches, sumps, and other small excavations that pose a hazard or nuisance to the public, wildlife, or livestock would either be adequately fenced to preclude access or constructed with a sloped end for easy egress.
- The riparian area along Fire Creek would be avoided, with the exception of installing stream gauges.
- Ventilation fans would be installed underground to reduce noise disturbance to wildlife.
- No bat hibernacula or maternal roost sites were detected during surveys; however, if bat hibernacula or maternal roost sites are detected during operations, Klondex would implement a 50-meter disturbance buffer. If disturbance needs to be within this buffer zone, another bat survey would be completed and if bats are detected, a BLM and NDOW biologist would be contacted to decide the proper actions or buffers to protect the bats.

Public Safety and Access

- Public safety would be maintained throughout the life of the Project. All equipment and other facilities would be maintained in a safe and orderly manner.
- Drill sites, sumps, and excavations would be reclaimed as soon as practicable after completion of sampling and logging.

- Any survey monuments, witness corners, or reference monuments would be protected and avoided, if possible.
- Pursuant to 43 CFR 8365.1-1(b)(3) and 43 CFR 3809.420(b)(5 and 6), no sewage, petroleum products, or refuse would be dumped from any trailer or vehicle.
- All regulated wastes would be removed from the Project Area and disposed in a state, federal, or local designated area.
- All applicable state and federal fire laws and regulations would be complied with, and all reasonable measures would be taken, to prevent and suppress fires in the Project Area.
- Final reclamation of overland travel routes, sumps, and drill sites would consist of, if required, fully recontouring disturbances to their original grade, and reseeding in the fall season immediately following completion of exploration activities or when access to the drill pads are no longer needed.
- In the event that any existing roads are severely damaged as a result of Klondex activities, Klondex would return the roads to their original condition.

Vegetation

- Reseeding would be consistent with all BLM recommendations for seed mix constituents, application rate, and seeding methods.

Noxious Weed Control Measures

- Klondex would follow the Noxious Weed Management Plan included in the Plan.
- Klondex would identify noxious weeds in the Project Area according to BLM-provided booklets and pamphlets.
- Klondex would ensure that all equipment is “weed free” (by washing or other means) before traveling to and from the Project Area so that noxious weeds are not spread to new locations.
- When noxious weeds are encountered in the Project Area, Klondex would document the location and extent, which would be provided to the BLM as soon as possible.
- Klondex would obtain approval from the authorized BLM officer prior to any herbicide application.
- Klondex would contact the Mount Lewis Field Office’s noxious weed program lead regarding any issues concerning noxious weeds.

To prevent and control the introduction and spread of noxious weeds within the Project Area during reclamation activities, Klondex would implement the following prevention and control practices:

- Stay on existing roads to and from the mine site and in the Project Area;
- Soil (growth media) disturbance would be minimized to the extent practicable, consistent with Project objectives;
- Growth media would be stockpiled and used in reclamation;

- Disturbed sites would be revegetated as soon as practicable when exploration work is completed. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching as necessary;
- The seed mixture used in reclamation activities would be certified pure live seed and weed free. Straw bales used for erosion control would also be certified as weed free; and
- Klondex would survey the Project Area semi-annually for invasive weed species. If a limited amount of weeds are discovered, they would be pulled, placed in a plastic bag, sealed, and disposed of properly. For more intensive infestations, Klondex would consult with the BLM on containment of eradication measures. In addition, if Russian knapweed is found or another particular species that would not respond well to hand-pulling, the BLM would be consulted for appropriate eradication methods.

2.2 No Action Alternative

Under the No Action Alternative, operations would continue as currently authorized. This section presents a summary of the current authorized operations and existing conditions at the Project. Additional details are included in the 2009 and 2014 Plans of Operation and supporting NEPA documentation. In addition, the Project is operating under WPCPs #NEV2007104 and #NEV2013102 on file with the Regulation Branch of the NDEP-BMRR.

2.2.1 Authorized and Existing Surface Disturbance

A total of 150 acres of surface disturbance is currently authorized for the Project of which approximately 150 has been utilized, with less disturbance than authorized on public lands and more on private land controlled by Klondex.

2.2.2 Underground Exploration and Test Mining

The current authorized activities include advanced underground exploration and test mining. The current test mining is conducted by the end slice stoping method. A stope is the open space created when mineralized material and waste rock is extracted. Backfill is needed for support and to close areas where no additional exploration or test mining would be conducted. The amount of material that can be removed prior to backfilling is constrained by the strength of the surrounding material and jointing present immediately adjacent to the stope. The stopes are backfilled from the drift used for drilling and blasting. Based on geochemical characteristics, waste rock is retained within the underground mine workings and not brought to the surface for mixing prior to being used as backfill. Cemented rock fill, which consists of screened mine waste, fly ash, and cement is mixed on the surface and transported underground in the same trucks used to haul blasted rock to the surface. Normal backfill is mixed to achieve desired compressive strengths and neutralization by blending a mixture containing up to four percent cement and fly ash, but can contain up to eight percent cementitious binder when additional test mining is anticipated to occur below the backfilled stope.

2.2.3 Ore Storage and Hauling

Ore is currently stockpiled on the upper portion of the existing WRR, which is designed to contain PAG material. As permitted, the ore capacity would not exceed 36,000 tons of ore stored at any one time and the ore is shipped off within a six-month period. The ore stockpile is maintained in a condition that can be easily shaped, capped, a reclaimed as part of the overall reclamation plan at any given point during operation, should operations cease. The ore is

currently being shipped to the mill at the Midas Mine located in Elko County, Nevada for processing and testing.

2.2.4 Waste Rock Management

The initial waste rock encountered during the development of the decline was non-acid generating and used as construction fill and as a base of the existing WRR. The WRR is an engineered permanent facility where waste rock is hauled from the decline and end dumped. As PAG materials were encountered, they were placed on the upper lift of the WRR and two-feet of non-PAG material or alluvial material was placed on top of this material. During reclamation, a three-foot cover of stockpiled growth material would cover the WRR. Approximately 145,000 cubic yards of waste rock is associated with the existing authorized mine activity. Approximately 70,000 to 100,000 cubic yards of the waste rock has been, or would be, placed on the WRR and the remainder has been, or would be, used as underground and construction backfill. Backfill used underground as needed to support the mining methods and stabilize non-active workings is mixed with cement and fly ash that is prepared at the batch plant near the portal.

2.2.5 Water Management Practices

There are currently three sources of water encountered at the Project: 1) underground water that meets NDEP Profile I reference values; 2) underground water that does not meet NDEP Profile I reference values; and 3) precipitation. The water from the underground mine that does not meet NDEP Profile I reference values is pumped to the surface and is treated to meet the Profile I standard. Underground water that meets Profile I is stored underground in Underground Containment Dam 1 (UCD-1). Water that is treated in the treatment plant to meet the Profile I standard can be discharged in Project's RIBs or used for dust suppression. The total capacity of the pond system is approximately 2.57 million gallons. The maximum current inflow of water into UCD-1 and Dewatering Storage Pond #1 is up to 100 gpm. Klondex only discharges to the RIBs once enough water meeting the Profile I standard has been stored in the water management system and in UCD-1. The RIBs were sized to handle flow from the pond system and UCD-1 combined. The purpose of retaining water at the surface and only discharging intermittently is to facilitate better RIB and pipeline maintenance and ensures best water management techniques.

2.2.6 Existing and Authorized Facilities

The following sections describe the existing and authorized mine facilities associated with Project operations as shown on Figure 1-3.

2.2.6.1 Underground Portal and Workings

The existing underground portal has an elevation of approximately 5,787 feet amsl and is an average of 16 feet wide by 14 feet in height. The existing underground workings (as planned through 2015) measure a length of 17,817 feet and extend to a depth of 628 feet below the portal elevation (5,159 feet amsl). The workings include the main portal that provides access to the active workings. The facilities underground include but are not limited to an explosives storage area, emergency support system, ventilation duct, sumps, and water piping.

2.2.6.2 Ventilation Raise and Hoist

The ventilation raise connecting the main decline to the surface is approximately 690 feet in length and eight feet in diameter with a completed working opening measuring six feet in diameter. The opening is entirely lined with corrugated metal pipe to support the ribs and maintain a uniform cross sectional area. Since the vertical extent of the raise exceeds the maximum 300 feet permitted for a continuous ladder way, the raise has been equipped with an automatic hoist and personnel capsule for evacuating the mine in the event of an emergency.

2.2.6.3 Waste Rock Repository

The existing WRR is an engineered permanent facility located north and east of the underground portal. The WRR was originally engineered to store up 135,000 cubic yards of waste rock in two lifts. An additional 10-foot high lift was permitted in 2014 and increased the capacity of the facility to 145,000 cubic yards of waste rock. This capacity also accounts for a temporary ore storage stockpile of 30,000 cubic yards. Klondex has projected that the capacity left on the WRR would be consumed by the end of 2015.

Based on the engineering design report (SRK, 2008), the WRR is designed to handle PAG materials and is constructed on a foundation of a one foot layer of compacted soil with permeability no greater than 1.0×10^{-6} centimeters per second (ASTM D 5084) from a clay borrow source within the existing Plan boundary. All seepage and runoff is collected in a stormwater pond at the southern toe of the WRR. A fluid collection and recovery system consists of a network of collection pipes and lined channels to direct seepage and excess stormwater flow into the Stormwater Pond #1. No seepage has been documented to date.

2.2.6.4 Water Management Ponds

The Project currently utilizes three ponds for water management and storage as described below.

Dewatering Storage Pond #1

Dewatering Storage Pond #1 is designed to contain 60 days of dewatering from the underground workings at a rate of 25 gpm, for a total capacity of approximately 2.1 million gallons. Flows into the pond are from two sources, including dewatering water from the underground workings and direct precipitation within the pond perimeter. The pond is constructed within a composite liner with a geomembrane, an impermeable membrane used to block the migration of fluids, over a compacted low-permeability soil layer. An active evaporation system is in place for this pond consisting of a submersible pump system. The footprint of Dewatering Storage Pond #1 measures approximately 225 feet long by 160 feet wide and is 16 feet deep.

Stormwater Pond #1

Stormwater Pond #1 has an operating volume of approximately 470,000 gallons and is designed to provide storage for non-contact diverted stormwater and to reject water from the water treatment plant. Water is delivered to this pond in a four-inch diameter high-density polyethylene (HDPE) pipe from the water treatment system. An active evaporation system is in place for this pond consisting of a submersible pump system. The pond is constructed within a composite liner with a geomembrane over a compacted low-permeability soil layer. The footprint of the Stormwater Pond #1 measures approximately 161 feet long by 115 feet wide and is 12.5 feet deep.

Fire Water Pond

The Fire Water Pond (Emergency Pond) measures 76 feet by 72 feet wide and is 15 feet deep. Water stored in this lined pond for emergency use is piped from either the treated water from the water treatment system or from the production well at the site (PW-1).

2.2.6.5 Water Treatment System

The water treatment system in operation at the Project uses a two stage treatment process beginning with microfiltration (MF) and then reverse osmosis (RO). Underground contact water is stored in the Dewatering Storage Pond #1 prior to treatment and then pumped into a 5,000-gallon Raw Water Tank and injected with sodium hypochlorite and ferric chloride as a pre-treatment. The pre-treated water is then pumped directly into the MF units and then to the RO units where a biocide, sodium bisulfite, and antiscalent is added to the water. The water runs through two stages of RO and is pumped to the permeate tanks with pH adjustment injective of sodium hydroxide or sulfuric acid, to neutralize pH as necessary. The water is pulsed by air and sent to another 5,000-gallon holding tank. Once the tank is full, the water is pumped through polymer injection and sent into a Geotube where the solids remain trapped. The clean water meeting NDEP Profile I standards is released back into Stormwater Pond #1. The main target constituents for the treatment system are nitrates, arsenic, antimony, sulfate, silica, total dissolved solids (TDS), and metals. The treatment system is continually under evaluation to ensure the water quality is meeting permit requirements and the system is subject to upgrade or replacement to meet Project requirements.

2.2.6.6 Rapid Infiltration Basins

Two RIBs have been constructed in the lower alluvial fan area in the eastern portion of the Plan boundary north of the access road. The RIBs were designed to measure 210 feet long by 100 feet wide and have a depth of 30 feet. The maximum proposed flow to the RIBs is 3,000 gpm, but the Project expects to discharge to the RIBs at an average rate of less than 1,000 gpm and only when the pond system reaches capacity of water meeting NDEP Profile I standards. Approximately 9,926 linear feet of gravity pipeline runs from the water treatment plant to the RIB system. The pipeline consists of an eight-inch diameter HDPE pipe.

2.2.6.7 Drainage and Sediment Control Structures

Best Management Practices (BMPs) for sediment control are effective for construction, operation, and reclamation in order to minimize sedimentation from disturbed areas (NDEP, 1994). A series of diversion ditches were constructed in the small drainage and along the side slopes above the WRR to divert any water that may run onto or under this facility. These diversions were engineered to handle a 100-year 24-hour storm event and were armored in areas of steeper gradient with rock material.

2.2.6.8 Stockpiles and Borrow Area

Growth Media Stockpiles

Two growth media stockpiles are present onsite. One is associated with the RIB area and the other is associated with the mine operations area.

Borrow Area

A borrow area located west of the RIBs on public land and was previously authorized in the 2009 Plan of Operations to measure approximately 26.88 acres and then revised in the 2014 Plan

Modification to 14.7 acres since borrow material was available from the RIB construction. This borrow area has not been constructed to date, and the acreage has been used for other facilities. Therefore, the borrow area is included in the proposed facilities under this Plan, located beneath the RIB growth media stockpile.

2.2.6.9 Buildings and Structures

The following buildings and structures are present or authorized at the Project:

- Truck shop (steel construction, measures 80 feet by 50 feet with a six-inch thick concrete slab);
- Truck wash bay (steel construction, measures 80 feet by 60 feet with a six-inch thick concrete slab);
- Core shed and storage area (steel construction, measures 80 feet by 100 feet with a six-inch thick concrete slab);
- Electrical equipment housing concrete pad (measures 35 feet by 20 feet and is six inches thick);
- Electrical substation concrete pad (measures 15 feet by 20 feet and is six inches thick).
- Portable offices and trailers (no concrete slab);
- Portable security trailer (no concrete slab); and
- Fencing is installed around the RIB facilities.

2.2.6.10 Power Supply

The main power supply for the Project ties into an existing NV Energy transmission line that feeds Crescent Valley. A substation was constructed along the north side of the Project access road within to serve the connection to the Project. The powerline measures approximately 2.77 miles in length and runs from the substation along the access road to a substation near the underground portal. Distribution lines within the operations area serve the production water well, office trailers and shops, communications site (underground), and hoist. Back-up generators are also present onsite.

2.2.6.11 Water Supply

One production well (PW-1) is located west of the portal and provides dust control water and operations water to the site. Due to the artesian conditions of the well, no water storage tank is needed and trucks connect directly to the well.

Klondex currently has certified underground water rights under three permits at the Project for a total of 0.446 cubic feet per second (cfs) (approximately 200 gpm) not to exceed approximately 282 acre-feet annually. The current permitted underground water right is approximately 200 gpm (annualized average) of which approximately 100 gpm are categorized Mining, Milling, and Domestic use and approximately 100 gpm are categorized as Dewatering. The dewatering rate from the underground workings currently averages less than 30 gpm, but does not exceed 100 gpm.

2.2.6.12 Monitoring Wells

There are currently nine groundwater monitoring wells permitted at the Project, eight of which have been installed. Table 2-9 is a summary of the monitoring well details currently authorized and existing for the Project as shown on Figure 1-3.

Table 2-9: Permitted Monitoring Well Specifications

Well ID	Coordinates*		Casing Size (inches)	Total Depth (feet)	Purpose
GW-1	4479652	529323	2	790	Site Upgradient Monitoring
GW-2	4478528	530006	2	200	WRR Downgradient Monitoring
GW-3	4478701	531688	2	610	Site Downgradient Monitoring/RIB Upgradient
GW-4	4479273	532337	4	534	RIB Downgradient Monitoring
GW-5	4478580	534444	4	245	RIB Downgradient Monitoring
GW-6	4478348	535971	4	125	RIB Downgradient Monitoring
GW-7	4479366	530168	4	460 (Backfilled to 225 feet and constructed)	WRSF Upgradient Monitoring
GW-8	4480670	528820	4	520	Replace GW-1 data
GW-9**	4479008	529160	4	TBD	Hydrogeologic/Hydrology Data

*Coordinates are in Universal Transverse Mercator (UTM), North American Datum (NAD) 1983, Zone 11

** Not yet drilled; TBD = to be determined

2.2.6.13 Access Road and Project Roads

Project Access Road

Klondex has approval to improve and widen the access road from the Lander County line through the Plan boundary from 15 feet to a running surface of 25 feet, where needed, installing drainage ditches and culverts, graveling and grading, also as needed. The improvements to the road would be permanent. Klondex is currently working with Eureka County on the maintenance of County Road G-247, which connects the Project access road to State Highway 306. Klondex is currently conducting dust control activities with the use of a water truck, magnesium chloride, or other dust suppressant (particularly in the area of residences near Highway 306). Klondex would continue to coordinate with the Lander County and Eureka County road superintendents prior to any maintenance activities.

Project Roads

Various roads are present within the Plan boundary for light-vehicle truck travel and haulage of material, which are approximately 15 feet wide. Roads are all constructed per MSHA regulations.

2.2.7 Surface Exploration

Surface exploration at the Project is currently conducted with up to four drill rigs, either core drill rigs or reverse circulation drill rigs. Drill holes average approximately 1,200 feet in depth.

The exploration roads and spurs average a 20-foot width including berms and sidecast materials. Drill pads measure an average of 40 feet by 60 feet including sumps which measure 10 feet by 15 feet by six feet deep. Not every pad has a sump as some drill holes may utilize the same sump depending on the proximity of the drill site. Prior to approval of this Plan, surface exploration would be conducted only on previously approved and disturbed areas.

A core storage area was planned along the Project access road on private land, but was not constructed. The core storage was relocated to be within the RIB operations area footprint, the building associated with permitted core storage area was not constructed.

2.2.8 Workforce

Klondex currently employs 63 personnel at Fire Creek associated with the current operations. In addition, 30 contractors perform underground test mining and exploration, drilling, maintenance and security operations for the Project. Table 2-10 represents the current employment levels by job classification.

Table 2-10: Current Employment by Job Type

Job Classification	Number of Employees
Operations	42
Geology/Engineering	15
Administration	6
Contractors: mining, maintenance, drilling, security	30
Total	93

2.2.9 Equipment

The equipment currently used on the Project as outlined in the 2009 and 2014 Plans is listed in Table 2-11.

Table 2-11: List of Current Project Equipment Types and Quantities

Type of Equipment	Number of Units
Underground Equipment	
Load-haul-dump (LHD) unit (4 cubic yards)	5
LHD unit (6 cubic yards)	3
Haulage trucks, 20 to 40-ton capacity	4
Jumbo-mounted blast hole rig	2
Rock bolting portable platform	2
Rock bolter	4
Scissor deck	2
Rammer-jammer for placing backfill	3
Portable diesel start-up/back-up generator (500 kilowatt class)	2
Diesel and/or electric powered air compressor	2
Core drill	2
Supply vehicle for explosives	2
Underground equipment, supply, and manpower transportation - light vehicle/tractor	6
Long-hole drill for stope mining/dewatering drains	5
Equipment maintenance/lube vehicle (underground and surface)	3
Emergency vehicle	1

Type of Equipment	Number of Units
Explosives loader	4
Boom jumbo	4
Grader	1
Concrete transmixer	3
Concrete pump	3
Shotcrete machine	3
Surface Equipment	
Water Truck	3
Pipe Truck	2
Portable light plant	4
Light 4x4 pick-up	10
Drill Rig (Core or Reverse Circulation)	2
Cat D8, or equivalent, dozer	1
320L, or equivalent, excavator	1
Forklift	5
Loader	2
Booster truck	2

2.2.10 Solid and Hazardous Waste Management

All refuse generated by the Project is placed in bins which are disposed at an offsite landfill or facility consistent with applicable regulations.

Klondex uses a variety of fuels and reagents for Project operations. These materials are transported and transferred from trucks to the container/containment vessel onsite. All materials and wastes are stored, used, and disposed according to federal and state regulations. Table 2-12 lists the types and quantities of fuels and reagents currently used to support Project operations.

Table 2-12: Summary of Current Fuels and Reagent Usage

Type	Storage Amount	Storage Method	Use
Diesel Fuel	5,000 gallons	Above ground storage tanks	Equipment, vehicles, mix with explosives
Unleaded Gasoline	100 gallons	Fuel totes	Light vehicles
Motor Oil	275 gallons	55-gallon drums	Equipment, vehicles
Lubricants	100 pounds	On drill rigs	Equipment, vehicles
Antifreeze	275 gallons	55-gallon drum	Equipment, vehicles
Sodium hydroxide	330 gallons	5-gallon bucket	Water treatment plant
Antiscalant	110 gallons	5-gallon bucket	Water treatment plant
Sulfuric acid	110 gallons	5-gallon bucket	Water treatment plant

2.2.11 Period of Operation

Current operations at the Project run 24 hours per day, seven days per week, 365 days per year. Surface exploration drilling could continue within the existing permitted disturbance.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

Waste Rock Storage Facility Siting Alternative

Klondex conducted a feasibility study to assess multiple locations for the placement of the proposed WRSF within the Project Area. A total of four location alternatives were analyzed. Two of the alternatives had preliminary engineering design completed and included expanding the existing WRR to the east to include the new facility. Both of these alternatives did not use the valley fill approach that the proposed WRSF does. A third location was near the headwaters of the Fire Creek drainage and a fourth one location was in the alluvial fan area in the eastern portion of the Project Area near the RIBs. The two WRR expansion alternatives did not accommodate upland stormwater management and had a larger disturbance footprint. The alternative located by the RIBs was not selected as there were multiple cultural resource sites in that area. The Fire Creek drainage alternative was not selected because this is an active drainage that channels water from a spring whereas the valley and drainage the proposed WRSF is located is ephemeral in nature and only channels stormwater runoff.

In summary, the proposed location of the WRSF was selected to move forward because it was located in a natural valley, which allows for a robust stormwater and seepage collection system. The seepage during closure can be collected at one central point at the toe of the WRSF. This design also had the smallest surface disturbance footprint and had avoided the Fire Creek drainage and had the least potential impact on known cultural resources.

Active Dewatering Alternative

Early in the planning process, Klondex considered installing dewatering wells to dewater the underground workings. It was determined that active dewatering was not necessary to support the mine plan at this stage. In addition, active dewatering may have had a potential effect on the Fire Creek Spring that feeds the Fire Creek drainage, whereas the Proposed Action maintains the existing water management practices and dewatering rates as currently authorized and analyzed. Therefore, this alternative was not brought forward for further evaluation.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

Supplemental authorities that are subject to requirements specified by statute or executive order (EO) must be considered in all BLM documents. Table 3-1 lists the elements and their status as well as the rationale to determine whether an element present would be affected by the Proposed Action. Supplemental authorities that may be affected by the Proposed Action are analyzed in this chapter following the discussion of the Affected Environment for each element, resource, or land use. Those elements listed under the supplemental authorities that do not occur in the Project Area, would not be impacted by the Proposed Action or alternatives are not discussed or analyzed further in this EA. The elimination of nonrelevant issues follows CEQ regulations, as stated in 40 CFR 1500.4.

Table 3-1: Supplemental Authorities to be Considered

Supplemental Authority Element	Not Present	Present/ Not Affected	Present/May Be Affected	EA Section Number or Rationale for Elimination
Air Quality			X	Section 3.3
Areas of Critical Environmental Concern (ACEC)	X			Would not be affected. No ACECs occur near the Project Area. This element is not analyzed further in this EA.
Cultural Resources			X	Section 3.4
Environmental Justice	X			Based on a review of existing baseline data, no minority or low-income groups would be disproportionately affected by health or environmental effects as a result of the implementation of the Proposed Action. This element is not present within the Project Area or vicinity. This element is not analyzed further in this EA.
Farm Lands (prime or unique)	X			Would not be affected. No prime or unique farmlands occur near the Project. This element is not analyzed further in this EA.
Fish Habitat	X			Would not be affected. No essential fish habitat is present in the Project Area or vicinity. This element is not analyzed further in this EA.

Supplemental Authority Element	Not Present	Present/ Not Affected	Present/May Be Affected	EA Section Number or Rationale for Elimination
Floodplains	X			Would not be affected. Proposed activities would not alter natural floodplains. The Project Area is not located within Flood Emergency Management Agency zone. This element is not analyzed further in this EA.
Forests and Rangelands (Healthy Forest Restoration Act [HFRA] only)	X			Would not be affected. The Project does not meet the requirements to qualify as a HFRA project. This element is not analyzed further in this EA.
Human Health and Safety (Herbicide Projects)	X			Herbicides may be used in the Project Area in accordance with Klondex's Weed Management Plan and consultation with the BLM; however, Executive Order 13045 would not apply to this Project as herbicides and pesticides would not be used in locations where children would be exposed. This element is not analyzed further in this EA.
Migratory Birds			X	Section 3.5, Wildlife Resources
Native American Cultural Concerns		X		Section 3.6
Noxious Weeds, Invasive and Non-native Species			X	Section 3.7
Threatened and Endangered Species (Plants and Animals)	X			Would not be affected. No federally listed threatened or endangered species have been identified or have the potential to occur in the Project Area or vicinity. This element is not analyzed further in this EA. Reference Section 3.5 for other special status species, including Greater Sage-Grouse
Wastes and Materials, Hazardous or Solid			X	Section 3.8
Water Quality, Surface/Groundwater			X	Section 3.9, Water Resources
Wetlands and Riparian Zones		X		Section 3.9, Water Resources

Supplemental Authority Element	Not Present	Present/ Not Affected	Present/May Be Affected	EA Section Number or Rationale for Elimination
Wild and Scenic Rivers	X			Would not be affected. No wild and scenic rivers occur in the Project Area or vicinity. This element is not analyzed further in this EA.
Wilderness/Wilderness Study Areas (WSAs)/ Lands with Wilderness Characteristics	X			Wilderness or WSAs are not present within the Project Area. The BLM conducted a Lands with Wilderness Characteristics inventory (NV-060-499) in 2012 and 1980 and determined that no lands with wilderness characteristics are present in the Project Area. These elements are not analyzed further in this EA.

In addition to the elements listed under supplemental authorities, the BLM considers other important resources and uses that occur on public lands in which impacts may occur from implementation of the Proposed Action. Other resources or uses of the human environment that have been considered for this EA are listed in Table 3-2. Resources that may be affected by the Proposed Action are analyzed in this chapter following the discussion of the Affected Environment for each resource or use.

Table 3-2: Other Resources and Land Uses to be Considered

Other Resource/ Land Uses	Not Present	Present/ Not Affected	Present/May Be Affected	EA Section Number or Rationale for Elimination
Fish and Wildlife (General)			X	Section 3.5, Wildlife Resources
Geology and Minerals		X		No potential impacts were identified, but a discussion of the geologic setting is provided in 3.2 for reference.
Grazing Management			X	Section 3.10
Land Use Authorizations		X		Would not be affected. Existing land use authorizations are present within the Project Area, but no changes are proposed and these authorizations would not be affected by the Project. This resource is not analyzed further in this EA.
Noise		X		Potential effects related to wildlife are analyzed in Section 3.5, Wildlife Resources.

Other Resource/ Land Uses	Not Present	Present/ Not Affected	Present/May Be Affected	EA Section Number or Rationale for Elimination
Paleontological Resources	X			The BLM resource model was queried and geologic maps consulted. The formations in the Project Area are volcanic and in nature and do not have the potential to host significant paleontological resources. This resources is not analyzed further in this EA.
Recreation			X	Section 3.11
Social and Economic Values			X	Section 3.12
Soils			X	Section 3.13
Special Status Plant Species	X			Would not be affected. No special status plant species have been observed and based on habitat conditions have the potential to occur within the Project Area. This resource is not analyzed further in this EA.
Special Status Fish and Wildlife Species			X	Section 3.5, Wildlife Resources
Transportation, Access, and Public Safety			X	3.14
Vegetation			X	3.15
Forestry and Woodland Resources	X			Would not be affected. No forestry or woodland resources are present within the Project Area. This resource is not analyzed further in this EA.
Visual Resources		X		Section 3.16
Water Quantity		X		Would not be affected. No change to existing and authorized water usage, dewatering rates, or discharge rates are proposed. This resource is not analyzed further in this EA.
Wild Horses and Burros	X			Would not be affected. The Project Area is located outside the boundaries of designated herd management areas. This resource is not analyzed further in this EA.

3.2 General Setting

3.2.1 Physiography

The Project landscape is typical of the volcanically-dominated portions of the Basin and Range Province of western Nevada. Elevations within the Plan boundary range between approximately 4,950 feet and 7,250 feet amsl. The topography of the area consists mostly of rounded hills with steeper grades along more competent strata. East of the Project is Crescent Valley, a playa-centered basin. The Project is located on the United States Geological Survey (USGS) Mud Spring Gulch 7.5-minute topographic quadrangle.

3.2.2 Geology and Hydrogeology

The Project is located in the northeast flank of the Shoshone Range on the Malpais Rim, within the structural domain of the northern Nevada rift (NNR). The NNR is thought to originate at the McDermitt caldera in northwest Nevada and is related to the initial impingement of the Yellowstone hot-spot on the North America Plate. The NNR is bounded by northwest-trending regional en-echelon normal faults. Along strike of these faults are a series of intersecting sub-parallel, northeast-trending, high-angle normal faults.

Stratigraphy at the Project subject to mining and exploration is characterized by a series of Miocene basalt, andesite and dacite flows, tuffs, and pyroclastic rocks approximately 1,500 feet thick. These overlay older Paleozoic clastic sediments. Mineralization at the Project is predominately sub-vertical in geometry, controlled by faults, fault zones, and mafic dikes. Figures 3-1 and 3-2 illustrate the geologic setting in the Project Area and vicinity.

Current underground workings begin at the portal that is collared in the lowermost lava beds of the Horse Heaven Formation and continue down section through the Fire Creek Sequence. Mining may extend into the lower tuffs and basalts. Occurring through the package of rock is multiple types of heterogeneous alteration with varying intensities. For the purpose of rock characterization, the formations have been classified into mineable units by rock type and alteration as listed in Table 3-3.

Table 3-3: Rock Types at the Fire Creek Mine

Formation		
<ul style="list-style-type: none"> • Fire Creek Sequence • Lower Tuffs and Basalt 	Tuff	Weak or No Alteration
		Strong Argillic
<ul style="list-style-type: none"> • Horse Heaven • Fire Creek Sequence • Lower Tuffs and Basalt 	Basalt	Weak or No Alteration
		Strong Argillic

This fractured and altered volcanic stratigraphy creates a structure that compartmentalizes the flow of groundwater due to flow barriers created by stratigraphy, altered units and major faults. The argillically-altered units decompose to clay with very low permeability, as observed in core from numerous exploration drill holes. Compartments of water-bearing units such as fractured basalts can become isolated from each other by such hydraulic barriers.

Observations during exploration indicate these compartments have low water storage and are quickly dewatered. Observations also indicate isolated areas of persistent, yet small, groundwater inflows to the mine. These conditions account for an average dewatering rate of 15 to 20 gpm from the underground workings. The compartmentalized groundwater and persistent groundwater inflow are associated with the Fire Creek Sequence. In addition, perched groundwater conditions that fluctuate with seasonal precipitation exist in the upper Horse Heaven Formation.

The same major faults that appear to control mineralization also exhibit flow barrier properties as well as limit the flow of water into the workings. The primary underground area of interest for mining and exploration is situated between two major faults, the Alimak Fault to the west and the Muleshoe Fault to the east. This has created a relatively isolated hydrogeologic compartment. The Fire Creek spring and known areas with higher groundwater flow rates and movement are located outside of this compartment.

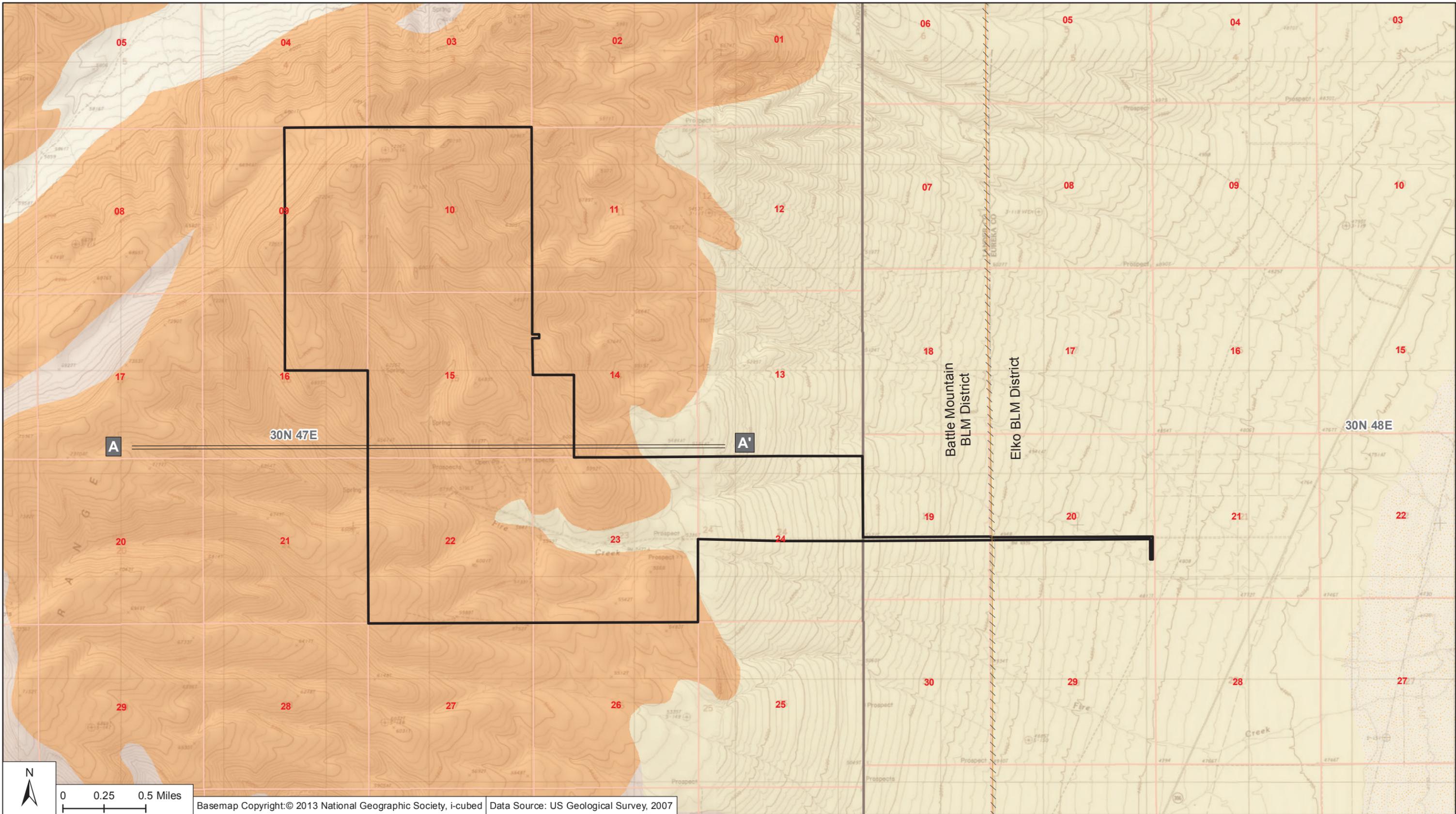
Geologic resources are presented to provide information on the Project setting and support other resource analyses. Impacts to geology and minerals were not identified and not further analyzed in this EA.

3.3 Air Quality

The analysis area for direct and indirect impacts to air quality is the Project Area, including the existing Plan boundary and proposed Plan boundary expansion, the Project access road, and the ore transportation route.

Project activities that would result in a potential increase in air emissions primarily associated with additional surface disturbance, vehicle and equipment exhaust emissions, and vehicle travel on dirt roads (fugitive dust). An air quality analysis was performed by Air Sciences, Inc. (2015) to assess the proposed activities in relationship to ambient air quality standards.

Ambient air quality standards are maximum concentrations of pollutants in ambient air that are considered protective of the public health. These standards are established by environmental regulatory authorities for air pollutants with known or anticipated human health effects. The total ambient concentrations (modeled concentrations plus applicable background concentrations) estimated in this analysis are compared to the National Ambient Air Quality Standards (NAAQS), promulgated by the U.S. Environmental Protection Agency (EPA), and to the Nevada Ambient Air Quality Standards (NvAAQS), for compliance demonstration. The NAAQS and NvAAQS, in units of parts per million (ppm) and/or micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), are presented in Table 3-4.



Basemap Copyright:© 2013 National Geographic Society, i-cubed | Data Source: US Geological Survey, 2007

LEGEND

- Project Area
- A-A' Cross-section
- BLM District Boundary
- Qal - Alluvium, undifferentiated
- Qpl - Playa, lake bed, and flood plain deposits
- QToa - Older alluvium and alluvial fan deposits (Pleistocene and Pliocene)
- Tba - Andesite and basalt flows (Miocene and Oligocene)
- Ts3 - Younger tuffaceous sedimentary rocks (Pliocene and Miocene)
- Township/Range
- Section

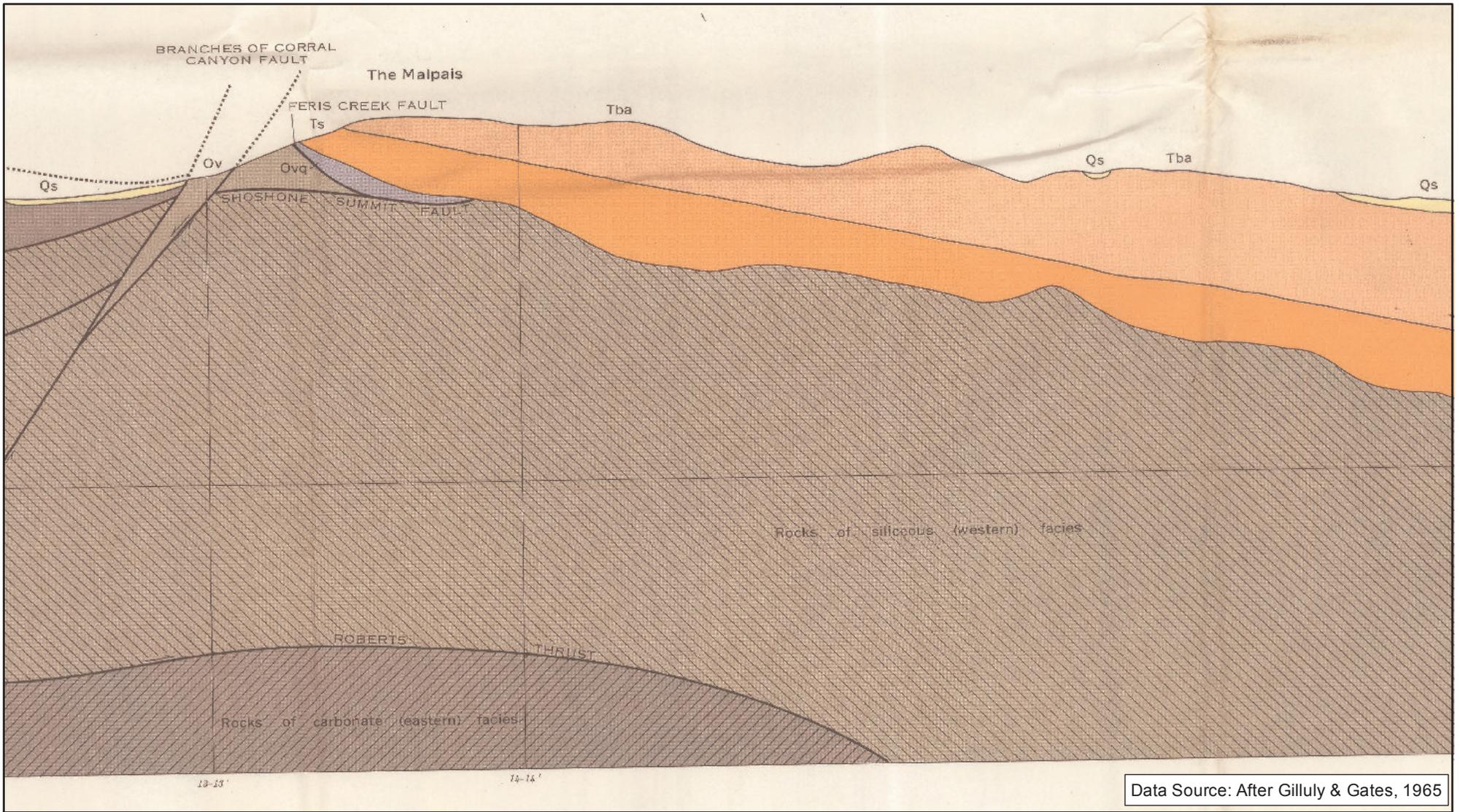


No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

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BUREAU OF LAND MANAGEMENT
FIRE CREEK MINE PROJECT
Environmental Assessment
DOI-BLM-NV-B010-2015-0062-EA
 Regional Geology
 Figure 3-1
 10/23/2015

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LEGEND

- Qs - Quaternary Sedimentary Rocks (Alluvial-Fan and Flood-Plain Deposits)
- Ts - Tertiary Sedimentary Rocks (Younger Tuffaceous and Minor Volcanics)
- Tba - Basaltic Andesite Flows
- Ovq - Quartzite
- Ov - Undifferentiated Sandstone, Shale, and Other Lithologies
- Ce - Eldorado Dolomite

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



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BUREAU OF LAND MANAGEMENT

FIRE CREEK MINE PROJECT
Environmental Assessment
DOI-BLM-NV-B010-2015-0062-EA

Geologic Cross-Section
 Figure 3-2
 10/23/2015

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Table 3-4: National and State of Nevada Air Quality Standards

Pollutant	Averaging Period	Nevada Standards	National Standards	
		Concentration ($\mu\text{g}/\text{m}^3$)	Primary ($\mu\text{g}/\text{m}^3$)	Secondary ($\mu\text{g}/\text{m}^3$)
Ozone	1-hour	235	NA	NA
	8-hour	157	157	157
Carbon monoxide (CO)	1-hour	40,000	40,000	40,000
CO at or less than 5,000 feet amsl	8-hour	10,000	10,000	10,000
CO at or greater than 5,000 feet amsl	8-hour	6,670		
Sulfur dioxide (SO ₂)	1-hour	NA	196	None
	3-hour	1,300	None	1,300
	24-hour	365	365	None
	Annual average	80	80	None
Nitrogen dioxide (NO ₂)	1-hour	--	189	None
	Annual average	100	100	100
PM ₁₀	24-hour	150	150	150
	Annual average	50	NA	NA
PM _{2.5}	24-hour	35	35	35
	Annual average	12	12	15
Lead	Rolling 3-month average	0.15	0.15	0.15
	Quarterly arithmetic mean	1.5	1.5	1.5
Hydrogen sulfide (H ₂ S)	1-hour	112	-	-

Source: NAC 445B.22097 Standards of Quality for Ambient Air (NRS 445B.210, 445B.300); EPA 2013.

3.3.1 Affected Environment

3.3.1.1 Air Quality and Project Permits

The existing operations at the site are permitted under a Class II Air Quality Operating Permit (#AP1041-2774). Air quality in the Project Area is governed by both factors of pollutant emissions and meteorological conditions. The Project Area is located within the Crescent Valley (#54) Air Quality Management Area (AQMA). The Crescent Valley is designated by the EPA as “unclassified” per NAAQS as set forth in 40 CFR 81.329. An unclassified area is one for which no ambient air quality data are available and the ambient concentrations could be above or below the ambient air quality standards; however, unclassified areas are managed as “in attainment.” The Project Area is classified as a Class II area, pursuant to the Prevention of Significant Deterioration regulations promulgated under the Clean Air Act (CAA). The Crescent Valley air basin is treated as an area “in attainment” with ambient air quality standards.

Generally, the ambient air quality over much of the valley is good, due to the limited population and absence of major industrial activity. Major sources of fugitive dust in the vicinity of the Project Area include operating mines to the south and east of the site and vehicular traffic on unpaved roads.

The current air pollution sources at the Project include the following source categories:

- Stationary sources (shotcrete plant, emergency generator, building heaters);
- Fugitive sources (drilling, blasting, material loading and unloading, wind erosion of exposed disturbed surfaces); and
- Mobile sources (underground and surface mobile equipment, material hauling inside Project boundary, ore hauling over public roads to Klondex’s Midas Mine for processing and refinement).

3.3.1.2 Climate and Meteorology

Elevations within the Plan boundary range between approximately 4,950 feet and 7,250 feet amsl. The climate at the Project is typical for northern Nevada with hot summers and cold winters. Average daily summer temperatures range from 80° Fahrenheit (°F) to 90°F, and average winter temperatures range from the low 40s°F to 20s°F. Summer temperatures may reach 100°F for short periods, and winter extreme temperatures may drop to less than 0°F for short periods.

A Project weather station has been collecting data since July 2011 and is located adjacent to the existing facilities at an elevation of approximately 5,740 feet amsl and records values of rainfall, temperature, and relative humidity. Average annual precipitation over the three-year period of record is 6.5 inches. In comparison, average annual precipitation at the Beowawe, Nevada weather station, located approximately 12 miles northeast of the Project at an elevation of approximately 4,695 feet amsl, is 8.6 inches over the period 1949-2005.

Average monthly pan evaporation rates are available for Beowawe Research Station, located approximately 38 miles south of the Project at a similar elevation of 5,740 feet amsl. Average annual pan evaporation at Beowawe Research Station is approximately 51 inches per year for the period 1972 to 2005.

Current Conditions

The BLM published the final Rapid Ecoregional Assessment (REA) for the Central Basin and Range in June 2013 (Comer et al., 2013). REAs examine climate change and other widespread environmental influences that are affecting western landscapes. REAs look across an ecoregion to more fully understand ecological conditions and trends; natural and human influences; and opportunities for resource conservation, restoration, and development. The REAs provide regional information that can inform local management efforts.

Over the past 100 years, the weather, vegetation cover, and wildfire regimes of the Central Basin and Range ecoregion have changed, suggesting a change in the ecoregion's climate regime. Changes in temperature and precipitation have resulted in changes to vegetation cover and wildfire regimes. Changes are expressed in species composition, changes in vegetation communities, and increasing quantities of invasive species. Many areas once dominated by sagebrush now have pinyon-juniper encroachment as well as downy brome (cheatgrass).

Greenhouse Gas Emissions

Greenhouse gases (GHGs) are those that allow short-wave solar radiation to enter the earth's atmosphere but absorb long-wave infrared radiation reemitted from the earth's surface. Greenhouse gases can affect climate patterns, which in turn can affect resource management. Gases exhibiting greenhouse properties come from both natural and human sources. Water vapor, carbon dioxide, methane, and nitrous oxide are examples of greenhouse gases that have both natural and man-made sources, while other greenhouse gases, such as chlorofluorocarbons, are exclusively man-made.

Sources of greenhouse gas emissions in the vicinity of the Project Area are wildfires and prescribed burns, vehicles (including off-highway vehicles), construction and operation for mineral and energy development, and grazing livestock and wild horses. To the extent that these activities increase, greenhouse gas emissions are also likely to increase.

Climate Change

Climate represents the long-term statistical characterization of daily, seasonal, and annual weather conditions such as temperature, relative humidity, precipitation, cloud cover, solar radiation, and wind speed and direction. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. A region's climate is affected by latitude, terrain, and altitude, as well as nearby water bodies and their currents.

Warmer and more arid conditions, coupled with a shorter snow season, have led to limited water supplies and severe drought in parts of the state. By 2100, the average temperature in Nevada is predicted to increase by 3°F to 4°F in the spring and fall and by 5°F to 6°F in the summer and winter. El Niño events are predicted to increase in frequency and duration as a result of global climate change. These temperature changes would affect evaporation and precipitation in the state, likely resulting in the decreased availability of water (National Conference of State Legislatures, 2008).

In the Central Basin and Range ecoregion, climate models suggest there is no strong trend toward either wetter or drier conditions either in the near future (through the 2020s) or in the long term (through the 2050s) (Comer et al., 2013). However, models show significant increases

in maximum monthly temperatures by 2020, but primarily in the summer months (July, August, and September).

The highest maximum temperature increase projected is 6°F. These increases are predicted to occur mostly in the southern and northeastern edges of the ecoregion. Forecasts for 2060 predict substantial increases in maximum temperature for all months. Similar to forecasts for 2020, the greatest increases are predicted during the summer months and along the southern and northeastern edges of the ecoregion (Comer et al., 2013). Model forecasts for minimum temperatures show a considerable change in both rate and magnitude over most of the study area. July through September showed the greatest degree of change over most of the region.

Precipitation data suggest no strong trend toward either wetter or drier conditions in any month for the ecoregion. With the exception of a slight increase in summer monsoon rains toward the south and east, there were no significant forecasted trends in precipitation for any other months in either the near-term (2020s) or midcentury (2050s) projections (Comer et al., 2013).

Potential effects of these forecasts on the landscape could include increased fuel loads in higher elevations, increased frequency and duration of droughts, expansion of invasive species in higher elevations, increased wind erosion, and changes in wildfire regimes (Comer et al., 2013). However, the potential effects of the Project on climate change are beyond the scope of this EA and are not further analyzed in this EA.

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

Summary of Air Dispersion Modeling Results

The Proposed Action includes the same air pollution sources which are currently associated with the existing operations. An updated emissions inventory was prepared to account for the additional equipment and truck trip frequency which is associated with the Proposed Action.

The air quality analysis for the Proposed Action included modeling for the following air pollutants and averaging periods:

- CO: 8-hour and 1-hour averaging periods;
- NO₂: Annual and 1-hour averaging periods;
- PM_{2.5}: Annual and 24-hour averaging periods;
- PM₁₀: Annual and 24-hour averaging periods; and
- SO₂: Annual, 24-hour, 3-hour, and 1-hour averaging periods.

For the analysis, the most recent version (14134) of the AERMOD (American Meteorological Society/Environmental Protection Agency Regulatory Model) was used to estimate the air quality impacts for the Project. The emissions from diesel combustion were estimated in a conservative manner, based on equipment utilization and engine load estimates. These estimates resulted in higher modeled fuel consumption than the anticipated fuel budget for the Proposed Action. This provides high confidence that modeled compliance is indicative of expected compliance with ambient air quality standards for the Project.

Based on the results of the modeling, all pollutants modeled show compliance with the NAAQS and the NvAAQS. A summary of results for all modeled pollutants and averaging periods is presented in Table 3-5.

Table 3-5: Model Results and Demonstration of Compliance with Air Quality Standards

Pollutant						
CO	8-hour (2 nd high)	285.7	0	285.7	10,000	6,670*
	1-hour (2 nd high)	630.4	0	630.4	40,000	40,000
NO ₂	Annual	9.1	0	9.1	100	100
	1-hour (8 th high)	136.9	0	136.9	189	None
PM _{2.5}	Annual	0.5	2.4	2.9	12	15
	24-hour (8 th high)	1.7	7	8.7	35	35
PM ₁₀	Annual	2.9	9	11.9	None	50
	24-hour (2 nd high)	14.0	10.2	24.2	150	150
SO ₂	Annual	0.1	0	0.1	None	80
	24-hour (1 st high)	0.9	0	0.9	None	365
	3-hour (2 nd high)	2.8	0	2.8	1,300	1,300
	1-hour (4 th high)	3.7	0	3.7	196	None

* For locations at or above 5,000 feet.

Hazardous Air Pollutants Emissions

In addition to criteria pollutants, potential hazardous air pollutant (HAP) emissions were quantified. These pollutants were not included in the AERMOD modeling analysis, but the potential emissions were included in the facility-wide emissions summary. HAPs emissions from the facilities expansion activities would result from the handling of earthen materials, the combustion of the hydrocarbon fuels, and the handling and use of various chemicals. A summary of the total HAPs emissions that would be emitted from the proposed new and reconfigured facilities is presented in Table 3-6.

Table 3-6: Hazardous Air Pollutants Emissions from the Proposed Action

HAPs	Facility Total (tpy)
Formaldehyde	4.23E-04
Benzene	3.35E-04
Acetaldehyde	2.75E-04
Naphthalene	1.83E-06

HAPs	Facility Total (tpy)
Xylenes	1.02E-04
1,3-Butadiene	1.40E-05
Acrolein	3.32E-05
Toluene	1.47E-04
Ethylbenzene	0.00E+00
Propionaldehyde	0.00E+00
2,2,4- Trimethylpentane	0.00E+00
Methyl tert-butyl ether	0.00E+00
Antimony	1.13E-04
Arsenic	4.88E-03
Beryllium	4.33E-05
Cadmium	2.45E-04
Chromium	3.64E-03
Cobalt	1.48E-04
Lead	1.61E-04
Manganese	8.13E-03
Mercury	2.94E-06
Nickel	3.23E-03
Selenium	1.50E-05
Styrene	0.00E+00
HCN	0.00E+00
Total HAPs	0.0219

Source: Air Sciences, 2015

There are no ambient air quality standards for HAPs. In sum, the estimated HAP emissions from the Plan Modification would total 0.0219 tpy. For reference, the total combined HAPs for the Proposed Action are approximately 0.09 percent of the EPA threshold of 25 tpy for a combination of HAPs. Therefore, these emissions would have a minimal impact on the air quality in the vicinity of the Project.

Fugitive Dust and Travel Routes

Under the Proposed Action, there would be an average of ten round-trip truck shipments daily, not to exceed a maximum of 19 trips for a maximum of 6,935 round trips per year. The PM₁₀ and PM_{2.5} emissions from the trucks transporting ore on public roads to and from the Plan were included in the analysis. These emissions would be from engine exhaust, tire and brake wear, and fugitive dust generated from bus travel on paved and unpaved roads. These emissions would have an incidental impact on the air quality in the vicinity of the transportation route.

The Fire Creek Mine property has less than ten kilometers of unpaved surface roads, and the application of water for each segment of road can therefore be relatively frequent. Given that, the maximum water control efficiency of 95 percent was chosen as the model input.

Indirect impacts primarily consist of the deposition of fugitive dust on vegetation, which would have the potential to lower the productivity of that vegetation.

Proposed Action Summary

Klondex would continue to operate under their Class II permit issued by NDEP. Environmental protection measures to reduce fugitive dust are incorporated into the Proposed Action as applicant committed measures (Section 2.1.15). In addition, concurrent reclamation of disturbed areas would be conducted when feasible and upon Project completion all disturbance would either be reclaimed or stabilized to prevent fugitive dust. All of the modeled emissions and calculated HAP emissions meet air quality standards and are below EPA thresholds. Therefore, the proposed facilities expansion activities and additional surface disturbance would have a minimal impact on the air quality in the vicinity of the Project and travel routes.

3.3.2.2 No Action Alternative

As result of the No Action Alternative, Klondex would continue to operate under current operational conditions as those outlined in the Class II AQOP AP1041-2774 and as approved by NDEP. The same environmental practices for dust control would continue. As similar to the Proposed Action, all pollutant concentrations would not exceed NAAQS or the NSAAQS and are expected to be slightly lower than the Proposed Action. Therefore, the direct impacts from the No Action Alternative, would be similar but less than the direct impacts from the Proposed Action. HAPs would continue to be emitted under the No Action Alternative and the impacts under the No Action Alternative would be similar but less than the impacts under the Proposed Action.

3.4 Cultural Resources

The analysis area for direct and indirect impacts to cultural resources, or Area of Potential Effect (APE) is the Project Area.

Cultural resources include prehistoric or historic archaeological sites, buildings, structures, districts, or other places or objects considered important to a culture, subculture, or community for traditional, religious, scientific, or other purposes. If these resources meet defined significance criteria, they are protected under several Federal Laws and executive orders. The Federal Laws include the National Historic Preservation Act (NHPA) of 1966 as amended, the Archaeological and Historic Preservation Act (AHPA) of 1974, the Archaeological Resources Protection Act (ARPA) of 1979, and the Native American Graves Protection and Reparation Act (NAGRPA) of 1990. These laws also require the BLM to invite federally recognized tribes for government-to-government consultation, as do EO 13007, *Indian Sacred Sites* and EO 13175, *Consultation and Coordination with Indian Tribal Governments*.

Cultural resources addressed in this EA include known resources that are determined or recommended eligible for inclusion in the National Register of Historic Places (NRHP) or that are unevaluated for NRHP inclusion. Cultural resources are eligible for the NRHP if they meet one or more of four significance criteria and retain historic integrity.

The significance criteria are:

- The resource is associated with events that have made a significant contribution to the broad pattern of history (Criterion A).
- The resource is associated with the lives of people significant in the past (Criterion B).
- The resource embodies distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic value; or represents

a significant and distinguishable entity whose components may lack individual distinction (Criterion C).

- The resource has yielded, or may be likely to yield, information important in prehistory or history (Criterion D).

A significant cultural resource must also possess several, if not most of the aspects of integrity defined by the NRHP: location, design, setting, materials, workmanship, feeling, and association. Integrity is defined as the authenticity of a property’s historic identity, as evidenced by the survival of physical characteristics it possessed in the past, and its capacity to convey information about a culture or people, historic patterns, or architectural or engineering design or technology. Location refers to the place where an event occurred or a property was constructed. Design considers elements such as the plan, form, and style of a property. Setting is the property’s physical environment. Materials refer to the physical elements used to construct the property. Workmanship refers to the craftsmanship of the property’s builders. Feeling is the property’s ability to convey a sense of historical time and place. Association refers to the link between the property and a historic event, pattern of events, or person.

Historical or archaeological districts are evaluated for NRHP eligibility as a whole. Individual sites within a district are evaluated as “contributing” or “not contributing” to the district’s significance. Sites within a district may also be evaluated individually for NRHP eligibility.

Cultural resources eligible for the NRHP or contributing to an eligible district are referred to as *historic properties*. Unevaluated cultural resources are treated as though eligible or contributing and are considered historic properties in this analysis.

3.4.1 Affected Environment

3.4.1.1 Prehistoric Context

Archaeologists at WCRM have developed a prehistoric cultural context for the Fire Creek area, informed by existing research from the Great Basin and Central Great Basin subarea and WCRM’s investigations in the Fire Creek area since 2008 (Cannon and Lennon 2013; Estes 2012; Hays et al. 2012; Kolvet et al. 2011; Martinez and Estes 2012; Stoner 2008; Stoner et al. 2012). This context is summarized here and begins with the earliest occupation of the central Great Basin, referred to here as the Paleoarchaic. Periods and phases of prehistoric occupation discussed below are presented in Table 3-7.

Table 3-7: Prehistoric Cultural Chronology

Calibrated Years Before Present (BP)	B.C./A.D.	Geologic Time Scale	Period	Phase
---100 BP---	--1850 AD--	Late Holocene	Late Archaic	Yankee Blade
---650 BP---	--AD 1500--			Underdown

Calibrated Years Before Present (BP)	B.C./A.D.	Geologic Time Scale	Period	Phase
--1,450 BP--	---AD 500-- -			
--2,450 BP--	---500 BC---		Middle Archaic	Reveille
--3,450 BP--	--1500 BC--			
--4450 BP--	--2500 BC--	Middle Holocene	Early Archaic	Devil's Gate
--5450 BP--	--3500 BC--			Clipper Gap
--6450 BP--	--4500 BC--			(Unnamed)
--7450 BP--	--5500 BC--			
--8450 BP--	--6500 BC--	Early Holocene	Paleoarchaic	Grass Valley (10,000-8,000 rcybp*) Dry Gulch (10,500-7,500 rcybp) Sunshine (10,300-8,500 rcybp)
--9450 BP--	--7500 BC--			
--10450 BP-- -	--8500 BC--			
--11450 BP-- -	--9500 BC--			
--12450 BP-- -	--10500 BC-- -	Terminal Pleistocene		

* radio carbon years before present (rcybp) – radio carbon years before present

Paleoarchaic (10,500 BC TO 8,000 BC)

Prehistoric cultures occupied the Great Basin as early as 12,500 years ago at the end of the Pleistocene, when the climate was cooler and moister than present. During this period, human populations in the Great Basin were small and dispersed. Evidence for Paleoarchaic occupations is somewhat sparse; however, archaeological sites are usually found near pluvial lakeshores and riverine environments. Sites are usually small, dispersed lithic scatters or isolated tools or projectile points. Unlike contemporaneous occupations elsewhere in the western United States, archaeological evidence suggests Paleoarchaic cultures in the Great Basin did not specialize in

hunting Pleistocene-era megafauna such as mammoth or bison. Rather, Paleoarchaic cultures relied on a broader resource base utilizing small and medium-sized fauna. Paleoarchaic subsistence patterns have not been well-studied and are poorly understood.

The Paleoarchaic in the Great Basin is divided into several phases, dependent on location, site types, and artifact styles. Clovis and Folsom points in the Western Great Basin have been assigned to the Grass Valley phase (10,000 to 8,000 radiocarbon years before present [rcybp]) or Dry Gulch phase (10,500 to 7,500 rcybp). Sites from these phases are often found in ancient riverine settings, marshes, or lakeshores. A Paleoarchaic occupation was also documented at Sunshine Wells, where archaeologists identified a fluted point and crescent tool from 12,200 calibrated years before present (BP).

The Mule Canyon and Knudtsen sites near the Fire Creek area contain Paleoarchaic assemblages with obsidian tools and projectile points sourced from up to 160 miles away. Studies of source materials and conveyance suggest Paleoarchaic groups may have traveled long distances to obtain lithic materials but stayed within defined geographic areas (Jones et al. 2003 in Stoner 2008).

Early Archaic (8000 BC TO 1500 BC)

The Early Archaic corresponds with the Middle Holocene, during which climate fluctuated widely. The first millennia of the Middle Holocene were extremely arid with warm temperatures and summer-dominated precipitation. Few archaeological sites have been found from the period 8000 BC to 3500 BC and little evidence exists for occupation of the Central Great Basin during this time. A cooler, wetter gap from 3850 BC to 3250 BC coincides with a slight increase in human population and transient use of the Central Great Basin. Sites from this period are assigned to the Clipper Gap phase (3500 BC to 2500 BC). A more permanent shift to cooler conditions and winter-dominated precipitation around AD 1500 marks the onset of the Late Holocene and corresponds with the transition to the Middle Archaic. Human occupations during this time are assigned to the Devil's Gate phase (2550 BC to 1550 BC).

Human populations during the Early Archaic were low density and dispersed. Archaeological evidence suggests a general pattern of sedentary or semi-sedentary winter settlement and seasonal campsites through the rest of the year, with pithouses common on valley floors. The Early Archaic is defined in part by significant reliance on dry seeds for subsistence, particularly pinyon pine, as evidenced by the introduction of groundstone. Early Archaic cultures also relied on large mammals such as big horn sheep. Upland areas and intermittent streams were important resource areas.

Middle Archaic (1500 BC TO AD 500)

Cool and moist conditions in the Middle Archaic correspond with increased availability of food resources and larger human populations, as evidenced by larger archaeological sites from this period, compared to occupations of the Early Archaic. Meadows, marshes, and riverine habitats were important resource areas for Middle Archaic populations that used a broad resource base, including small and large fauna and dry seeds. Milling equipment increased in numbers and complexity during this period.

Sites from this period are assigned to the Reveille phase (1500 BC to AD 500), marked by increased numbers of grinding slabs (over Early Archaic occupations) and Elko series projectile

points. Trade items such as shell beads and remotely-sourced obsidian also appear in archaeological assemblages from this period.

Late Archaic (AD 500 TO AD 1850)

The Late Archaic was a period of shifting patterns and cultural change. The bow-and-arrow and brown ware pottery were introduced during this period. Habitation and use of the Central Great Basin declined slightly during the Underdown Phase (AD 500 to AD 1300), coinciding with more arid conditions than the Middle Archaic. The Yankee Blade phase (AD 1300 to AD 1850) is associated with high-altitude village sites and Gatecliff, Elko, Rosespring, and Desert Series projectile points. High-altitude communal hunting, including antelope and rabbit drives, are also associated with the Yankee Blade phase. At the time of contact with Euro-Americans, the Great Basin was home to several Numic-speaking groups, including the Paiute and Shoshone, whose descendants continue to reside in Nevada. Additional ethnographic information is available in Catacora et al. (2008).

3.4.1.2 Historic Context

Historic-period occupation in the Fire Creek area is largely associated with mining but was also influenced by developments in ranching and transportation. The discovery of the Comstock Lode in 1859 precipitated an influx of miners into the Great Basin area and the subsequent discovery of precious metals in the Shoshone Range and surrounding areas in the 1860s. Although the initial mining boom declined by the 1880s, mining has continued off and on until present, fluctuating in response to technological advances, market fluctuations, war-time demand, and economic crises. Five districts were established near the Plan area in the mid- to late-1800s: Hilltop, Bullion, Beowawe, Argenta, and Bateman Canyon (Stoner 2008). Minerals extracted in these districts included silver, gold, manganese, barite, antimony, arsenic, and turquoise. These districts contributed to settlement and development in Crescent Valley, which housed and supplied the various mining outfits.

Ranches often developed in tandem with mining districts and several were developed in the northern portion of Crescent Valley and the surrounding ranges, including Horseshoe Ranch, Dean Ranch, and French Ranch. Ranches provided goods to mining camps during booms and also contributed some economic stability to communities during periods of decline.

Transportation routes north along the Humboldt River provided access to Crescent Valley and the Shoshone Range that facilitated mining, ranching, and settlement of the region. The Emigrant Trail along the Humboldt River, also referred to as the River Route, was a popular route to California. The Central Pacific Railroad also used the river corridor when the railroad was built in 1869. In 1926, US Route 40 (now I-80) was built along the same corridor. Several roads were built in Crescent Valley connecting various ranches and mining communities with the town and railroad. The earliest road in the Plan area is Tenth Street, which first appears on a 1917 Government Land Office (GLO) map of the area. The road was used by miners to access Malpais Rim in the northeastern Shoshone Range (Stoner 2008).

3.4.2 Fire Creek Archaeological District

The Fire Creek Archaeological District (FCAD) is a National Register-eligible district comprising a large portion of the proposed Plan area. As defined by the National Park Service [NPS], “a district possesses a significant concentration, linkage or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development” (NPS 1993). Sites in the FCAD, called loci, are linked through thematic associations. Prehistoric loci represent quarrying and procurement of volcanic material for manufacturing stone tools from the Paleoarchaic to the Late Archaic. Historic loci are related to the region’s mining history from the late 1880s to present. The FCAD is eligible for the NRHP for its potential to yield scientific data important to understanding history and prehistory. The district contains some of the earliest known open-air Paleoarchaic deposits in the Great Basin, dating to 12,420 years BP, and is considered of national scientific significance (Stoner 2014).

The FCAD was defined in 2007 following a cultural resource survey of 739 acres in the Fire Creek area (Catacora et al. 2008). The survey identified 37 loci within the boundaries of a previously identified site, CrNV-62-5389, which became the FCAD. Seventeen of the original 37 loci were identified as contributing elements to the district. The district has since expanded to include 178 loci, consisting of 154 prehistoric loci, 7 historic loci, and 17 multicomponent loci (containing both prehistoric and historic components). Prehistoric loci are predominately lithic procurement and reduction areas, lithic scatters, camps, and hunting blinds. Historic loci consist of roads, mining-related deposits, and refuse scatters. Of the 178 total loci, 28 contribute to the district’s NR eligibility and 41 are unevaluated.

The district boundary encompasses numerous sites that were recorded prior to the district’s designation and have not yet been evaluated in relation to the FCAD. Although these sites may individually be eligible or not eligible for the NRHP, they are unevaluated for contribution to the FCAD.

3.4.3 Previous Cultural Inventories

Approximately 76 percent of the Project Area was previously surveyed for cultural resources between 1987 and 2015. The entire existing Plan area was surveyed during this period of the 1,467 acres of proposed expansion, approximately 40 percent, or about 575 acres has been surveyed. Areas not previously surveyed include approximately 530 acres in Sections 9 and 10, approximately 280 acres in Section 22, and approximately 80 acres in Section 26. Table 3-8 summarizes previous cultural inventories within the proposed Project Area.

Table 3-8: Cultural Inventories within the Project Area

Survey ID	Year	Project Title	Authors	Acres
6-1110 (P)	1987	Class III of Geo Seismic System Project in Lander and Eureka counties	Zerga, Donald L. and Barry A. Price	2338
CRR-6-1314	1989	A Cultural Resource Survey of 520 Acres at the Fire Creek Project.	Johnson, Frank W.	520
CRR 6-1314-1 (P)	1989	A Cultural Resource Survey of Approximately 188 Acres at the Fire Creek Project	Johnson, Frank W.	188

Survey ID	Year	Project Title	Authors	Acres
CRR 6-1314-2 (P)	1990	A Cultural Resources Survey of 360 Acres at the Fire Creek Project in Lander County, Nevada for Black Beauty Gold, Inc. (Addendum 2)	Johnson, Frank W.	360
6-1714 (P)	1994	The Fire Creek Project: A Cultural Resources Inventory of Approximately 1040 Acres	Johnson, Frank W.	1040
6-1912 (P)	1996	The Fire Creek Project: A Cultural Resources Inventory of the 1480 Acres in Lander County, Nevada for North Mining Inc.	Johnson, Frank W.	1480
6-2734 (P)	2008	Cultural Resource Inventory of 739 Acres at Fire Creek, Lander County	Catacora, Andrea, Mark Giambastiani, Margo Memmott, and Kari Sprengeler	739
CRR-6-2734-4	2012	A Class III Cultural Resources Inventory of 211.5 Acres for Klondex Gold and Silver Company, Fire Creek Project	Hays, Heidi Guy, Tara Cannon, and Edward J. Stoner	211.5
CRR-6-2734-5 ^a	2011	A Class III Cultural Resources Inventory of 922 Acres for the Klondex Gold and Silver Company's Fire Creek Exploratory Drilling Project, Lander County, Nevada	Kolvet, Renee Corona, Edward J. Stoner, Jaclyn Raley, and Mark B. Estes	922
CRR-6-2734-6	2012	A Class III Cultural Resource Inventory of Approximately 2.8 Miles of Existing Access Road for the Klondex Gold & Silver Company, Part of the Fire Creek Project, Lander and Eureka Counties, Nevada	Stoner, Edward J., Renee Corona Kolvet, and Heidi Guy Hays	67
6-2734-7	2011	A Class III Cultural Resource Inventory of 4.8 Acres for the Klondex Gold & Silver Mining Co. Fire Creek Project, Lander County, Nevada	Estes, Mark B.	4.8
CRR-6-2734-12	2012	A Class III Cultural Resource Inventory of 147 Acres for a Proposed Rapid Infiltration Basin for Klondex Gold & Silver Company, Part of the Fire Creek Project, Lander County, Nevada. Volume I: Report	Estes, Mark B.	147

Survey ID	Year	Project Title	Authors	Acres
CRR-6-2734-13 ^a	2012	A Class III Cultural Resource Inventory of 447 Acres for the Full Production and Rapid Infiltration Basin Expansion Project for Klondex Gold & Silver Company, Part of the Fire Creek Project, Lander County, Nevada	Martinez, Amanda L., and Mark B. Estes	447
6-2734-17	2013	A Class III Cultural Resource Inventory of 15.1 Acres of a Transmission Line Corridor for Klondex Gold and Silver Company, Part of the Fire Creek Project, Lander County, Nevada	Cannon, Tara, Thomas J. Lennon	15.1

Notes: ^a Project is in or partially in the proposed Plan boundary expansion area

Other cultural resource projects have been performed in the proposed Plan area in addition to the surveys discussed above. These include site evaluations, data recovery (excavation), and monitoring of ground disturbing activities. A report detailing the data recovery at eight loci within the FACD is currently under review by BLM (Stoner, 2014).

3.4.4 Historic Properties in the Plan Area

Archaeological and historical data from the Project Area indicate that a broad range of prehistoric and historic site types are possible in the Project Area. Prehistoric site types include quarries and opportunistic lithic procurement areas, lithic scatters, hunting blinds and rock stacks dating from the Paleoarchaic to Late Prehistoric. Prehistoric resources comprise at least 80 percent of the resources in the Fire Creek area (Cannon and Lennon, 2008). Historic sites include mining features, refuse scatters, rock cairn claim markers, and remnants of historic roads from the late nineteenth to the mid-twentieth century.

The Project Area overlaps a large portion of the FCAD, including 150 known loci. In addition, the Project Area contains 57 known sites that are either outside the FCAD or inside the district but unevaluated as contributing loci. Appendix A of this EA includes a table that details known sites and loci in the Project Area.

Of the 208 sites and loci within the Project Area, 32 are eligible for the NRHP or contribute to the eligibility of the FCAD. An additional 30 sites are unevaluated for the NRHP or as contributing components of the FCAD. In total, 62 sites and loci in the Project Area are considered historic properties. These properties include 53 prehistoric resources and nine multicomponent resources. Prehistoric resources consist of lithic procurement and reduction areas, lithic scatters, quarries, camps, and hunting blinds. Historic components are predominately mining-related deposits or refuse scatters.

3.4.5 Environmental Consequences

3.4.5.1 Proposed Action

All of the disturbance associated with the Proposed Action would be conducted in accordance with the Memorandum of Agreement (MOA) for the Project. This includes surveying any areas that have not been evaluated prior to any planned disturbance. Klondex would be able to avoid or treat all eligible, contributing, or unevaluated sites prior to disturbance. All of the proposed

Phase I activities are located within areas that have been surveyed treated. In addition, Klondex would implement the protection measures outlined in Section 2.1.15. Through the practice of avoidance and treatment of eligible or unevaluated sites, there would be minimal direct and indirect impacts on cultural resources resulting from the Proposed Action.

3.4.5.2 Mitigation Measures

- **Recommended Mitigation Measure:** To facilitate the ongoing management of cultural resources at the Project, a Programmatic Agreement (PA) should be developed as an expansion on the measures included in the MOA that implements the current treatment plans for the Project. The PA should be signed by BLM, Nevada SHPO, and Klondex.

3.4.5.3 No Action Alternative

Under the No Action Alternative, Klondex would continue exploration and test mining under the existing Plan, totaling 150 acres of surface disturbance. Cultural resource treatment plans and the MOA addressed above have been implemented to address any impacts to cultural resources from the existing operations. In addition, the same protection measures outlined in Section 2.1.15 are incorporated into the existing operations. Therefore, the No Action Alternative is similar to the Proposed Action and would not have an impact on cultural resources based on the management regimes currently in place.

3.5 Wildlife Resources

This section includes a discussion of wildlife resources, including migratory birds, general wildlife, and special status wildlife species. The analysis area for direct and indirect impacts to wildlife resources is the Project Area, but study areas extended beyond the Project Area for certain resources.

Wildlife and fish resources and their habitat on public lands are managed cooperatively by the BLM and the Nevada Department of Wildlife (NDOW) under a Memorandum of Understanding (MOU) as established in 1971. The MOU describes the BLM's commitment to manage wildlife and fisheries resource habitat, and NDOW's role in managing populations. The ecological definition of population is a group of organisms of one species that interbreed and live in the same place at the same time. The BLM meets its obligations by managing public lands to protect and enhance food, shelter, and breeding areas for wild animals. The NDOW assures healthy wildlife numbers through a variety of management tools including wildlife and fisheries stocking programs, hunting and fishing regulations, land purchases for wildlife management, cooperative enhancement projects, and other activities.

The Bald and Golden Eagle Protection Act (BGEPA) of 1940, as amended, prohibits the "take" or possession of bald and golden eagles with limited exceptions. Take, as defined in the BGEPA, includes, "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturb means, "to agitate or bother a bald or golden eagle to a degree that causes or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding or sheltering behavior."

Additional direction comes from the MOU between the BLM and the United States Fish and Wildlife Service (USFWS), signed January 17, 2010. The purpose of this MOU is to strengthen migratory bird conservation through enhanced collaboration between the BLM and the USFWS, in coordination with state, tribal, and local governments. The USFWS' MOU with the BLM states, in part, that both parties shall, as practicable, protect, restore, and conserve habitat of migratory birds; follow the USFWS Bald Eagle Management Guidelines; follow other migratory bird conservation measures as appropriate and consistent with agency missions; work collaboratively to identify and address issues that affect species of concern; promote and contribute migratory bird population and habitat data to interagency partnership databases (BLM, 2010). The MOU also commits the BLM to, among other measures, participate in planning efforts of Bird Conservation Regions and, at the project level, evaluate the effects of the BLM's actions on migratory birds during the NEPA process (BLM, 2010).

3.5.1 Affected Environment

Multiple general and focused wildlife surveys were conducted within the Project Area and vicinity over a period of two years by Enviroscientists, Inc. The results of the surveys are summarized in a Baseline Biological Resources Summary Report (Rubicon Environmental Consulting, 2015a). Prior to conducting the surveys, the NDOW, Nevada Natural Heritage Program (NNHP), and the USFWS were consulted in 2012 and 2013.

The NDOW identified two known Greater Sage-Grouse lek sites within four-miles of the Project Area and two hawk nests, three eagle nests, one falcon nest, and two owl nests in the vicinity of the Project Area. The NDOW also identified mule deer (*Odocoileus hemionus*) and pronghorn antelope (*Antilocapra americana*) habitat.

The NNHP determined that no known sensitive species populations occur within the vicinity of the Project Area. However, the NNHP did specify that potential habitat within the Project Area may be available for the pygmy rabbit (*Brachylagus idahoensis*), which is a Nevada BLM sensitive species.

The USFWS determined that two threatened, endangered, or candidate species may be present in the Project Area. These two species are Lahontan cutthroat trout (*Oncorhynchus clarkii* ssp. *henshawi*), a threatened species, and Greater Sage-Grouse (*Centrocercus urophasianus*), a Candidate species. No Lahontan cutthroat trout habitat is present within the Project Area and Greater Sage-Grouse is addressed as a Nevada BLM sensitive species.

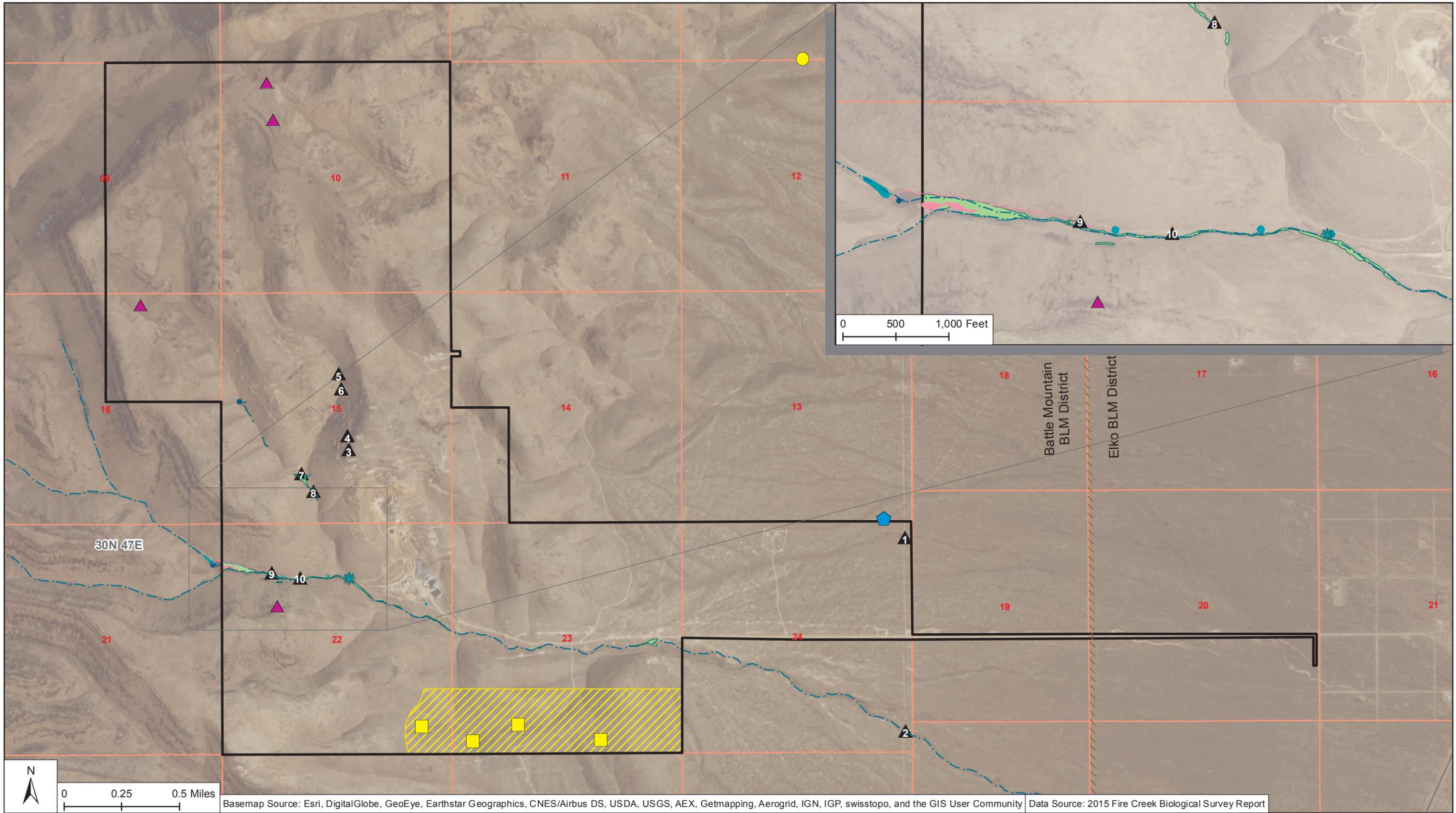
Baseline wildlife surveys included the following:

- General wildlife habitat assessment and species inventory;
- Acoustic bat survey;
- Pygmy rabbit survey;
- Spring snail survey;
- Greater Sage-Grouse survey and habitat assessment;
- Western burrowing owl habitat evaluation;
- Migratory bird survey;
- Nesting raptor survey; and
- Aerial golden eagle survey.

Figure 3-3 shows the locations of the bat detectors and notable observations made during the wildlife surveys in the Project Area and vicinity.

3.5.1.1 Migratory Birds

“Migratory bird” means any bird listed in 50 CFR 10.13. All native birds commonly found in the U.S., with the exception of native resident game birds, are protected under the Migratory Bird Treaty Act (MBTA). The MBTA prohibits the taking of migratory birds, their parts, nests, eggs, and nestlings without a permit. EO 13186, signed January 10, 2001, directs federal agencies to protect migratory birds by integrating bird conservation principles, measures, and practices.



LEGEND

- Project Area
- Riparian / Wetland Vegetation
- BLM District Boundary
- Section

- Fire Creek
- Spring

Noxious Weed Results

- Scotch Thistle
- Bull Thistle [0.75 acres]
- Scotch Thistle [0.62 acres]

Wildlife Survey Results

- Greater Sage-Grouse Scat
- Burrowing Owl Sighting
- Potential Burrowing Owl Burrow
- Potential Burrowing Owl Habitat

- Black Throated Sparrow Nest
- Bat Detector

0 0.25 0.5 Miles

0 500 1,000 Feet

Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community | Data Source: 2015 Fire Creek Biological Survey Report



BATTLE MOUNTAIN DISTRICT OFFICE
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 Battle Mountain, Nevada 89820

BUREAU OF LAND MANAGEMENT

FIRE CREEK MINE PROJECT
Environmental Assessment
DOI-BLM-NV-B010-2015-0062-EA

Wildlife Survey Results

Figure 3-3
 10/23/2015

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

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A migratory bird survey was conducted in conjunction with the general wildlife and habitat assessment, in 2012 and 2013, and included the survey and evaluation of potential nesting and foraging habitats. These surveys included sunrise and sunset hours to detect periods of active avian foraging and use of the habitat in the Project Area. All avian species were recorded along with the behavior of the individuals in order to document potential breeding or nesting. Any nest or breeding sign was documented and GPS coordinates recorded, if they had been encountered. The following migratory bird species were detected: American kestrel (*Falco sparverius*); black-billed magpie (*Pica hudsonia*); black-throated sparrow (*Amphispiza bilineata*); Brewer's blackbird (*Euphagus cyanocephalus*); Brewer's sparrow (*Spizella breweri*); brown headed cowbird (*Molothrus ater*); common nighthawk (*Chordeiles minor*); common poorwill (*Phalaenoptilus nuttallii*); common raven (*Corvus corax*); gray flycatcher (*Empidonax wrightii*); golden eagle (*Aquila chrysaetos*); Greater Sage-Grouse (*Centrocercus urophasianus*); horned lark (*Eremophila alpestris*); hummingbird (unknown species); killdeer (*Charadrius vociferus*); lark sparrow (*Chondestes grammacus*); Lazuli bunting (*Passerina amoena*); long-eared owl (*Asio flammeus*); Northern harrier (*Circus cyaneus*); prairie falcon (*Falco mexicanus*); red-tailed hawk (*Buteo jamaicensis*); rock wren (*Salpinctes obsoletus*); sage sparrow (*Amphispiza belli*); turkey vulture (*Cathartes aura*); and Western meadowlark (*Sturnella neglecta*).

3.5.1.2 General Wildlife

This section identifies the wildlife (mammals, upland game birds, reptiles, and amphibians) that have potential habitat or may occur in the Project Area. Multiple wildlife surveys were conducted between May 2012 and June 2013 to document the wildlife species utilizing the Project Area. This section also is tiered to the 2008 EA, Sections 3.8 and 4.1.8 and are incorporated by reference (BLM, 2008b).

In 2012, a total of seven reptiles, 20 birds, and 12 mammals were directly observed or detected by tracks, scat, feathers, call, prey remains, or burrows. In 2013, a total of seven reptiles, 23 birds, and 16 mammals were directly observed or detected. The general wildlife species detected are common throughout the Great Basin Region.

The majority of the Project Area was identified within the occupied distribution range of mule deer (*Odocoileus hemionus*) and pronghorn antelope (*Antilocapra americana*) distribution. Both of these species were detected in the Project Area. Mule deer scat, tracks, and beds were observed and occurred primarily in the western, South Slope 12-16" precipitation zone (P.Z.) portions of the Project Area. Based on the habitat type and elevation at the Project, the Project Area and vicinity likely represent year-round habitat. No other mule deer sign, such as sheds or skeletal remains, was observed. Pronghorn scat and tracks were noted in the lower elevation portions of the Project Area. Additional small game species observations within the Project Area include desert cottontail (*Sylvilagus audobonii*).

Game birds detected include Greater Sage-Grouse (e.g., scat), mourning dove (*Zenaidura macroura*), and chukar (*Alectoris chukar*). Chukar were observed in the higher elevation rocky slopes and outcrops in the northwestern portion of the Project Area.

The Fire Creek spring located west of the Project Area feeds the Fire Creek drainage supporting some wetland and riparian vegetation. In addition, two small seeps with limited riparian and wetland vegetation are present in the Project Area. These water resources serve as wildlife

habitat and use areas. In addition, unidentified spring snails, family Amnicolidae were observed in the portion of Fire Creek.

3.5.1.3 Special Status Wildlife Species

BLM policy for management of special status species is in the BLM Manual Section 6840. Special status species include the following:

- Federally Threatened or Endangered Species: Any species the USFWS has listed as an endangered or threatened species under the Endangered Species Act of 1973, as amended (ESA) throughout all or a significant portion of its range;
- Proposed Threatened or Endangered Species: Any species the USFWS has proposed for listing as a federally endangered or threatened species under the ESA;
- Candidate Species: Plant and animal taxa under consideration for possible listing as threatened or endangered under the ESA;
- Delisted Species: Any species in the five years following their listing;
- BLM Sensitive Species: Native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either: 1) there is information that a species has undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range; or 2) the species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk (BLM 2008); and
- State of Nevada Listed Species: State-protected animals that have been determined to meet BLM's Manual 6840 policy definition.

Appendix B of this EA includes an evaluation of sensitive species and their potential to occur within the Project Area. The species discussed below were determined to have potential to occur or have been confirmed present.

Greater Sage-Grouse

In 2010, USFWS found that the Greater Sage-Grouse (*Centrocercus urophasianus*) was a candidate species for listing under the ESA, but that action was precluded by higher priority listings (USFWS, 2010). In Nevada, Greater Sage-Grouse are distributed throughout the northern two-thirds of the state, and along the state border with California. Although this species' historic range has been reduced, it is still found in relatively large populations in Elko, northern Humboldt, northern Washoe, Eureka, Lander, and White Pine counties (NDOW, 2004).

Greater Sage-Grouse is a sagebrush-obligate species, meaning that it is restricted to sagebrush ecosystems and cannot survive in areas lacking this habitat. Sagebrush shrubs are used for forage and for nesting, brood-rearing, and fall/winter cover. Sage-grouse congregate at leking grounds each spring (March 1 to May 15), where the males display breeding plumage to attract hens for mating. Nesting and early brood-rearing occurs from April through June (NDOW, 2004). Nests

are within 1.1 to 6.2 kilometers (0.7 to 3.9 miles) of the lek site on average (Connelly et al., 2000).

The September 2015, the BLM issued the *Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of Idaho and southwestern Montana, Nevada and Northeastern California, Oregon, and Utah*, which details the Greater Sage-Grouse habitat management plan for Nevada (BLM, 2015). This document and associated mapping identifies the following four habitat management categories:

- Sage Brush Focal Areas (SFA)
- Priority Habitat Management Areas (PHMA);
- General Habitat Management Areas (GHMA); and
- Other Habitat Management Areas (OHMA).

Figure 3-4 was prepared in accordance with the new habitat management classifications per the 2015 ROD document and shows the management categories within the Project Area and vicinity. Based on this data, no PHMA is present within the Project Area, approximately 2,384 acres of GHMA are present within the Project Area, and 1,052 acres of OHMA are present within the Project Area. Approximately 17.2 acres of Non-Habitat area is present along the Project access road. The Project Area or vicinity does not include any SFA designated areas.

Based on site specific surveys, the South Slope 12-16” P.Z. ecological site in the western portion of the Project Area provides suitable winter and nesting habitat for Greater Sage-Grouse. The Loamy 8-10” P.Z. ecological site in the southern portion of the Project Area, and the South Slope 12- 16” P.Z. ecological site in the western portion of the Project Area provide suitable winter, brood rearing, and nesting habitat for Greater Sage-Grouse. Greater Sage-Grouse scat was observed in four locations within the Project Area as shown on Figure 3-3 and summarized in Table 3-9. Low sagebrush (*Artemisia arbuscula*) and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) are the dominant shrubs in these locations, with a high canopy cover of bluebunch wheatgrass (*Pseudoroegneria spicata*).

Table 3-9: Locations of Greater Sage-Grouse Detections

Date	UTM Zone 11		Notes
	Easting	Northing	
May 31, 2012	528071	4480719	Three old scat.
June 9, 2013	528722	4478774	One individual scat from winter
June 22, 2013	528692	4482165	Bleached winter scat, all single scat with no piles.
June 22, 2013	528650	4482422	Bleached winter scat, all single scat with no piles.

Note: Universal Transverse Mercator (UTM) Coordinate Datum: NAD 1983

The NDOW reported that there is one known lek within 3.1 miles of the Project Area and one located greater than 3.1 miles from the Project Area. The Horse Heaven 1 lek is located 3.3 miles from the Project Area, and the Horse Heaven 2 lek is located 2.2 miles from the Project Area.

Both leks are located northwest of the Project Area on the opposite side of the ridgeline. The ridgeline serves as topographical shielding and also serves as a noise barrier from existing and proposed operations.

Lek surveys were performed at the two Horse Heaven leks in 2012 and 2015 per NDOW protocols. The timing of the surveys was within the breeding season between March 1 and May 15. Each lek was surveyed three times within this period each year. The Horse Heaven 1 lek was surveyed on May 12, 2012, and was found to be active, with up to seven males and three females on the lek. The Horse Heaven 2 lek was surveyed on May 11, 2012 and was not active. No sign was observed in the vicinity of the Horse Heaven 2 lek. One male Greater Sage-Grouse was observed at approximately 8:30 a.m. on May 12, 2012, moving toward the Horse Heaven 2 lek from the Horse Heaven 1 lek. In 2015, the lek surveys were conducted on March 27, April 9, and May 9. No Greater Sage-Grouse were observed at either the Horse Heaven 1 or Horse Heaven 2 leks. On March 27, the observer noticed another consulting firm had placed noise monitoring equipment at each of the lek sites for another project. Due to the equipment being in place, the observer did not walk the area after the three counts to detect Greater Sage-Grouse sign. On April 9, 2015, the noise monitoring equipment had been removed. The observer walked each of lek sites after the three counts. No Greater Sage-Grouse, sounds, or sign were observed at either site. On May 9, the observer walked the area and no Greater Sage-Grouse or sign were observed or detected at either lek site.

Western Burrowing Owl

Western burrowing owls roost and nest in the abandoned burrows of ground dwelling animals such as kit fox, badgers, coyotes, and ground squirrels. Even if this diurnal owl is not directly observed, evidence of its nesting activity, including scats, pellets, feathers, insect prey remains, tracks, and burrows lined with other animals' scat, is readily detected.

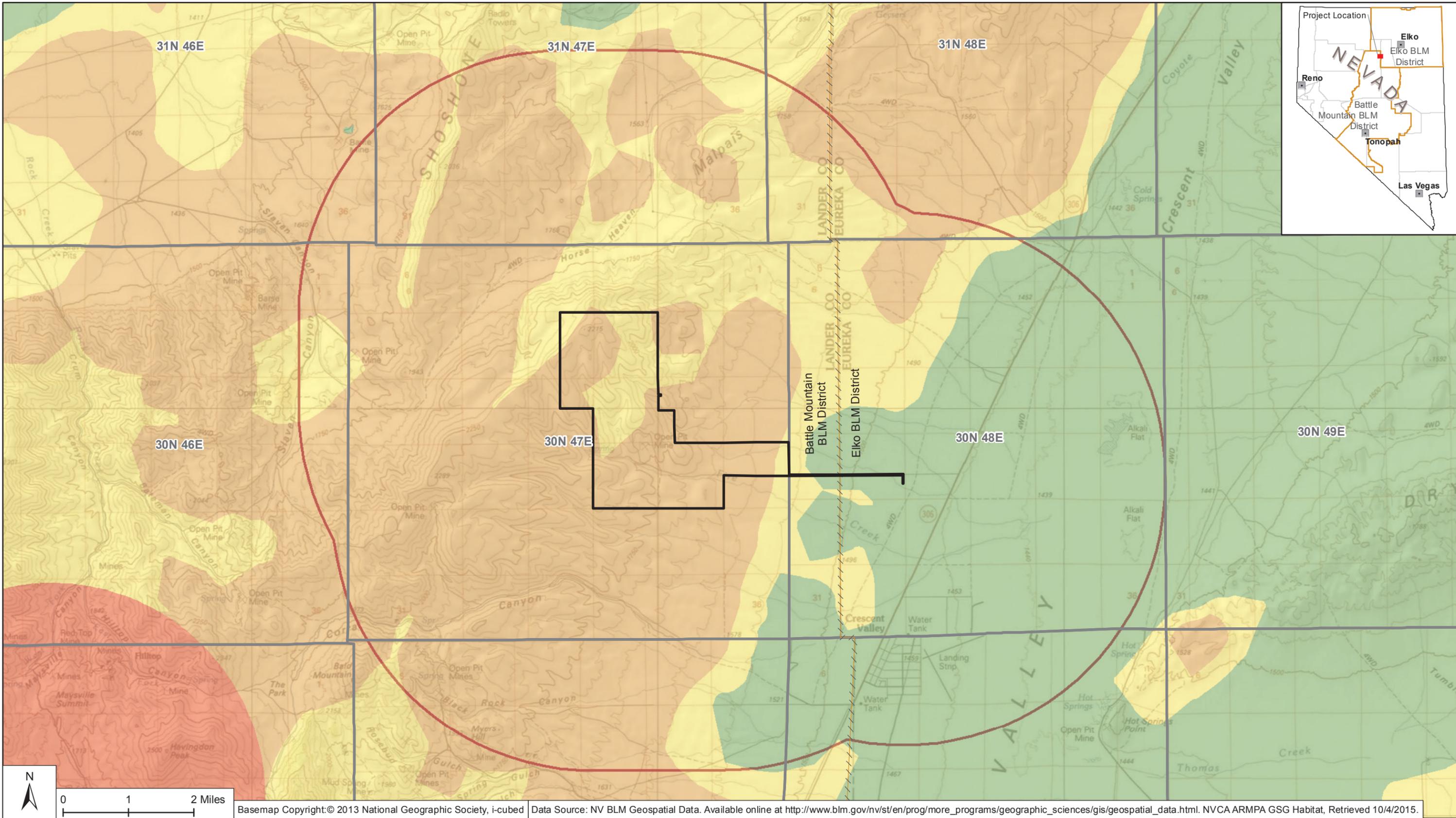
Suitable foraging habitat is present throughout the Project Area and potential nesting habitat is limited to the southern portion of the Project Area. Four potential burrows that could be utilized by burrowing owl were identified and are shown on Figure 3-3. In addition, a burrowing owl individual was observed outside of the Project Area confirming the species presence in the area.

Golden Eagle

Golden eagles (*Aquila chrysaetos*) are protected by the MBTA and the Bald and Golden Eagle Protection Act, both of which prohibit take, and is a Nevada BLM sensitive species. The USFWS overall management objective for golden eagle populations is to ensure no declines in breeding populations (USFWS, 2010b). Golden eagles nest in high densities in open and semi-open habitat, but may also nest at lower densities in coniferous habitat when open space is available. Golden eagles currently breed in and near much of the available open habitat in North America west of the 100th meridian. Golden eagles avoid nesting near urban habitats. In the Great Basin, golden eagles nest on cliffs and in scrub forest habitat. Golden eagles forage both close to and far from their nests (up to 5.6 miles from the center of their territory). Foraging distances may be greater in xeric habitats (USFWS, 2010b).

Suitable foraging habitat is present throughout the Project Area, but limited potential nesting habitat is present. No golden eagle nests were observed in the Project Area. In 2012, 12 potential golden eagle nests were observed outside of the Project Area but within the five-mile radius survey area. Four of these nests showed signs of activity in 2012 including abundant whitewash,

prey remains, downy feathers, or adult golden eagles near the nest. These four nests were located outside of the one mile intensive raptor survey area with the closest nest being located approximately 3.6 miles from the Project Area. On June 22-23, 2013, a nest status check was conducted for raptor nests within the Project Area and a one mile buffer. During the status check of one of the red-tailed



- LEGEND**
- Project Area
 - BLM District Boundary
 - 4-Mile Greater Sage-Grouse Study Area
 - Township/Range

- Greater Sage-Grouse Habitat**
- PHMA (Priority Habitat Management Areas) [0.0 acres]
 - GHMA (General Habitat Management Areas) [2,384.0 acres]
 - OHMA (Other Habitat Management Areas) [1,052.8 acres]
 - Non-Habitat [17.2 acres]

Basemap Copyright: © 2013 National Geographic Society, i-cubed | Data Source: NV BLM Geospatial Data. Available online at http://www.blm.gov/nv/st/en/prog/more_programs/geographic_sciences/gis/geospatial_data.html. NVCA ARMPA GSG Habitat, Retrieved 10/4/2015.

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



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BUREAU OF LAND MANAGEMENT

FIRE CREEK MINE PROJECT
Environmental Assessment
DOI-BLM-NV-B010-2015-0062-EA
 Greater Sage-Grouse Habitat Map

Figure 3-4
 10/23/2015

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hawk nests observed in 2012 was occupied by an active golden eagle nest. A fledged juvenile golden eagle was observed on the rock outcrop that contains the nest, and the nest showed abundant sign of activity such as whitewash and numerous marmot skulls. An adult golden eagle was observed flying over Project Area near the nest site.

Ferruginous Hawk

Ferruginous hawk (*Buteo regalis*) uses sagebrush, pinon-juniper woodlands and salt desert scrub habitats year round in northern Nevada. Ferruginous hawks in Nevada reportedly prefer landscapes where human presence is minimal and they are generally more sensitive to nest disturbances than most other raptors (Great Basin Bird Observatory [GBBO], 2010).

No ferruginous hawks were observed during surveys and no ferruginous hawk nests were found in the survey area. The Project Area is located within an area that is subject to ongoing human presence and activity, which may deter this species from occurring within the Project Area on a regular basis.

Loggerhead Shrike

Loggerhead shrikes (*Lanius ludovicianus*) are typically associated with greasewood and sagebrush communities. They also frequent open country in valleys and foothills. They also frequent open country in valleys and foothills, juniper or pinon-juniper woodlands. Dense stands of trees and shrubs are used for nesting and roosting sites as well as for hunting perches.

No loggerhead shrikes were observed in the Project Area, but the species would be expected to occur locally.

Sage Thrasher

Sage thrashers are associated with sagebrush, montane shrubland, and salt desert scrub habitats. Species abundance can be associated with higher shrub densities and a lack of trees. Nest habitat often consists of low branches in dense shrubs (GBBO, 2010).

No sage thrashers were observed in the Project Area, but the species would be expected to occur locally.

Brewer's Sparrow

Brewer's sparrows (*Spizella breweri*) are found throughout Nevada in sagebrush and mixed shrub communities. Nest habitat is in brush communities with low shrubs and grasses.

Brewer's sparrow was observed during wildlife surveys and the majority of the Project Area represents foraging and nesting habitat.

Pygmy Rabbit

Suitable pygmy rabbit habitat consists of areas with mature big sagebrush, drainages, sagebrush draws, patches of sagebrush that appear uneven in both height and density, and areas with friable soil that allows for burrowing.

Suitable pygmy rabbit habitat is not present in Project Area. The sagebrush community lacks the necessary height and density for pygmy rabbits. Surveys for pygmy rabbit to detect sign and

habitat were conducted during the general wildlife surveys and no evidence of pygmy rabbits or current or past occupancy was observed.

Sensitive Bats

Acoustic surveys were conducted for bat species using Pettersson ultrasonic detectors (Model D240X). To increase species detection, detectors were placed in riparian areas, which can attract foraging and drinking bats from a considerable distance, ecotones, and near rock outcrops as well as roosting sites such as adits. The two easternmost sections of the Project Area do not have roosting habitat (e.g., rocks, trees, buildings, abandoned mine workings). The habitat consists of desert scrub vegetation dissected by various east-west trending drainages. It is possible for bats to temporarily roost in sagebrush at night and to forage over sagebrush. The detectors were strategically placed in potential bat use areas according to topography, potential foraging habitat, and proximity to rock outcrops or other potential roosting habitat.

Based on the results of the bat surveys the following species were detected: little brown bat (*Myotis lucifugus*); long-eared myotis (*Myotis evotis*); small-footed myotis (*Myotis melanorhinus*); and western pipistrelle (*Pipistrellus hesperus*). In addition to the species detected, the following species have the potential to occur: California myotis (*Myotis californicus*); little brown bat (*Myotis lucifugus*); fringed myotis (*Myotis thysanodes*); big free-tailed bat (*Nyctinomops macrotis*); and Brazilian free-tailed bat (*Tadarida brasiliensis*).

The riparian areas along the Fire Creek drainage represent potential foraging habitat, and rock crevices and outcrops represent potential roosting sites. No habitat suitable for maternal or winter roosting sites was identified within the Project Area.

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Migratory Birds

Under the Proposed Action, the Project design features and environmental protection measures would minimize direct impacts to migratory birds. Indirect impacts to migratory birds would result from habitat loss or disturbance. A total of approximately 184.44 acres of potential migratory bird nesting and foraging habitat would be disturbed. All of the disturbed area would be reclaimed upon Project completion with the exception of water management ponds needed for closure management. If required, the ponds at project closure would be operated and managed under an NDOW Industrial Artificial Pond Permit to ensure minimal impacts on migratory birds. Noise impacts to migratory birds would be temporary in nature, and the overall ambient noise level would not increase beyond existing conditions at the site. All proposed vent raises would have vent fans installed interior to the underground mine workings to minimize noise disturbance to migratory birds. It is unlikely the Proposed Action would result in a decline in local or regional migratory bird populations.

General Wildlife

Under the Proposed Action, the Project design features, environmental protection measures for migratory birds and sensitive species would minimize impacts to general wildlife species. A total of approximately 184.44 acres would be disturbed accounting for approximately five percent of the total Project Area. Disturbance related to mining operations in the Project Area would be an incremental increase over existing conditions and would be reclaimed following Project

completion with the exception of water management ponds needed for closure management. The ponds would be fenced to prevent wildlife from entering these areas. Further, at mine closure the ponds would be operated and managed under an NDOW Industrial Artificial Pond Permit to ensure minimal impacts on birds and wildlife, if required.

Noise impacts to wildlife species would be temporary in nature and the overall ambient noise level would not increase beyond existing conditions at the site. As outlined in Section 2.1.15, proposed ventilation raises would have fans installed underground and not above ground to minimize noise disturbance to wildlife species.

Special Status Wildlife Species

The Proposed Action would result in a net loss of potential sensitive species habitat, but it is not anticipated to contribute to a loss of viability for any particular sensitive species because most activities would be concentrated near areas already disturbed and extensive similar habitat is available adjacent to the Project Area.

Greater Sage-Grouse

Approximately 50 acres (40 acres of facilities and ten acres of roads) of GHMA potential Greater Sage-Grouse habitat would be disturbed under Phase I of the Proposed Action. Additional disturbance may occur in classified habitat management areas (GHMA or OHMA) during future phases of surface exploration. Therefore, up to a total of approximately 150 acres may be disturbed in areas classified as GHMA or OHMA. The disturbance to GHMA would be mitigated as outlined in Section 2.1.15. Indirect impacts to the Greater Sage-Grouse as a result of the Proposed Action include the following: vehicular travel and dust; interruption of “bird foot traffic” created by above ground pipes, noise, vehicles, and equipment; and collision with fences and other structures. These impacts would be minimal because no active leks are present within or near the Project Area. The leks located to the northwest of the Project Area are shielded topographically from the Project Area and the Proposed Action would not increase ambient noise levels relative to the existing operations.

Sensitive Bird Species

In addition to Greater Sage-Grouse, the sensitive bird species that have the potential to occur or are confirmed to use Project Area include golden eagle, western burrowing owl, ferruginous hawk, loggerhead shrike, sage thrasher, and Brewer’s sparrow. Potential impacts to birds from proposed activities would include possible direct loss of nests (e.g., crushing) or indirect effects (e.g., abandonment) from increased noise and human presence within close proximity to an active nest site and disturbance to habitat. No raptor nests, including golden eagle nests, were located within areas subject to disturbance within the Project Area.

The Proposed Action would result in disturbance to approximately 184.44 acres of potential nesting and foraging habitat for sensitive bird species. Not all of the disturbed acreage would be suited for individual sensitive species, but acreage this represents the maximum disturbance that any one species would be subject to. This area does not support raptor nesting habitat. Therefore, sensitive raptor species would only potentially use this area for foraging. Under the Proposed Action, the Project design features and environmental protection measures for migratory birds and sensitive species would minimize direct impacts to sensitive bird species.

Pygmy Rabbit

No pygmy rabbit habitat or evidence of pygmy rabbit use were observed during survey and therefore this species would not be affected by the Proposed Action.

Sensitive Bats

Nine sensitive bat species have been confirmed or have the potential to occur within the Project Area. The proposed activities and disturbance in the Proposed Action would not result in the disturbance or removal of bat hibernacula or roosting sites. No disturbance to riparian areas within the Project Area would occur. Approximately 184.44 acres of other potential bat foraging habitat would be disturbed, but would be reclaimed following mine closure. The bats foraging within the Project Area have likely adapted to the existing disturbance from Project activities during their flight times. The expansion of the surface disturbance may reduce their prey base, but the reclamation of the disturbance would restore the foraging potential.

3.5.2.2 No Action Alternative

Under the No Action Alternative, Klondex would continue existing operations as previously authorized, which include 150 acres of authorized disturbance within the Project Area. No new disturbance would occur under the No Action Alternative unless previously disturbed acres were reclaimed and released by the BLM. The total amount of potential sensitive habitat disturbed would not occur all at one time due to incremental exploration disturbance and concurrent reclamation. The same environmental protection measures outlined in Section 2.1.15 of this EA are also incorporated into the existing operations.

Similar to the Proposed Action, the No Action Alternative would result in a net loss of potential sensitive species habitat, but it is not anticipated to contribute to a loss of viability for any particular sensitive species because extensive similar habitat is available adjacent to the Project Area. It is unlikely the No Action Alternative would result in a decline in local or regional migratory bird populations. The direct and indirect impacts under the No Action Alternative would, therefore, be similar but less than the impacts under the Proposed Action.

3.6 Native American Cultural Concerns

3.6.1 Affected Environment

Located within the traditional territory of the Western Shoshone, the MLFO administrative boundary contains spiritual, traditional, and cultural resources, and sites to engage in social practices that aid in maintaining and strengthening the social, cultural, and spiritual integrity of the Tribes. The BLM conducted Native American consultation on August 27, 2015, by contacting the Te-Moak Tribe of Western Shoshone and the Battle Mountain Band of the Te-Moak Tribe. To date the Te-Moak Tribe of Western Shoshone has not brought forward any concerns or comments. The Battle Mountain Band of the Te-Moak Tribe had a question regarding the purpose of the Plan boundary expansion. Subsequently, a site visit was scheduled for September 27, 2015, but was postponed. On October 5, 2015, the BLM Cultural Resources Specialist met with Chairman of Battle Mountain Band of the Te-Moak Tribe to discuss the boundary expansion. A site visit will be conducted and additional informational requests will be

fulfilled with the Battle Mountain Bank of the Te-Moak Tribe as part of the continual consultation process.

Social activities of Native Americans continue to define places of cultural importance across lands currently administered by the BLM. Some Western Shoshone maintain cultural, spiritual, and traditional activities, visit their sacred sites, hunt game, and gather available medicinal and edible plants. Through oral history (the practice of handing down knowledge from the elders to the younger generations), some Western Shoshone continue to maintain a world view similar to that of their ancestors.

Cultural, traditional, and spiritual sites and activities of importance to Tribes include, but are not limited to the following:

- Existing animal traps;
- Certain mountain tops used for vision questing and prayer;
- Medicinal and edible plant gathering locations;
- Prehistoric and historic village sites and gravesites;
- Sites associated with creation stories;
- Hot and cold springs;
- Collection of materials used for basketry and cradle board making;
- Locations of stone tools such as points and grinding stones (mano and matate);
- Chert and obsidian quarries;
- Hunting sites;
- Sweat lodge locations;
- Locations of pine nut ceremonies, traditional gathering, and camping;
- Rock collecting for use in offerings and medicine gathering;
- Tribally identified Traditional Cultural Properties (TCPs);
- TCPs found eligible to the NRHP;
- Rock shelters;
- Rock art locations;
- Lands or resources that are near, within, or bordering current reservation boundaries; and
- Actions that conflict with tribal land acquisition efforts.

In accordance with the National Historic Preservation Act of 1966 (P.L. 89-665), the NEPA, the FLPMA (P.L. 94-579), the American Indian Religious Freedom Act of 1978 (P.L. 95-341), the NAGPRA (P.L. 101-601) and EO 13007, the BLM must provide affected Tribes an opportunity to comment and consult on the proposed Project. The BLM must attempt to limit, reduce, or possibly eliminate any negative impacts to Native American traditional/cultural/spiritual sites, activities, and resources.

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

Various Tribes and Bands of the Western Shoshone have stated federal projects and land actions can have widespread effects to their culture and religion as they consider the landscape as sacred and as a provider. Various locations throughout the BLM MLFO administrative area host certain traditional, spiritual, and cultural use activities today, as in the past. TCPs, designated by the Tribes, are not known to exist in or within the vicinity of the Project Area. The BLM continues to solicit input from local tribal entities. The BLM is continuing to coordinate with the Tribes to identify any other sites or artifacts, or cultural, traditional, and spiritual use resources and activities that might experience an impact.

If any TCPs, tribal resources, sacred sites, etc. are identified within or in close proximity to the Project boundary, a protective “buffer zone” may be acceptable, if doing so satisfies the needs of the BLM, the proponent, and affected Tribe. The size of any “buffer zone” would be determined through coordination and communication between all participating entities.

The BLM Cultural Resource Specialist, accompanied by designated tribal observers, may periodically visit identified cultural resources sites within or near the Project Area. Native American Consultation and monitoring by the BLM and Tribal Representatives may occur throughout the life of a project to ensure that any identified TCPs are not deteriorating.

If a subsequent development plan or amendment to the Plan is submitted to the BLM as a result of an approval of this specific proposal, the BLM would again initiate consultation with the local Tribes and utilize any data collected during this proposal.

During the Project's activities, if any cultural properties, items, or artifacts (i.e., stone tools, projectile points, etc.) are encountered, it must be stressed to those involved in the proposed Project activities that such items are not to be collected. The EPM in Section 2.1.15 states that all activities would be halted immediately in the event of a discovery of a cultural resource. Cultural and archaeological resources are protected under the ARPA (16 US Code 470ii) and the FLPMA.

Though the possibility of disturbing Native American gravesites within most project areas is extremely low, inadvertent discovery procedures must be noted. Under the NAGPRA, Section (3)(d)(1), the discovering individual must notify the authorized officer in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation.

At this time, no specific impacts related to Native American Cultural Concerns have been from the Proposed Action. Tribal relations and coordination does not terminate with the land use decision itself, but rather continues to engage Tribes regarding treatments, mitigation, reclamation, and disposition of artifacts and deposits. This element is not further analyzed in this EA.

3.6.2.2 No Action Alternative

Under the No Action Alternative, existing mineral exploration and test mining activities at the Project would continue as authorized. Tribal consultation was conducted for the existing operations at the Project site and is ongoing. No concerns have been identified to date from the existing activities. Any change to the existing Plan of Operations or additional Notice-level activity proposed by Klondex in the vicinity of the Project would be subject to further consultation in order to avoid any potential impacts to Native American Cultural Concerns. Therefore, at this time, no impacts related to the No Action Alternative in relation to Native American Cultural Concerns would result from the No Action Alternative.

3.7 Noxious Weeds, Invasive and Non-Native Species

The analysis area for direct and indirect impacts related to noxious weeds, invasive, and non-native species is the Project Area.

3.7.1 Affected Environment

Noxious weeds, invasive and non-native species are species that are highly competitive, aggressive and spread easily. They typically establish and infest disturbed sites, along roadsides and waterways. Changes in plant community composition from native species to non-native species can change fire regimes, negatively affect habitat quality, biodiversity, and ecosystem structure and function.

Noxious weeds and invasive plant species have been defined as pests by law or regulation. The BLM defines a noxious weed as, “a plant that interferes with management objectives for a given area of land at a given point in time.” (BLM, 2014). The Federal Noxious Weed Act of 1974 (as amended by Section 15, Management of Undesirable Plants on Federal Lands, 1990) authorizes cooperation among federal and state agencies in the control of weeds. The BLM Battle Mountain District recognizes the current noxious weed list designated by the State of Nevada Department of Agriculture (NDOA) statute, found in NAC 555.010. Currently the list contains 47 noxious weed species. When considering whether to add a species to the list, the NDOA makes a recommendation after consulting with outside experts and a panel comprising Nevada Weed Action Committee members. Per NAC 555.005, if a species is found probable to be “detrimental or destructive and difficult to control or eradicate”, the NDOA, with approval of the Board of Agriculture, designates the species as a noxious weed. The species is then added to the noxious weed list in NAC 555.010. Upon listing, the NDOA will also assign a rating of “A”, “B”, or “C” to the species. The rating reflects the NDOA view of the statewide importance of the noxious weed, the likelihood that eradication or control efforts would be successful, and the present distribution of noxious weeds within the state.

An invasive species is defined as a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (EO 13112, signed February 3, 1999). As of May 2014, 47 noxious weeds were on the Nevada Noxious Weed List (NDOA, 2014).

The BLM’s policy relating to the management and coordination of noxious weeds and invasive plant species activities is set forth in the BLM Manual 9015 – Integrated Weed Management (BLM, 1992b). The BLM’s primary focus is providing adequate capability to detect and treat

smaller weed infestations in high-risk areas before they have a chance to spread. Noxious weed control is based on a program of prevention, early detection, and rapid response.

Klondex has taken weed control actions in coordination with the BLM to address the thistle in the Project Area. A site specific noxious weed management plan was developed by Klondex and incorporated into the Plan and describes control methods used. In addition to the Weed Management Plan included in the Plan, Section 2.1.15 includes details on the applicant-committed protection measures related to weed control that are incorporated into the Proposed Action.

In 2012, 2013, and 2014, multiple noxious weed surveys were performed within the Project Area and along access roads and focused on the current noxious weed list designated by the NDOA statute, found at NAC 555.010. An infestation of Scotch thistle (*Onopordum acanthium*) and bull thistle (*Cirsium vulgare*)¹ were observed along the Fire Creek drainage measuring approximately 0.62 acre and 0.75 acre, respectively (Figure 3-3). Invasive and non-native species observed include pale madwort (*Alyssum alyssoides*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), rubber rabbitbrush (*Ericameria nauseosus*), halogeton (*Halogeton glomeratus*), tansy mustard (*Descurainia pinnata*), and cheatgrass (*Bromus tectorum*). These species were primarily observed in previously disturbed or burned areas intermixed with native species, and no large populations or monocultures of these species were noted in the Project Area.

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

Under the Proposed Action, new surface disturbance would increase the potential for promoting the spread and establishment of noxious weeds and invasive and non-native species. Direct impacts include increased vehicular traffic and increased soil disturbance, which could introduce or spread existing infestations. Indirect impacts may include an increased disturbance exposure to wind-born seed resulting in the spread of noxious weeds.

Under the Proposed Action, the noxious and invasive weed control measures detailed in the Weed Management Plan included in the Plan would be implemented. Weed control measures include preventative actions to reduce the chance of spreading seeds from vehicle traffic. This would include avoiding known areas of noxious weeds, invasive, and non-native plant species during periods when they could be spread by vehicles. Implementation of Klondex's Weed Management Plan would ensure proposed activities follow proper BLM protocol regarding invasive, non-native weeds.

3.7.2.2 No Action Alternative

Under the No Action Alternative, Klondex would continue existing authorized operations at the Project, which have the potential to introduce or spread noxious or invasive species. The same protection measures outlined in Section 2.1.5 would be implemented. The No Action Alternative does not include the Weed Management Plan included in Plan (NVN-091111); however, ongoing coordination and management with the BLM regarding the prevention, control, and management of weeds at the Project would continue. The No Action Alternative has a similar but

¹ Bull thistle is considered an invasive/non-native species, not a noxious weed.

greater effect on noxious weed management based on the lack of having a Weed Management Plan incorporated into the action.

3.8 Wastes and Materials, Hazardous or Solid

The analysis area for direct and indirect impacts related to wastes and materials is the Project Area.

3.8.1 Affected Environment

Federal hazardous material and waste laws and regulations would be applicable to hazardous substances used, stored, or generated by the Project. Applicable federal laws would include the following: the Resource Conservation and Recovery Act (RCRA); Hazardous and Solid Waste Amendments (HSWA); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; aka Superfund); Toxic Substances Control Act (TSCA); Superfund Amendments and Reauthorization Act (SARA), Safe Explosives Act (SEA). Pursuant to regulations promulgated under Section 102 of CERCLA, as amended, release of a reportable quantity of a hazardous substance to the environment in a 24-hour period must be reported to the National Response Center (40 CFR Part 302). A release of reportable quantity on public land must also be reported to the BLM. In 1999, the metal mining industry began submitting reports on release of chemicals to the EPA and appropriate state agencies, under Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986; commonly referred to as the Toxics Release Inventory (TRI) Program.

The Project Area is an active exploration and test mining facility. Hazardous materials currently used in conjunction with mining activities to operate and maintain equipment include petroleum motor fuels and lubricants, antifreeze, explosives, and solvents. Hazardous materials are currently being used at the Project on a daily basis. Klondex uses a variety of hazardous materials, such as fuels and reagents. Solid wastes within the Project Area would consist of refuse, paper, and other inert materials generated by Project activities. These materials and wastes are transported, transferred from trucks to containers and containment areas, used, and disposed according to federal and state regulations.

3.8.2 Environmental Consequences

3.8.2.1 Proposed Action

A Class-III landfill would be operated within the footprint of the WRSF which would allow for onsite disposal of inert construction wastes. Section 2.1.11 of this EA outlines the amounts and management of these wastes and hazardous materials associated with the Proposed Action. These are similar in nature to the hazardous materials and fuels currently being utilized for the Project. A fuel station would be constructed thereby increasing the volume of fuels stored onsite, but reducing the frequency of the transport of fuels to the site.

The generation of wastes and the use of hazardous materials and fuels as a result of the Proposed Action may result in the inadvertent release of these wastes or materials. The Plan includes a Spill Prevention and Control Plan that outlines how these wastes and materials would be managed and how a spill would be addressed. Therefore, the Proposed Action would have a minimal impact from hazardous and solid waste. This element is not further analyzed in this EA.

3.8.2.2 No Action Alternative

Under the No Action Alternative, Klondex would continue to operate as authorized with respect to the onsite use and management of hazardous materials and wastes. Section 2.2.10 of this EA outlines the amounts and management of these wastes and hazardous materials associated with the No Action Alternative which is similar to the Proposed Action with regards to the types and waste management practices but with less quantities used and stored onsite.

3.9 Water Quality

The analysis area for direct and indirect impacts to water resources is the Project Area.

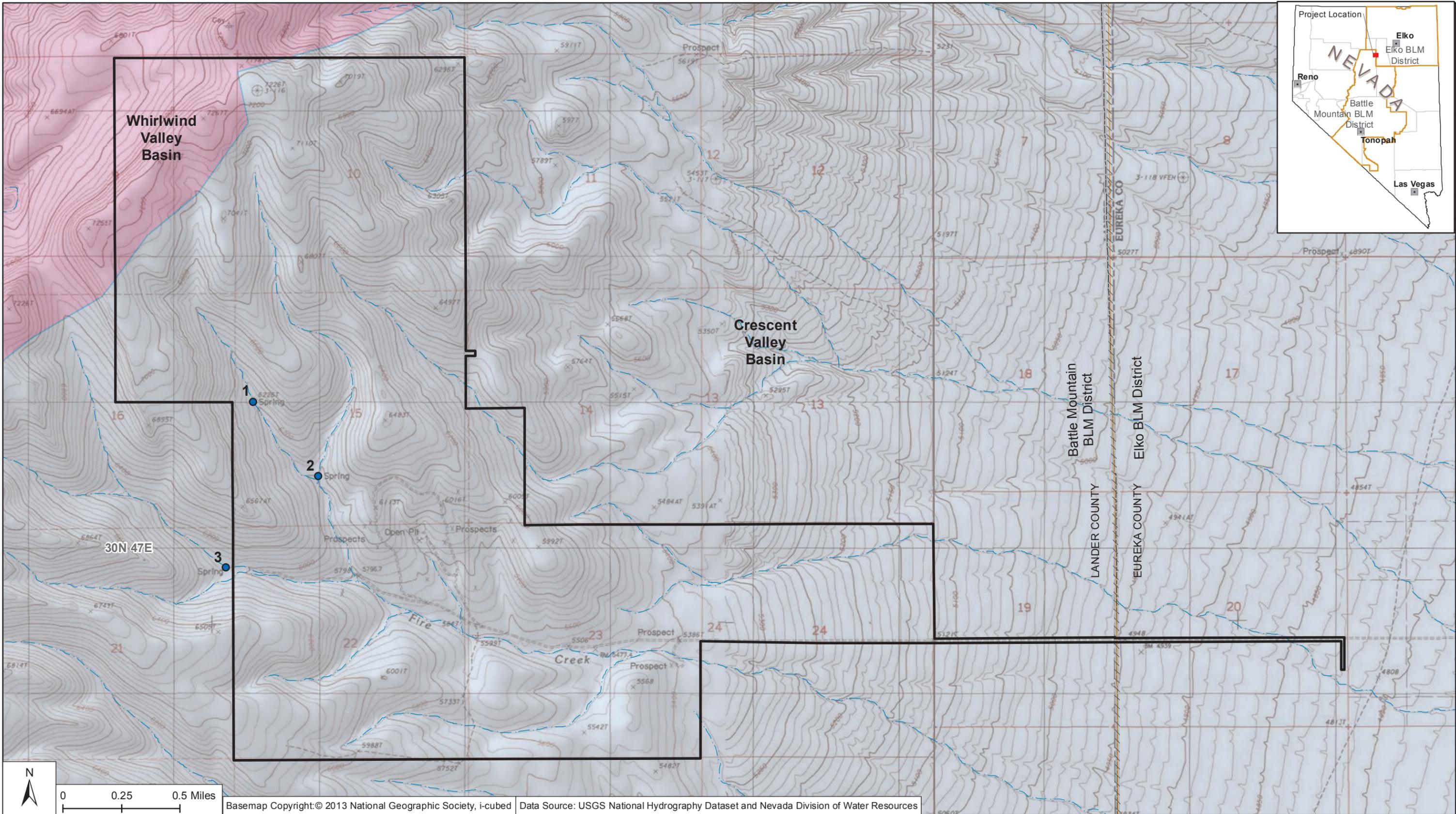
A baseline hydrogeology report was prepared that summarizes the hydrogeological and surface hydrology conditions within the Project Area and surrounding area (Interrallogic, 2015a). This report incorporated all existing surface water and groundwater quality monitoring conducted at the Project. A geochemistry baseline report was prepared discussing the waste rock and ore characterization associated with the Proposed Action (Interrallogic, 2015b). In addition, a Seep and Spring Report was prepared detailing the riparian and wetland resources within the Project Area (Rubicon Environmental Consulting, 2015b). The majority of the Project Area is located in Nevada Division of Water Resources (NDWR) Crescent Valley Hydrographic Basin (#54) with a small portion in the northwest corner of the Project located within the Whirlwind Valley Hydrographic Basin (#60) as shown on Figure 3-5.

3.9.1 Affected Environment

3.9.1.1 Groundwater Resources

The fractured and altered volcanic stratigraphy at the Project creates a compartmentalized system of groundwater flow due to flow barriers created by stratigraphy, altered units and major faults. Groundwater flow in the volcanic units at the Project is controlled by geologic structures that tend to form barriers to flow in the east-west direction but may be conduits along strike. Stratigraphic controls, including highly weathered basalt layers also tend to inhibit vertical flow, resulting in perched or otherwise hydraulically disconnected, groundwater zones or compartments. The combination of the structural and stratigraphic controls results in a compartmentalized flow system in the Project Area with a “stair stepped” groundwater table from east to west. The structural and stratigraphic controls also result in a low permeability flow system. The low primary porosity and fractures of the volcanic units, in combination with clay filled secondary porosity (fractures and faults) results in low storage groundwater system. The existing underground exploration drifts and proposed mine workings are located primarily in a fault block bounded by the Alamik Fault and Muleshoe Fault (Interrallogic, 2015a).

The same groundwater conditions as the existing operations would be encountered and the same groundwater quality treatment and management would continue. Ongoing and additional groundwater quality monitoring would be conducted in accordance with the WPCPs for the Project. Therefore, groundwater quality is not analyzed further.



LEGEND

Project Area	NHD Spring/Seep	Hydrologic Basins
BLM District Boundary	NHD Intermittent Stream	Crescent Valley
County Boundary		Whirlwind Valley

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 Surface Water Resources

Figure 3-5
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3.9.1.2 Surface Water Resources (including Wetlands and Riparian Areas)

Drainages

Within the Project Area, the main surface water feature is the Fire Creek drainage, which has a perennial segment with regular flow controlled by the Fire Creek Spring (Spring/Seep #3). Fire Creek flows on a seasonal basis for approximately 0.5 mile before fully infiltrating into the alluvial soils. There are multiple small tributary channels within the Project Area that connect with the Fire Creek drainage. In addition to storm water runoff and snowmelt, the source of water for the main northern tributary to the Fire Creek drainage is from ground water seepage at two seeps/springs points (Spring/Seep #1 and #2). The BLM has identified three head cuts (knick points) within the Fire Creek drainage that are causing erosion of the stream channel and bed.

There are two other unnamed ephemeral drainages within the Project Area. These drainages are located north of Fire Creek and are intermittent channels with moderate incision averaging 1.6 feet to 3.3 feet. The drainages exhibit a step pool morphology, with the more level pools (one to five degree slope) averaging ten to 15 feet wide and dominated by graminoid (grass or grass-like plants) vegetation. The steps or riffles are steeper, approximately 15 degrees and are naturally incised and narrower (three to eight feet across) to one foot in depth. No head cuts (knick points) were observed on these drainages, and the banks are 80 to 100 percent vegetated. These drainages appear to receive water from precipitation runoff and seasonal snow melt. Other than the Fire Creek drainage, there are no surface waterbodies located downgradient of the Project. All drainages terminate prior to entering the playa area within the center of Crescent Valley. There is no physical surface connection to the Humboldt River. Drainages in the Project Area and vicinity are shown on Figure 3-5.

Regional Seep and Springs

The USGS National Hydrography database was used to identify seep and spring features that may be present within the general region. According to this database there are 24 seep/spring features within a five-mile radius around the Project Area, one of which is located within one-mile of the northern boundary of the Project Area.

Project Area Seeps and Springs

A spring and seep assessment was performed to characterize hydrology, soils, and vegetative conditions of the spring-seep locations within the Project Area (Rubicon Environmental Consulting, 2015b). In addition, wetland and riparian vegetation was mapped along the drainages within the Project Area. There are two unnamed Spring/Seeps located within the Project Area boundary along with the Fire Creek Spring is located immediately west of the Project Area boundary as described below and shown on Figure 3-5.

Spring/Seep #1

Seep/Spring #1 is located within a drainage channel and meets wetland criteria (hydric soils, hydrophytic vegetation, and hydrology). This spring is associated with the surface water monitoring point SS-2 to support the Water Pollution Control Permit for the Project. This site is monitored on a quarterly basis and water quality data is collected if water is present. No regular flow has been observed at this location and when water is present, the flow rate has been too low to measure.

Soils were saturated at this site to a depth of approximately 18 inches and one inch of surface/ponded water was present during the spring assessment. The point of discharge is characterized by herbaceous wetland vegetation with riparian scrub vegetation downstream and on the margins of the drainage where the soils are moist. The vegetation plot assessed had 20 percent vegetation cover and 80 percent bare ground.

Spring/Seep #2

Seep/Spring #2 is located within a drainage channel and meets wetland criteria (hydric soils, hydrophytic vegetation, and hydrology). No regular flow has been observed at this location and when water is present, the flow rate has been too low to measure. Similar to Spring/Seep #1, the point of discharge is characterized by herbaceous wetland vegetation with riparian scrub vegetation downstream. The vegetation plot assessed had 98 percent vegetation cover and two percent bare ground.

Spring/Seep #3 (Fire Creek Spring)

The discharge point for the Fire Creek spring is located immediately west of the Project Area and discharges into the Fire Creek drainage. This spring is also associated with the surface water monitoring point SS-1 to support the WPCP for the Project. Below monitoring station SS-1, the spring supports a seasonal flow within the Fire Creek drainage that extends a distance of approximately 0.5 mile before fully infiltrating into the alluvium. Flow rates are greatest during the spring, during snowmelt runoff, and lowest during the fall and winter when the streamflow is supplied by baseflow. Flow rate data along the reach of Fire Creek from SS-1 to a downgradient monitoring station range from 0.05 cfs to 0.30 cfs.

Wetland and Riparian Zones

The two springs within the Project Area and the Fire Creek spring, located immediately west of the Project Area, support wetland and riparian vegetation within their associated drainage features. The wetland obligate species are concentrated near the spring discharge areas where the soils are moist. These species include sedges, rushes, and spikerush species. Within ponded water speedwell species and watercress were observed. Downstream of the spring, riparian scrub vegetation is present within the drainage channels where seasonally moist soils are present. The dominant shrubs observed within the riparian vegetation is dominated by wild rose (*Rosa* spp.), and chokecherry (*Prunus virginiana*). The dominant forbs included stinging nettle (*Urtica dioica*), common yarrow (*Achillea millefolium*), and sheep sorrel (*Rumex crispus*). The riparian and wetland vegetation within the Project Area is shown on Figure 3-3 and totals approximately 4.51 acres.

3.9.1.3 Waste Rock Material Characterization

The objective of the baseline geochemical characterization program was to develop a geochemical data set representative of the principal waste rock/alteration types and ore material, focusing on the long-term environmental chemistry and their potential to impact the environment, in particular water quality. The results of this analysis were incorporated into the Project design and waste and water management practices were assessed to ensure that the proper management techniques would be employed to prevent any impact to Waters of the State and to comply with applicable regulations and the Project's WPCP stipulations.

Waste rock characterization was representative of the material and was proportional to the tonnages of waste rock formation/lithology/alteration. To this end, samples were selected to represent the expected range of chemistry within each formation/lithology/alteration type, and were targeted to represent the materials spatially. A total of 43 samples were chosen to represent waste rock for: formation, lithology, alteration, geochemistry, and spatial location (laterally and with depth). This over-representation of samples for the small amount of waste rock to be generated under the Proposed Action (570,093 tons) was the result of deliberate oversampling to accommodate some uncertainty in the mine plan at the time of sample selection. Geochemical analysis on the 43 samples included the following:

- Acid-Base Accounting (ABA), including paste pH and sulfur speciation;
- Total inorganic carbon (TIC);
- NAG testing;
- Multi-element analyses (MEA);
- Meteoric Water Mobility Procedure (MWMP);
- Humidity Cell Testing (HCT); and
- Optical mineralogy and x-ray diffraction (XRD) mineralogy.

Baseline geochemical testing confirmed that some portion of the Project's waste rock has the potential to be acid generating; however, a significant portion, almost exclusively consisting of weakly/un-altered rock, contains lower sulfide-S and indicates non-PAG behavior. This result is significant because the majority of the waste rock from the Project would consist of unaltered basalt (approximately 86 percent of life of mine waste rock production). The current Plan estimates that approximately 399,000 tons of waste rock would be stored aboveground in the engineered WRSF during mining (Interralogic, 2015b).

Based on the MWMP and HCT results, water in contact with relatively low sulfur materials is expected to maintain neutral pH with some alkalinity, at least during the short-term mining operation and prior to closure. These analyses indicate that metals/metalloid concentrations in the contact waters would be low; however, both tests identified some analytes that may become elevated in neutral waste rock runoff/seepage. Where higher sulfur material is present, the possibility of acid-generation exists along with higher concentrations of aluminum, iron, manganese, and sulfur and low exceedances of some metals/metalloids (Interralogic, 2015b).

3.9.2 Environmental Consequences

3.9.2.1 Proposed Action

Surface Water Quality

In areas where Project roads and facilities would cross these drainages, an increase in stormwater runoff and soil erosion may occur. As a result, sedimentation may increase in these drainages and surface water quality may be impacted. Klondex would implement the environmental protection measures identified in Section 2.1.15 and in more detail in the Project's Stormwater Pollution Prevention Plan included as Appendix D of the Plan. Additionally, Klondex would continue to monitor surface water locations along Fire Creek and the two spring locations onsite. In addition, no disturbance would occur in the spring and seep areas or any wetland and riparian vegetation.

The WRSF has been designed to manage PAG material similar to the existing WRR. During operations, water in contact with exposed waste rock would be managed and treated in the water treatment system onsite. The WRSF would be reclaimed using standard best engineering and closure practices, including a soil cover suitable for the dry climate to limit infiltration and erosion. In addition, the closure of the facility would limit stormwater contact through permanent diversion.

3.9.2.2 No Action Alternative

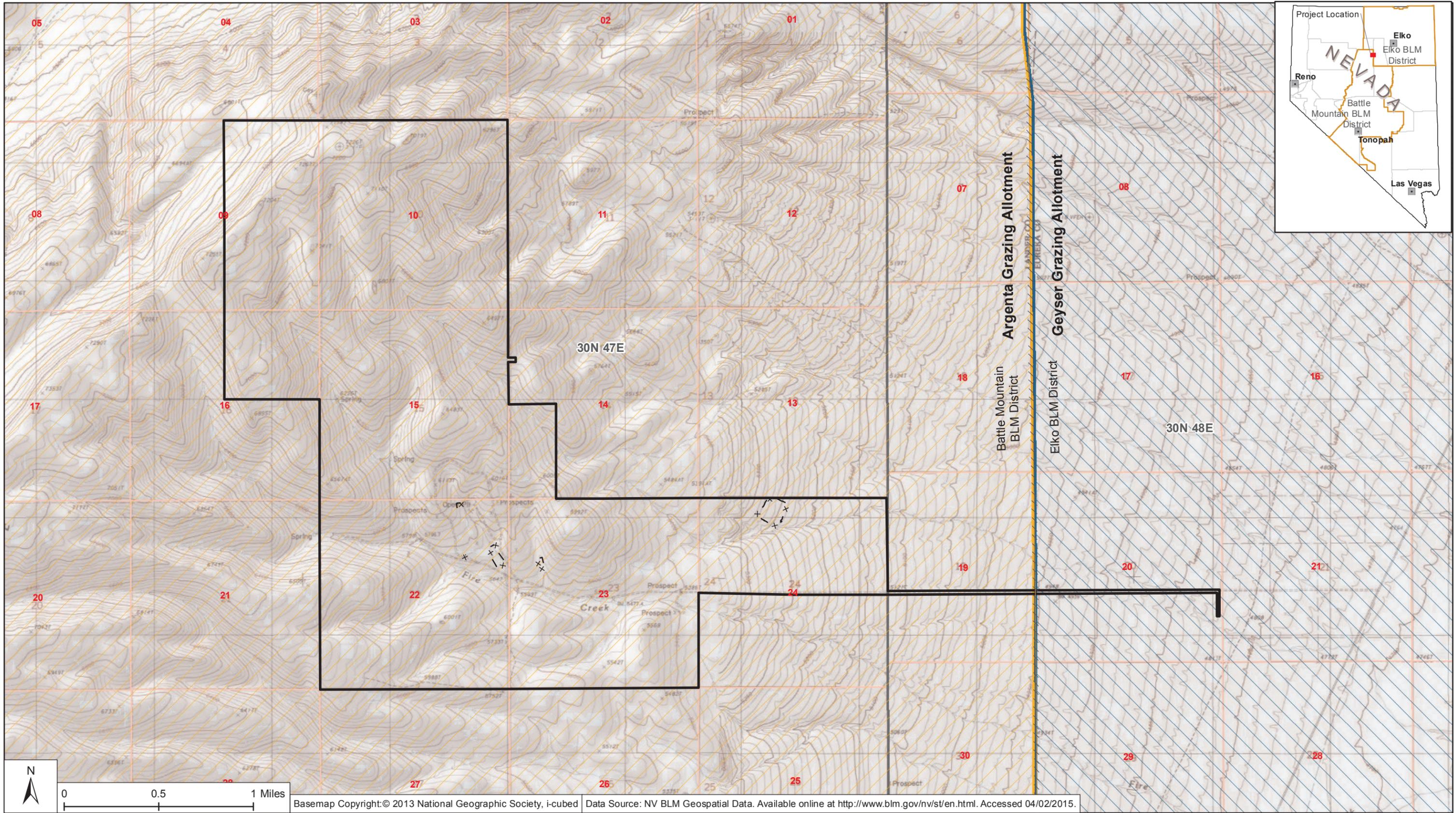
Under the No Action Alternative, Klondex would continue existing operations as previously authorized, which include 150 acres of authorized disturbance within the Project Area. No new disturbance would occur under the No Action Alternative unless previously disturbed acres were reclaimed and released by the BLM. Disturbance related to ongoing surface exploration activities has the potential to increase erosion and sedimentation, but the No Action Alternative includes the same environmental protection measures outlined in Section 2.1.15. The existing WRR is designed to manage PAG waste and reduce stormwater runoff during operations and in closure. The No Action Alternative does not incorporate the improvements to the Fire Creek drainage. The direct and indirect impacts under the No Action Alternative would, therefore, be similar but less than the impacts under the Proposed Action, but would not include the beneficial impact of stream channel restoration.

3.10 Grazing Management

The analysis area for direct and indirect impacts to grazing management is the Project Area in the context of respective the grazing allotments.

3.10.1 Affected Environment

The Project is located primarily within the Argenta Grazing Allotment, which is presently managed for approximately 18,025 AUMs annually. An AUM represents the amount of forage required to support one cow and her calf for a month. The average acreage per AUM within the Argenta Grazing Allotment is 7.8 acres. The Project access road is located within the Geyser Grazing Allotment, but the Proposed Action would not affect this allotment. The Geyser Grazing Allotment is presently managed for approximately 2,411 AUMs annually and the average acreage per AUM is 20 acres. Figure 3-6 shows the Project Area in relationship to the grazing allotments.



- LEGEND**
- Project Area
 - BLM District Boundary
 - Fence
 - Township/Range
 - Section
 - Grazing Allotment**
 - Argenta
 - Geyser

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Grazing Allotments

Figure 3-6
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3.10.2 Environmental Consequences

3.10.2.1 Proposed Action

Based on the proposed surface disturbance associated with the Proposed Action on public land approximately 94.25 acres would be temporarily suspended from grazing, which equates to approximately 12 AUMs in the Argenta Grazing Allotment. This represents approximately 0.08 percent of the AUMs within the Argenta Grazing Allotment. All proposed disturbance on public land would be subject to reclamation, and no acres would be permanently removed from grazing.

Grazing is active within the Project Area, and Klondex would continue to work with grazing permittees to ensure operations are conducive to grazing on public land within the Project Area. The Proposed Action includes approximately 1,000 feet of fencing and barbed-wire fencing (meeting BLM standards) to secure new ponds, underground openings, and ore stockpiles. Figure 1-3 shows the existing chain-link fencing at the Project. Figure 2-2 shows the 1,000 feet of proposed chain-link fencing included in the Plan of Operations. Figure 3-6 shows the existing and proposed fencing as well as the existing and proposed barbed-wire fencing, representing all of the areas in the Project Area that are excluded from grazing. However, these areas are within active mine areas and no vegetation is or would be present within these areas to support for grazing. Therefore, the impact of the Proposed Action on range resources would be minimal.

3.10.2.2 No Action Alternative

Under the No Action Alternative as analyzed in the 2008 EA, a temporary loss of 15 AUMs resulted from existing facilities and operations. Existing chain link fencing and barbed wire fencing is present around the RIBs, ponds, and underground openings (shown on Figures 1-3 and Figure 3-6). No vegetation is present in these areas for grazing. Therefore, No Action Alternative is similar to the Proposed Action in the level of temporary AUM loss.

3.11 Recreation

The analysis area for direct and indirect impacts to recreation is the Project Area.

3.11.1 Affected Environment

The Project Area is relatively isolated and undeveloped. There are no recreational facilities within the Project Area and vicinity, and in this part of Nevada, developed recreational opportunities are relatively sparse. In the Project Area, opportunities for public recreation are considered as dispersed in nature and primarily include off-highway vehicle use, hunting, and camping. Mountain biking, horseback riding, sightseeing, outdoor photography, nature study, wildlife viewing, bird watching, and rock collecting may also occur.

3.11.2 Environmental Consequences

3.11.2.1 Proposed Action

The Proposed Action would not change existing access to public lands within the Project Area for recreational uses. The Project Area is not known as a popular destination for public use, and no annual commercial or competitive permitted events occur in the area. Disturbed areas totaling approximately 94.25 acres on public land would be reclaimed following Project completion returning all public land to pre-mining conditions and open for recreation. Some facilities on

private land may remain following closure including water management ponds. This land use is not further analyzed in this EA.

3.11.2.2 No Action Alternative

The No Action Alternative is the same as the Proposed Action Alternative in that no change in existing access to public lands would result. The existing disturbance (approximately 82.73 acres) on public land from the authorized activities is less than authorized acreage (approximately 117.37 acres). All public land would be reclaimed following Project activities and open for recreation.

3.12 Social and Economic Values

The analysis area for direct and indirect impacts related to social and economic values is Lander County.

3.12.1 Affected Environment

The closest towns to the Project Area are Crescent Valley (six miles), Battle Mountain (45 miles), Carlin (55 miles), and Elko (75 miles). The towns have varying degrees of services that may include post offices, gas stations, hotels, restaurants, automobile repair garages, and community services including law enforcement, fire departments, ambulances, schools, and health care. Major industries that contribute to the economic base for Lander County include government services, mining, transportation and utilities, ranching, farming, and gaming (BLM, 2008b).

Lander County is located in north-central Nevada and encompasses 5,494 square miles. Over 85 percent of the land in the County is administered by the federal government. Interstate 80 traverses the county in an east-west direction on the northern end, as does Highway 50 on the southern end. State Highway 305, which runs north-south, bisects the center of the county. This highway links the cities of Battle Mountain (County seat) and Austin. The town of Kingston is located in the southern part of Lander County on Highway 376 (BLM, 2008b).

The total population of Lander County in 2011 was estimated to be 5,841, which was a decrease since 1990 (population 6,266) (Department of Employment Training and Rehabilitation [DETR], 2015).

Approximately 85 percent of residents live in the northern portion of the county and 65 percent of the residents live in urban settings. In recent years Lander County's economy has been dominated by mining. Agriculture also plays an important role in the local economy with production of high quality alfalfa hay and seed (BLM, 2008).

The median household income in Lander County in 2011 was \$64,392 annually. The majority of job-related income is derived from the mining sector (DETR, 2015).

The unemployment rate in Lander County was 6.5 percent in 2014, which was 1.3 percent lower than the State of Nevada as a whole at 7.8 percent (DETR, 2015).

3.12.2 Environmental Consequences

3.12.2.1 Proposed Action

Surface exploration and mining activities associated with the Proposed Action would continue until approximately 2019. The direct impact of the Proposed Action would be the addition of approximately 97 employees to the Klondex workforce. Since a majority of the current Fire Creek employees reside in Lander and Elko Counties, it is assumed a majority of the new employees would reside in the same locations and be hired from the existing labor pool. Even if all 97 employees were new residents and lived in Lander County, this would only represent an approximately 1.6 percent increase in total population of Lander County. There would be sufficient labor force to meet the increased demand for employees.

The individuals involved with the Project could impact the local community in the following ways: impacts to the labor force and unemployment rates; impacts to personal income; impacts to population; impacts to housing; impacts to community facilities and services, including public safety, schools, health care and social services, utilities, recreational facilities, and county administrative functions; and Lander County fiscal conditions. The housing resources are anticipated to be sufficient for the added demand created by the Proposed Action. There would, however, be indirect employment effects as new residents increase the demand for goods and services, which is a positive effect on the local economy. There would also be minor increased demand for public services (schools, medical services, water, wastewater, etc.).

3.12.2.2 No Action Alternative

Under the No Action Alternative, Klondex would not be able to continue test mining at the Project due to the need to construct additional capacity for waste rock storage. Surface exploration activities could continue, but the majority of the employees associated would be laid off including approximately 85 employees. The No Action Alternative would increase the unemployment rate in Lander County and potentially decrease population as some of the mine workers and contractors would move elsewhere to find employment.

3.13 Soils

The analysis area for direct and indirect impacts to soils is the Project Area.

3.13.1 Affected Environment

The Natural Resource Conservation Service (NRCS) Websoil Survey was reviewed for the soil associations and complexes within Project Area as shown on Figure 3-7. According to the NRCS Websoil Survey (NRCS, 2015), there are five soil units within the Project Area. Table 3-10 summarizes these soil units and their associated ecological sites.

Table 3-10: Soil Units within the Project Area

Soil Unit ID	Soil Unit Name	Acres	Setting/Profile	Associated Ecological Sites
251	Bucan-Bucan, steep association	256.2	5,200 to 5,500 feet amsl, slope 15 to 30%, mountains/ cobbly loam	Loamy 8-10 precipitation zone (p.z.) (R024XY005NV)
901/1041	Tenabo-Ricert association	590.5	4,700 to 5,100 feet amsl, slope 0 to 4%, fan piedmonts/ gravelly, silty, clay, sandy loam	Loamy 5-8 p.z. (R024XY002NV)
1085	Trunk-Dewar-Stingdorn association	362.3	5,500 to 6,000 feet amsl, slope 8 to 50%, mountains, hills, fan remnants/ very cobbly loam, gravelly loam	Loamy 8-10 p.z. (R024XY005NV) and Loamy 5-8 p.z. (R024XY002NV)
1201	Slaven-Linrose-Cleavage association	543.5	6,500 to 7,200 feet amsl, slope 4-75%, mountains/ gravelly loam	South slope 13-16 p.z. (R024XY029NV), Steep gravelly loam 14+ p.z. (R024XY042NV), and Claypan 12-16 p.z. (R024XY027NV)
3127	Walti-Cleavage-Softscrabble Association	1859.7	6,500 to 7,900 feet amsl, slope 15 to 30%, mountains/ gravelly loam	Claypan 12-16 p.z. (R024XY027NV), Mountain Ridge (R024XY016NV), and Loamy slope 12-14 p.z. (R024XY021NV)

3.13.1 Environmental Consequences

3.13.1.1 Proposed Action

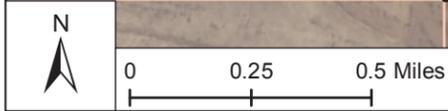
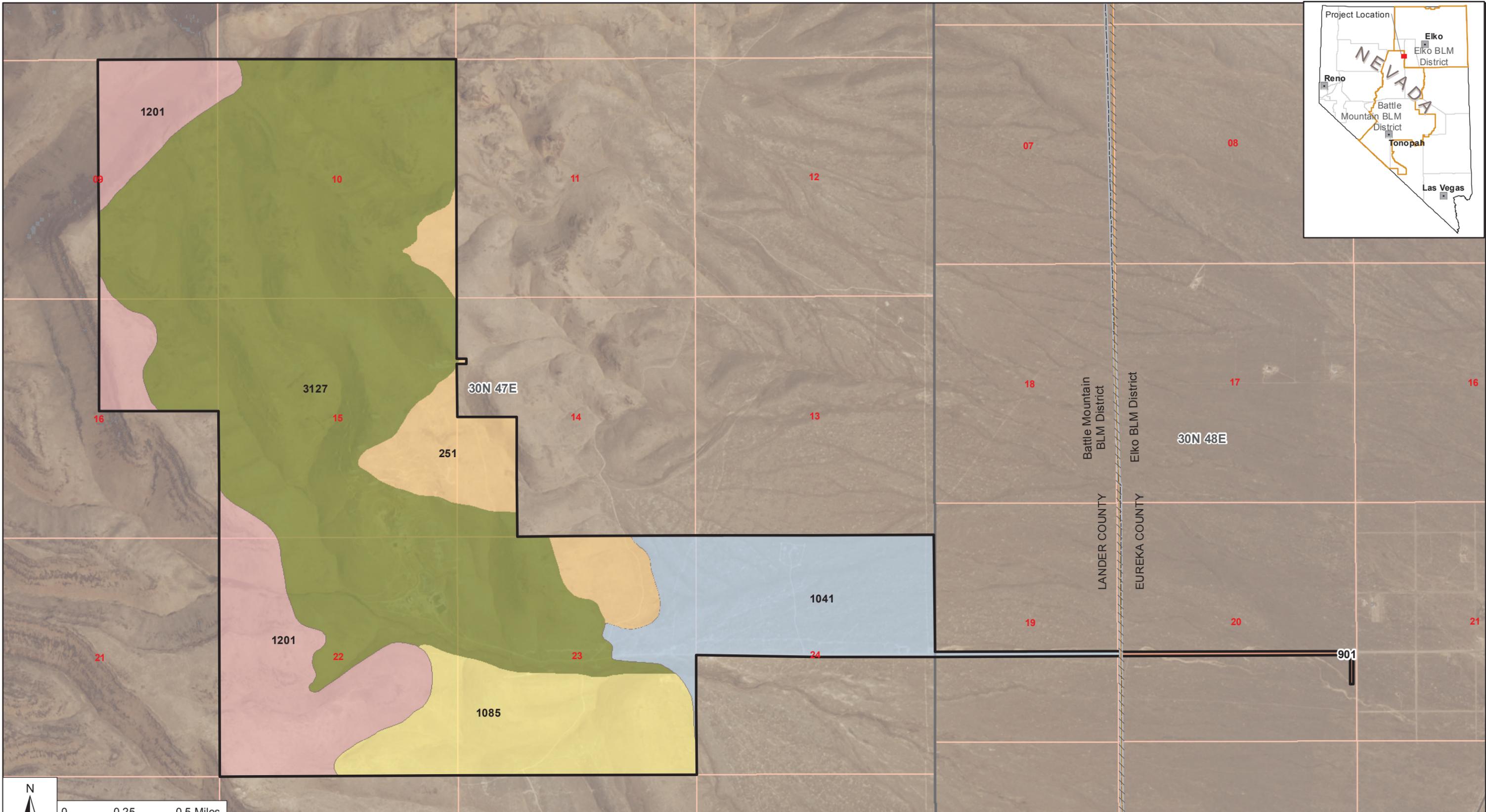
Under the Proposed Action, approximately 184.44 acres of additional soil would be disturbed outside of the authorized disturbance footprint. The majority of the existing and proposed disturbance occurs within the Walti-Cleavage Softscrabble Association, which comprises over 50 percent of the Project Area including the central operations area. Direct impacts from the new and reconfigured facilities would include potential increases in soil erosion due to wind and storm water runoff until the disturbed areas were stabilized, i.e., implementation of BMPs. The disturbance would be conducted in phases and would limit the amount of disturbed area subject to erosion at one time. Concurrent reclamation of exploration drilling disturb and would be completed when feasible. Final reclamation activities in the Plan include the stabilization and revegetation of all disturbed areas within the Project Area.

New growth media stockpiles and the existing growth media stockpiles subject to relocation would have a higher erosion potential than the natural environment due to the potential for decreased soil compaction, increased slope gradients, and the loss of stabilizing vegetation cover. Growth media stockpiles would be stabilized and revegetated following the removal of material for the reclamation of other facilities during final reclamation activities.

3.13.1.2 No Action Alternative

Under No Action Alternative, Klondex would not implement the Plan and construct new facilities and reconfigure existing facilities. Existing surface exploration and test mining would continue to operate through the existing permitted action. Direct impacts would continue, i.e.,

potential increase in soil erosion due to wind and storm water runoff, until the disturbed areas were



Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community | Data Source: NRCS Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/>. Accessed 04/02/2015.

LEGEND		NRCS Soil Survey – Lander and Elko Counties, NV	
	Project Area		1041 Tenabo-Ricert association
	BLM District Boundary		1201 Slaven-Linrose-Cleavage association
	County Boundary		1085 Trunk-Dewar-Stingdorn association
	Township/Range		251 Bucan-Bucan, steep association
			3127 Walti-Cleavage-Softscrabble
			901 Tenabo-Ricert association

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 NRCS Soil Associations

Figure 3-7
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stabilized, i.e., implementation of BMPs and reclamation. There would be no change in the size or erosion potential of the current growth media stockpiles. Direct and indirect impacts would be similar but less than the impacts under the Proposed Action.

3.14 Transportation, Access, and Public Safety

The analysis area for direct and indirect impacts related to transportation, access, and public safety is the Project Area, access road, and ore transportation route to Midas Mine.

3.14.1 Affected Environment

There are four major road segments associated with the transport of ore from the Project to the Midas Mine totaling approximately 132 miles (one-way):

- Project Access Road (10th Street/County Road G-247) – four miles
- State Route (SR) 306 – 16 miles
- I-80 from the Beowawe Exit (#261) to the Golconda Exit (#194) – 66 miles
- Midas Road (SR 789/18) – 46 miles

Project Access Road

The Project access road is an unpaved two-lane road that connects the Project Area to SR 306. This road is maintained by Klondex in coordination with Eureka and Lander Counties. Prior to any maintenance or improvement activities Klondex would continue to contact the county road superintendents regarding the nature of the road work. The road would need to be widened in certain areas and potentially improved to accommodate the additional truck traffic resulting from the Proposed Action which would be coordinated with Lander County. This road does not have an AADT established and no traffic volumes were available. In addition to the truck traffic from the Project, the road is used by local residents as well as mine personnel on a daily basis. The portions of the road subject to widening are contained within the 3809 Plan boundary and therefore would not require a separate ROW grant. If the segments outside of the 3809 Plan boundary are determined to need expansion or upgrade, Klondex would submit a separate right-of-way application to the BLM, subject to additional NEPA analysis.

SR 306

SR 306 provides access to the mine vicinity from I-80 through Beowawe. SR 306 has a functional classification of Urban or Rural Minor Collector in the segment associated with Project travel. Lander County has identified the level of service (LOS) for roads within the County as good (Lander County, 2005). For rural two-lane major collector roads, the LOS is A if annual average daily traffic (AADT) is at or below 2,500 AADT (NDOT, 2015). According to NDOT (2015), traffic volumes in 2013 in the segment of the road within Lander County was 600 AADT and 1800 AADT in the Eureka County portion near the Beowawe interchange with I-80.

I-80

Klondex would use I-80 to provide access for its vehicles hauling ore from the Project Area to the Midas Mine in Elko County, Nevada. I-80 is a federal four-lane interstate traversing east / west across northern Nevada. It connects the communities of Elko in the east and Reno in the west. The section of I-80 connecting Battle Mountain and Elko is four lanes, paved, separated by a median and has a typical posted of speed of 70 miles per hour. Interstates are designed to

provide high mobility, carry large volumes of traffic and a variety of vehicles, and provide access between population centers (FHWA, 1989).

For LOS, a road classified as an interstate is determined to have a LOS A if the AADT is 46,000 or less. All applicable sections of I-80 have a LOS A. For the section of I-80 in Lander County, NDOT in 2007 (last year in which data was available) classified 3,300 of the vehicles as heavy trucks and 195 as light trucks. Of the 3,300 heavy trucks, 360 were seven-axle multi-trailer trucks and 2,700 were five-axle semi-tractor trailer trucks (NDOT, 2015).

Midas Road (SR 789/18)

Midas Road serves as the major connection between I-80 and the Midas Mine. A portion of the route is a two-lane paved route and then a portion is a dirt road maintained by Elko County. This road is designed by NDOT as a Minor Collector. Similar to SR 306, the LOS is A if the AADT is at or below 2,500. A portion of this road serves other mines in the area including Turquoise Ridge Mine and Twin Creeks Mine. Traffic volumes for this road near the Golconda exit in 2013 were 1,200 AADT.

3.14.2 Environmental Consequences

3.14.2.1 Proposed Action

The Proposed Action would result in increased travel along the transportation route between the Project Area and Midas Mine. All of the roads are currently designed for and used by multi-axle trailer trucks. Currently ore generated from testing mining at the Project is being shipped to Midas Mine but only when enough ore is generated to warrant shipping. The Proposed Action increases the mining rate to full production levels and ore would need to be shipped daily to the Midas Mine for processing. There would be an average of ten round-trip truck shipments daily, not to exceed a maximum of 19 trips. This equates to an AADT related to truck transportation of 38 AADT that would be added to the travel routes.

Based on evaluation of the LOS associated with each road segment, the added traffic volume from the Proposed Action would not cause any of the roads to exceed LOS designations. The maintenance of the Project access road would be coordinated with Lander County to ensure the road conditions are safe for the residents using the road as well as Project employees.

3.14.2.2 No Action Alternative

Under the No Action Alternative, test mining may be reduced or cease due to lack of storage space for the waste rock material thereby reducing truck travel from the Project Area to the Midas Mine. The Project Area would still be accessed by Project personnel conducting surface exploration and maintaining the Project Area.

3.15 Vegetation

The analysis area for direct and indirect impacts to vegetation is the Project Area.

3.15.1 Affected Environment

The Project is located within the Intermountain Region, Great Basin Division, Central Great Basin Section floristic zone (Cronquist et al., 1972). Approximately 895 acres within the Project

Area burned in 1996 and approximately 276 acres in the northern portion of the Project Area burned again in 2011 as shown on Figure 3-8. Dominant native vegetation in the hilly portions of the Project Area include sagebrush and various grass species and desert scrub species in the lower alluvial portions of the Project Area. Some forbs and understory species are present in the more intact habitat areas, primarily outside of the burn areas. Riparian scrub vegetation is present along the perennial portion of the Fire Creek drainage as shown on Figure 3-3.

The following five ecological sites were observed within the Project Area as shown in Figure 3-8 and described below:

- Loamy 5-8" P.Z.
- Loamy 8-10" P.Z.
- Claypan 12-16" P.Z.
- Cobbly Claypan 8-12" P.Z.
- South Slope 12-16" P.Z.

Loamy 5-8" P.Z.

The Loamy 5-8" P.Z. ecological site (Ecological Site ID #R024XY002NV) covers approximately 434.95 acres of the Project Area and is located on alluvial flats, fan skirts, and low hills in the eastern portion of the Project Area.

The Ecological Site Description describes this vegetation community as dominated by shadscale (*Atriplex confertifolia*), budsage (*Picrothamnus desertorum*), and Indian ricegrass (*Achnatherum hymenoides*) (USDA, 1973). The dominant species observed in this community are shadscale, budsage, and Indian ricegrass. Forbs were interspersed with the shrubs and included Humboldt River milkvetch (*Astragalus iodanthus*), woolly milkvetch (*Astragalus purshii*), orange globemallow (*Sphaeralcea munroana*), pale madwort (*Alyssum desertorum*), and halogeton (*Halogeton glomerata*). Grasses noted within this community included Sandberg's bluegrass (*Poa secunda*) and bottlebrush squirreltail (*Elymus elimoides*). Inclusions of Loamy 8-10" P.Z. are present along drainages and in low areas in this community. These inclusions are dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and bluebunch wheatgrass (*Pseudoroegneria spicata*). The Loamy 5-8" P.Z. ecological site appears to be in good condition.

Loamy 8-10" P.Z.

The Loamy 8-10" P.Z. ecological site (Ecological Site ID #R024XY010NV) covers approximately 617.13 acres of the Project Area and is located on hills and lower slopes in the southern portion of the Project Area.

The Ecological Site Description describes this vegetation community as dominated by Wyoming big sagebrush and Thurber's needlegrass (*Achnatherum thurberiana*) (USDA, 1973). The dominant species observed in this community are Wyoming big sagebrush, yellow rabbitbrush (*Chrysothamnus viscidiflorus*), four-wing saltbrush (*Atriplex canescens*), Sandberg's bluegrass, and bluebunch wheatgrass, with littleleaf horsebrush (*Tetradymia glabrata*) and broom snakeweed (*Gutierrezia sarothrae*) in lower abundance. Forbs were interspersed with the shrubs and included woolly milkvetch, matted buckwheat (*Eriogonum caespitosum*), prickly phlox (*Leptodactylon pungens*), Douglas dustymaiden (*Chaenactis douglasii*), and tufted evening primrose (*Oenothera caespitosa*). The observed plant community matched the expected community for this ecological site with the exception that Thurber's needlegrass is absent and is replaced by bluebunch wheatgrass and Sandberg's bluegrass.

Claypan 12-16" P.Z.

The Claypan 12-16" P.Z. ecological site (Ecological Site ID #R024XY027NV) covers approximately 1,227.91 acres of the Project Area and is located on mountain summits and sideslopes and intermountain valleys and fans ranging from four to 30 percent.

The Ecological Site Description describes this vegetation community as dominated by low sagebrush, bluebunch wheatgrass, and Idaho fescue (*Festuca idahoensis*) (USDA, 1973). The dominant species observed in this community are low sagebrush, Wyoming big sagebrush, yellow rabbitbrush, and Sandberg's bluegrass.

Forbs were interspersed within the shrubs and included arrowleaf balsamroot (*Balsamorhiza sagittata*), matted Indian paintbrush (*Castilleja angustifolia*), spiny phlox (*Phlox hoodii*), orange globemallow, woolly milkvetch, umbrella desert buckwheat (*Eriogonum umbellatum*), and stemless mock goldenweed (*Stenotus acaulis*). Grasses noted within this community included bottlebrush squirreltail, Indian ricegrass, basin wildrye (*Leymus cinereus*), and cheatgrass (*Bromus tectorum*). Departures from the expected Ecological Site Description include an increase in annual grasses and forbs, and a decrease in shrub cover in previously burned areas. Cheatgrass is abundant in this community in areas of previous disturbance, such as, along roads, in previously burned areas, and in ephemeral washes.

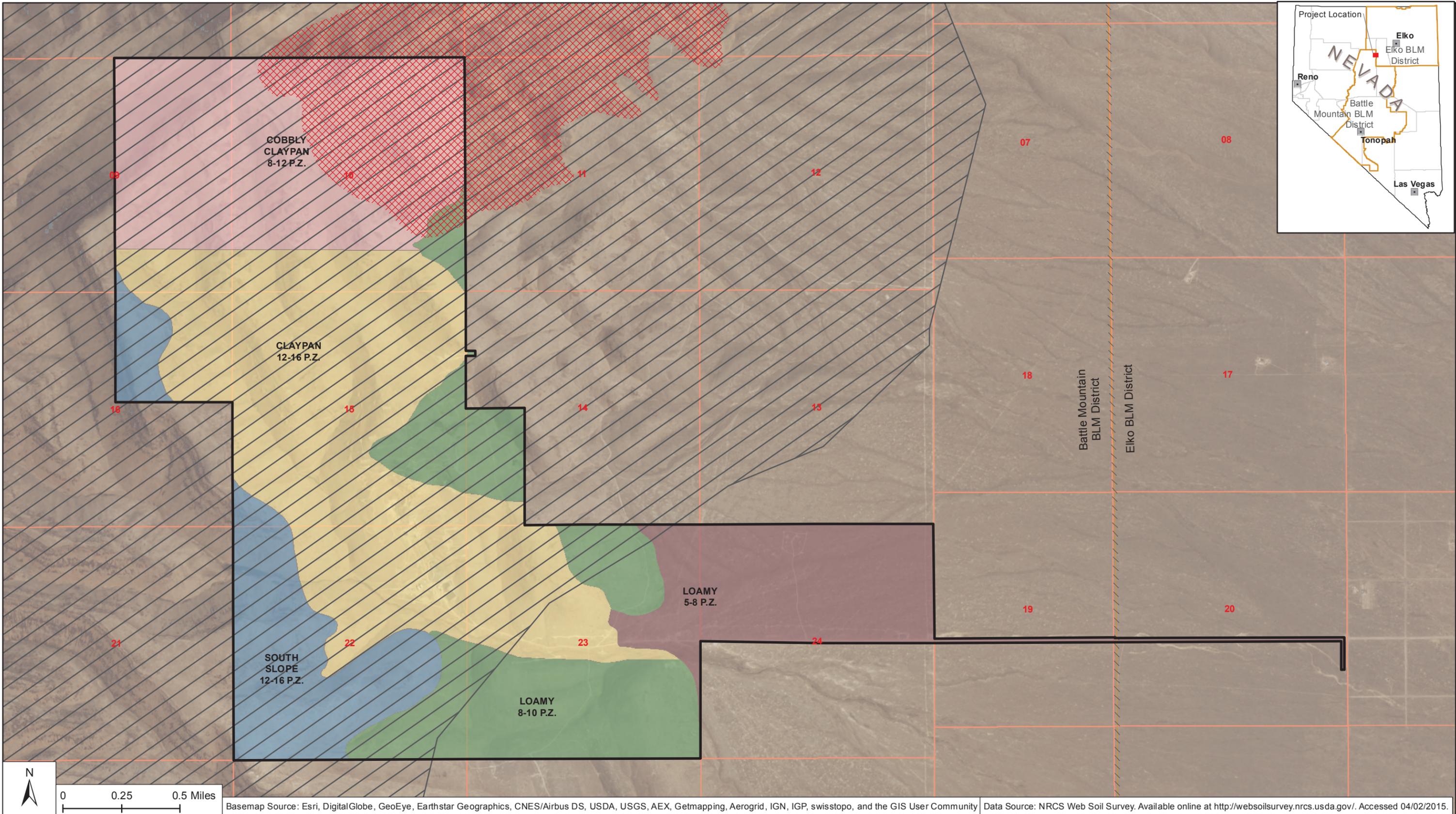
Cobbly Claypan 8-12" P.Z.

The Cobbly Claypan 8-12" P.Z. ecological site (Ecological Site ID No. R025XY022NV) covers approximately 764.38 acres of the Project Area, primarily in the northern portion. This ecological site occurs on hills, erosional fan remnants, and rock-pediment remnants. The ESD describes this vegetation community as dominated by low sagebrush, bluebunch wheatgrass, and Thurber's needlegrass (USDA, 1973).

The dominant plant species observed in the Cobbly Claypan 8-12" P.Z. ecological site were low sagebrush, bluebunch wheatgrass, Sandberg bluegrass, and arrowleaf balsamroot (*Balsamorhiza sagittata*). Indian ricegrass, rock melicgrass (*Melica stricta*), and squirreltail were additional grass species in this ecological site. Common forb species observed within this vegetation community included the following: pale agoseris (*Agoseris glauca*); sand gilia (*Aliciella leptomeria*); darkred onion (*Allium atrorubens*); Hooker's balsamroot (*Balsamorhiza hookeri*); tapertip hawkbeard (*Crepis acuminata*); wingnut cryptantha (*Cryptantha pterocarya*); tall annual willowherb (*Epilobium brachycarpum*); matted buckwheat (*Eriogonum caespitosum*); sulphur-flower buckwheat (*Eriogonum umbellatum*); rockspirea (*Holodiscus dumosus*); lava aster (*Lonactis alpine*); Harkness' flaxflower (*Leptosiphon harknessii*); bitterroot (*Lewisia rediviva*); granite prickly phlox (*Linanthus pungens*); Brewer's monkeyflower (*Mimulus breweri*); Brewer's navarretia (*Navarretia breweri*); tufted evening primrose; mountain ball cactus (*Pediocactus simpsonii*); King's beardtongue (*Penstemon kingii*); mat rockspirea (*Petrophytum caespitosum*); spiny phlox; wallflower phoenicaulis (*Phoenicaulis cheiranthoidese*); nose skullcap (*Scutellaria antirrhinoides*); stemless mock goldenweed (*Stenotus acaulis*); and Oregon cliff fern (*Woodsia oregana*). One departure from the ESD is the absence of Thurber's needlegrass, which was replaced with squirreltail and Sandberg's bluegrass. This is potentially a sign of declining ecological condition (USDA, 1973).

The entire Cobbly Claypan 8-12" P.Z. ecological site in the Project Area burned in 1996, and 263 acres burned again in 2011. Much of this burned area has an increased percent cover of desert madwort (*Alyssum desertorum*), Mexican whorled milkweed (*Asclepias fascicularis*),

shadscale (*Atriplex confertifolia*), cheatgrass, curvseed butterwort (*Ceratocephala testiculata*),
yellow



- LEGEND**
- Project Area
 - BLM District Boundary
 - PLSSFirstDivision
 - 2011 Fire
 - 1996 Fire
 - CLAYPAN 12-16 P.Z.
 - COBBLY CLAYPAN 8-12 P.Z.
 - LOAMY 5-8 P.Z.
 - LOAMY 8-10 P.Z.
 - SOUTH SLOPE 12-16 P.Z.

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 Vegetation and Land Cover Types
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rabbitbrush, bull thistle (*Cirsium vulgare*), western tansymustard (*Descurainia pinnata*), redstem stork's bill (*Erodium cicutarium*), Douglas knotweed (*Polygonum douglasii*), tall tumbledustard (*Sisymbrium altissimum*), field pennycress (*Thlapsi arvense*), and yellow salsify (*Tragopogon dubius*). Low sagebrush and other native species were also present in the burned sections but were not as prevalent as the other dominant plant species.

South Slope 12-16" P.Z.

The South Slope 12-16" P.Z. ecological site (Ecological Site ID #R024XY029NV) covers approximately 409.63 acres of the Project Area and is located on mountain sideslopes on all but northerly exposures with slopes ranging from 30 to 50 percent.

The Ecological Site Description describes this vegetation community as dominated by bluebunch wheatgrass with areas of big sagebrush (USDA, 1973). The dominant species observed in this community are bluebunch wheatgrass, Sandberg's bluegrass, Wyoming big sagebrush, and yellow rabbitbrush. Forbs were interspersed within the shrubs and included arrowleaf balsamroot, silvery lupine (*Lupinus argenteus*), longleaf hawksbeard (*Crepis acuminatus*), spiny phlox, woolly milkvetch, and umbrella desert buckwheat. Grasses noted within this community included bluebunch wheatgrass, Sandberg's bluegrass, Idaho fescue, and cheatgrass. The conditions within this community match the expected conditions for this ecological site.

3.15.2 Environmental Consequences

3.15.2.1 Proposed Action

Activities in the Proposed Action would disturb approximately 184.44 acres of vegetation within the Project Area. The majority of the new disturbance is located within the Claypan 12-16" P.Z. zone. Vegetation removal and subsequent reclamation efforts would result in plant community simplification and the conversion from a shrub-dominated community to a grass/forb-dominated community during activities conducted over the four-year Project life. Once established, shrub species may become dominant within three to five years, depending on precipitation and growth media characteristics. Although the structure of the vegetation would be temporarily modified, the reclaimed plant community is expected to produce adequate cover to stabilize the site and provide forage for use by livestock and wildlife in the long term, thereby meeting reclamation goals. Reclamation and revegetation activities are outlined in Section 2.1.12 of this EA. Reclamation and revegetation activities would be in conformance with the BLM and State of Nevada Reclamation regulations. Reclamation and revegetation would minimize the direct impacts to the vegetation communities within the Project Area.

Indirect effects to vegetation would include particulate deposition on the vegetation communities from mining activities, in addition to vehicular traffic, within the Project Area. Deposition could result in lowered primary production in plants due to reduced photosynthesis and decreased water-use efficiency. The potential effects on vegetation from dust would be reduced by wind and periodic precipitation, which would remove accumulated dust. In addition, Klondex would continue to implement the dust abatement measures outlined in Section 2.1.15 of this EA and in compliance with Project air permits.

3.15.2.2 No Action Alternative

Under the No Action Alternative, Klondex would continue existing operations as previously authorized, which include 150 acres of authorized disturbance within the Project Area. No new

disturbance would occur under the No Action Alternative unless previously disturbed acres were reclaimed and released by the BLM. The direct and indirect impacts under the No Action Alternative would, therefore, be similar but less than the impacts under the Proposed Action.

3.16 Visual Resources

3.16.1 Affected Environment

The Visual Resource Management (VRM) system designates classes for BLM-administered lands in order to identify and evaluate scenic values to determine the appropriate levels of management during land use planning (Table 3-11). Each management class portrays the relative value of the visual resources and serves as a tool that describes the visual management objectives (BLM, 1986b). Lands within the Project Area are currently designated as VRM Class IV.

Table 3-11: BLM Visual Resource Management Classes

Class	Description
I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any change must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the character should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Source: BLM, 1986b

The activities associated with mineral exploration and surface disturbance may require modifying the existing character of the landscape. There has been previous surface disturbance from mining, mineral exploration, and road construction activities in the Project Area that are currently part of the existing visual landscape.

3.16.2 Environmental Consequences

3.16.2.1 Proposed Action

New mine facilities and horizontal and shallow diagonal lines from drill roads would cause moderate, line contrasts with the natural landscape. Disturbance of vegetation would cause moderate, temporary color contrasts. With concurrent and successful reclamation and revegetation of mine facilities and exploration roads and drill sites, long-term visual impacts would be reduced and would remain within BLM management objectives for Class IV. The objective of Class IV is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer

attention. However, every attempt would be made to minimize the impacts of these activities through careful location, minimal disturbance, and repeating the basic elements (BLM, 1986b). The effects of the Proposed Action on visual resources would be consistent with BLM prescribed Class IV VRM objectives. This resource is not further analyzed in this EA.

3.16.2.2 No Action Alternative

The existing conditions at the Project and ongoing operations would have a similar but less than impact on the visual resources. The No Action Alternative is also consistent with the BLM prescribed Class IV VRM objectives.

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4 CUMULATIVE EFFECTS

4.1 Introduction

For the purposes of this EA, the cumulative impacts are the sum of all past, present (including the Proposed Actions), and reasonably foreseeable future actions (RFFAs) resulting primarily from mining and mineral exploration, right-of-way (ROW) construction and maintenance, commercial activities, and public uses. The purpose of this cumulative analysis in this EA is to evaluate the Proposed Action and No Action Alternatives contributions to the cumulative environment. A cumulative impact is defined under federal regulations as follows:

“...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individual minor but collectively significant actions taken place over a period of time” (40 CFR 1508.7).

The extent of the Cumulative Effects Study Area (CESA) would vary with each resource, based on the geographical or biological limits of that resource. As a result, the list of projects considered under the cumulative analysis varies according to the resource being considered. In addition, the length of time for cumulative effects to occur would vary according to the duration of impacts from each Proposed Action on the particular resource.

For the purposes of this analysis and under federal regulations, ‘impacts’ and ‘effects’ are assumed to have the same meaning and are interchangeable. The cumulative impacts analysis was accomplished through the following three steps:

Step 1: Identify, describe, and map the CESA for each resource to be evaluated in this chapter.

Step 2: Define time frames, scenarios, and acreage estimates for cumulative impact analysis.

Step 3: Identify and quantify the location of potential specific impacts from the three Proposed Actions and Connected Action and compare these contributions to the overall impacts.

Step 4: Evaluate the combined effects of the information and data identified within each CESA as it relates to the resources brought forward for cumulative impact analysis.

4.1.1 Assumptions for Cumulative Analysis

Direct and indirect environmental consequences of the Proposed Action and the No Action Alternative were evaluated in Sections 3.3 through 3.16 for the various environmental resources. The following elements, resources, or land uses were not brought forward for cumulative analysis due to the minimal level of anticipated affects and incorporated management practices:

- Native American Cultural Concerns;
 - Recreation;
 - Wastes, Hazardous and Solid;
 - Water Quality (Groundwater);
 - Wetlands and Riparian Zones; and
 - Visual Resources.
-

4.1.2 Description of CESA Boundaries

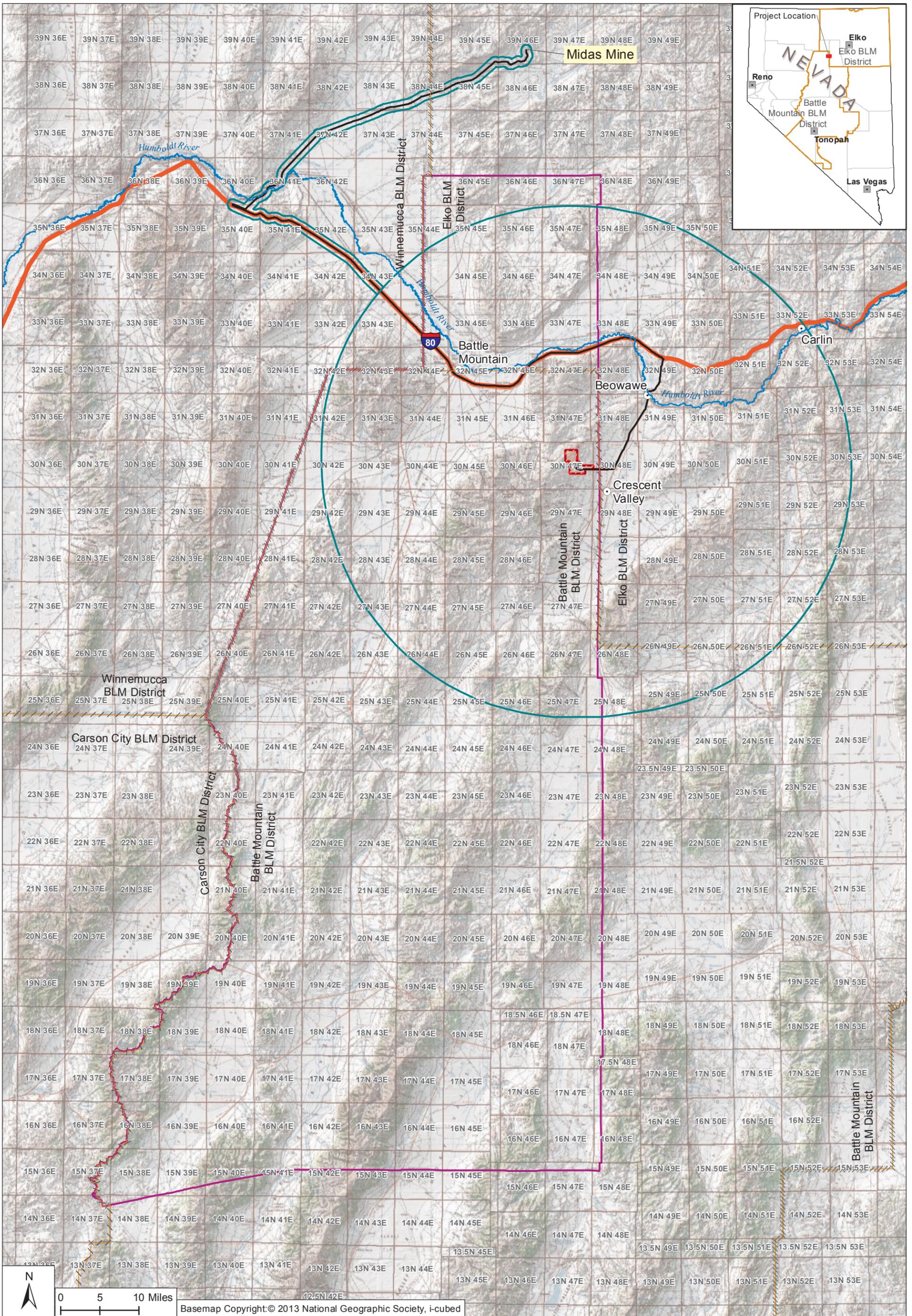
The geographical areas considered for the analysis of cumulative effects vary in size and shape to reflect each evaluated environmental resource and the potential area of impact. The descriptions of the CESA boundaries are described in Table 4-1. The CESA boundaries are shown on Figures 4-1 and 4-2.

Table 4-1: Cumulative Effects Study Areas by Resource

Element/Resource	CESA Description	CESA Name	Acres
Air Quality	A 50-kilometer radius around the Project Area + 1-mile buffer along the Transportation Route to Midas	Air Quality CESA	2,277,622
Cultural Resources	Fire Creek Archaeological District	Cultural Resources CESA	24,793
Noxious Weeds and Non-native Species	HUC 10 Watershed – Coyote Creek	Immediate Watershed CESA	160,400
Water Quality, Surface/Groundwater	Crescent Valley + Whirlwind Valley Hydrographic Basins	Immediate Watershed CESA	160,400
Wildlife (includes General, Migratory Birds, & Sensitive Species)	Immediate Shoshone Mountain Range	Wildlife CESA	257,588
Grazing Management	Argenta Allotment	Grazing CESA	331,521
Social and Economic Values	Lander County	Social and Economic Values CESA	3,529,628
Soils	HUC 10 Watershed – Coyote Creek	Immediate Watershed CESA	160,400
Transportation, Access, and Public Safety	Project Area + Project Access Road + Transportation Route to Midas	Transportation CESA	3,455 acres + 132 linear miles
Vegetation	HUC 10 Watershed – Coyote Creek	Immediate Watershed CESA	160,400

4.2 Past and Present Actions

On the basis of aerial photographic data, the BLM’s Land and Mineral Legacy Rehost 2000 System (LR2000) database (which records lands and mineral actions) reports ran in August 2015, agency records, and current agency Geographic Information Systems (GIS) records and analysis, the following past and present actions, which have impacted resources within the CESAs to varying degrees, have been identified and are discussed in the following sections.



- LEGEND**
- Project Area
 - Social and Economic Values CESA (Social and Economic Values)
 - Air Quality CESA (Air Quality)
 - Transportation CESA (Transportation, Access, and Public Safety)
 - BLM District Boundary
 - Township/Range

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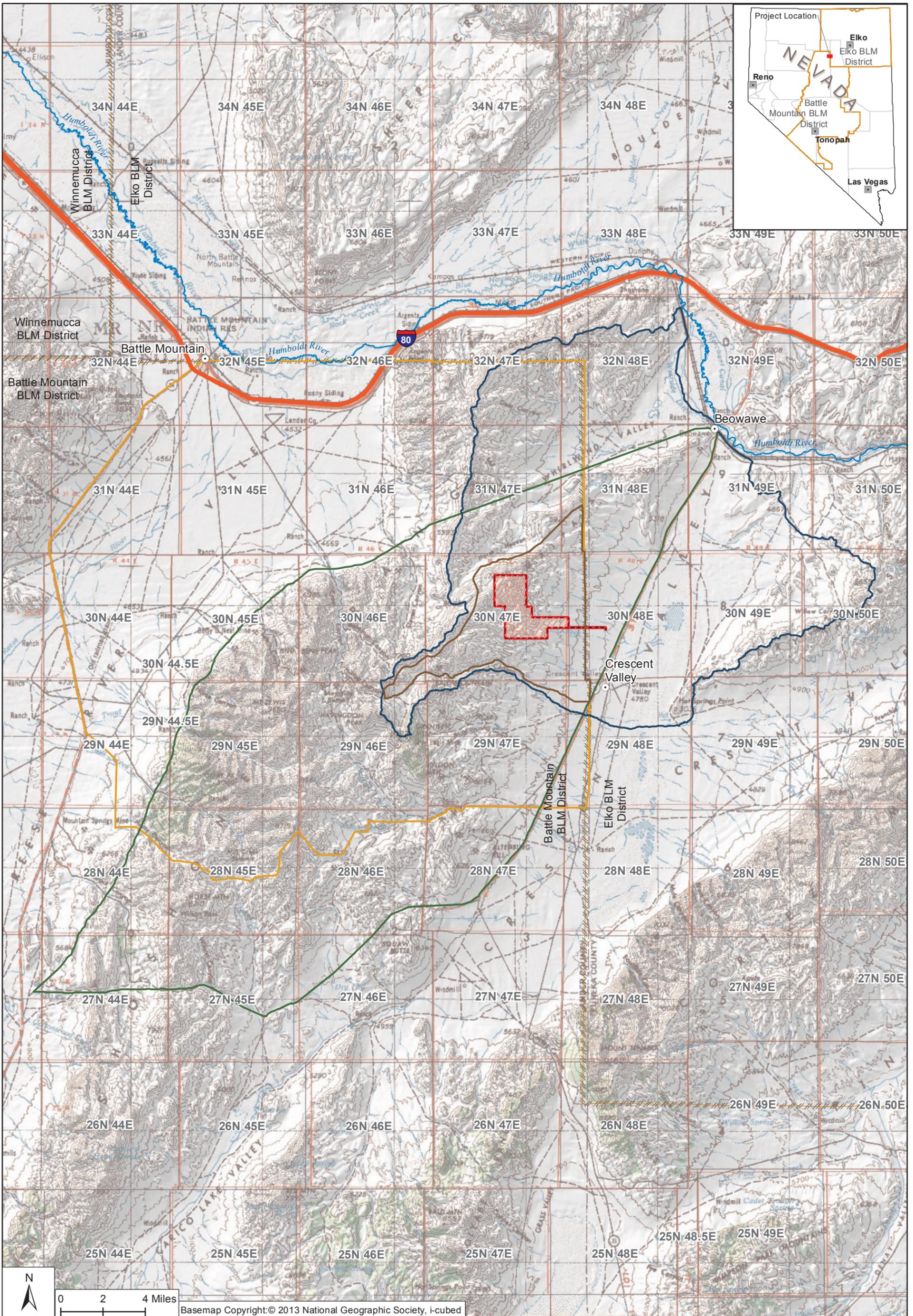
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Cumulative Effects Study Areas (Map 1 of 2)
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- LEGEND**
- Project Area
 - BLM District Boundary
 - Township/Range
 - Immediate Watershed CESA (Water Quality, Surface and Ground; Noxious Weeds, Invasive, Non-native Species; Soils; and Vegetation)
 - Wildlife CESA (General Wildlife, Migratory Birds, and Sensitive Species)
 - Cultural Resources CESA (Cultural Resources)
 - Grazing CESA (Grazing and Range Resources)

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Cumulative Effects Study Areas (Map 2 of 2)
 Figure 4-2
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4.2.1 Mineral Exploration and Mining

The BLM’s LR2000 database was queried for mineral exploration or mining activities (Notices and plans of operation) in the CESAs (with resources potentially affected by surface disturbance) by section, Township, and Range. Past and present mineral exploration and mining activities within the CESAs include the following: mining and exploration plans of operation; exploration Notices; mineral material disposal sites; and community material pits. The LR2000 database was queried on August 16, 2015, for the CESAs. Table 4-2 is a summary of the past and present mineral activities within each CESA.

Table 4-2: Past and Present Mining and Mineral Exploration Disturbance in the CESAs

CESA	Type	Total Acres of Disturbance
Air Quality CESA	Notices	2,344.8
	Plans of Operation	75,131.0
	Mineral Material Disposal Sites	190.1
	Air Quality CESA Total	77,665.9
Cultural Resources CESA	Notices	53.0
	Plans of Operation	16,347.4
	Mineral Material Disposal Sites	0
	Cultural Resources CESA Total	16,400.4
Immediate Watershed CESA	Notices	167.0
	Plans of Operation	1,979.2
	Mineral Material Disposal Sites	20.0
	Immediate Watershed CESA Total	2,166.2
Wildlife CESA	Notices	644.0
	Plans of Operation	19,997.6
	Mineral Material Disposal Sites	0
	Wildlife CESA Total	20,641.6
Grazing CESA	Notices	567.9
	Plans of Operation	3,855.5
	Mineral Material Disposal Sites	5.9
	Grazing CESA Total	4,429.3

Source: BLM, 2015a

4.2.2 Rights-of-Way

The LR2000 database was used to query the various types of ROWs that have been applied for or approved in the CESAs by section, Township, and Range, and section include the following: roads and highways; railroads; power transmission facilities; communication sites; telecommunications; irrigation/water facilities; oil and gas pipelines; wind generation facilities; and other ROWs. The acreage of surface disturbance associated with these ROWs cannot be precisely quantified; however, it is assumed that these types of ROWs and the construction and maintenance associated with these facilities would create a level of surface disturbance that would contribute to cumulative impacts to various resources. In addition, certain types of ROWs can fragment habitat or create barriers or hazards for wildlife passage. The LR2000 database was queried on August 16, 2015. The approximate acreage of each type of ROW within each CESA is listed in Table 4-3.

Table 4-3: Past and Present ROW Acreages in the CESAs

ROW Type	Air Quality CESA	Cultural Resources CESA	Immediate Watershed CESA	Wildlife CESA	Grazing CESA
Roads and Highways	1,512.6	1.0	348.1	445.8	621.3
Wind Project	56,914.2	0	13,797.9	13,797.9	13,797.9
Power Transmission	10,745.3	283.3	3,340.4	3,423.7	1,313.1
Communication Sites	289.6	0	60.4	150.9	210.9
Telecommunications	3566.6	4.8	49.4	63.7	1,581.2
Irrigation/Water Facilities	297.5	5.3	39.0	94.9	110.6
Oil and Gas Pipelines	674.1	1.0	278.1	279.1	383.2
Other	536.1	0.01	0.1	20.1	409.6
Total	74,536.0	295.4	17,913.5	18,276.1	18,428.0

Source: BLM, 2015a

4.2.3 Wildland Fires

Over the last 20 years (1994-2014), wildland fires burned approximately 640,766 acres of the Air Quality CESA, 74,098 acres of the Watershed CESA, 55,292 acres of the Wildlife CESA, and 77,025 acres of the Grazing CESA (BLM, 2015b).

4.2.4 Dispersed Recreation

Dispersed recreation, such as hunting, rock hounding, wildlife viewing, fishing, primitive camping, and limited off-road vehicle travel, occurs throughout all the CESAs; however, there are no data on the level of use that are quantifiable to use in the analysis.

4.3 **Reasonably Foreseeable Future Actions**

4.3.1 **Mineral Exploration and Mining**

There are mineral development and exploration RFFAs within the CESAs. Table 4-4 shows the number of foreseeable acres of mineral development and exploration activities within each CESA per the pending applications listed in LR2000. This includes Klondex’s South Exploration Notice that totals 4.99 acres.

4.3.2 **Rights-of-Way**

There are pending or proposed ROW RFFAs within the CESAs. Table 4-4 shows the number of foreseeable acres of ROW applications within each CESA listed in LR2000.

Table 4-4: Pending Mineral Activities and ROWs within the CESAs

CESA	Type	Acres of Disturbance
Air Quality CESA	Plans of Operation	5,452
	Notices	32.89
	ROWs	9,009.5
Cultural Resources CESA	Plans of Operation	0
	Notices	4.99
	ROWs	0
Immediate Watershed CESA	Plans of Operation	2,325
	Notices	14.99
	ROWs	0
Wildlife CESA	Plans of Operation	3,164
	Notices	14.99
	ROWs	0.3
Grazing CESA	Plans of Operation	3,214
	Notices	14.99
	ROWs	30.9

Source: BLM, 2015a

4.3.3 **Livestock Grazing and Rangeland Improvements**

Livestock grazing is expected to continue at management levels established in the various grazing allotments including in the vicinity of the Proposed Action. This may include rangeland improvement projects in the Argenta Allotment; however, there are no range improvement projects associated with the proposed action.

4.3.4 **Wildland Fires and Vegetation Treatments**

Fire suppression activities are expected to continue to occur in the CESAs, as wildland fires are also expected to occur, and are likely to include areas previously burned and seeded.

4.3.5 Dispersed Recreation

Recreational use within the CESAs is expected to continue consistent with past and present use, with dispersed outdoor recreational activities being the predominant type of recreation.

4.4 Cumulative Impacts for the Proposed Action

This section of the EA considers the nature of the cumulative effect and analyzes the incremental impact to which all three components of the Proposed Action contribute to the collective impact. The analysis is considered a conservative estimate of the potential cumulative impacts as many of the disturbances permitted, such as ROWs and mineral exploration and mining activities, are subject to reclamation and do not represent permanent disturbance within a CESA.

4.4.1 Air Quality

The Air Quality CESA encompasses approximately 2,277,622 acres, including a one-mile buffer on the ore transportation route extending beyond the 50-kilometer buffer around the Project Area as shown in Figure 4-1.

Past and Present Actions: Present actions within the Air Quality CESA that are likely contributing to air quality impacts include wildland fire, dispersed recreation, mineral exploration and mining activities, industrial operations (i.e., construction facilities, power generation facilities, and generators), and transportation networks. These activities are principally contributing point source particulate matter emissions and fugitive dust to the air quality impacts; however, products of combustion are also emitted. Impacts from wildland fires would be of short duration and localized.

There are multiple operating metal mines which are located within the Air Quality CESA and are operating under BAPC Class II Operating permits as follows: Midas Mine; Cortez Hills Mine; Cortez Pipeline Mine; Mule Canyon Mine; and Phoenix Mine. In addition, four industrial mineral mines or quarries are present (Nevada Mining Association, 2015). A total of 77,665.9 acres of past and present mineral activities and 74,536.0 acres of ROWs are present within the Air Quality CESA. Wildland fires (1994-2014) have burned approximately 28 percent of the Air Quality CESA over the last 20 years creating a greater potential for wind born dust in recently burned areas. The Air Quality CESA includes the ore transportation route and also includes both paved and unpaved roads. Dust emissions along unpaved sections of the road occur and vehicle exhaust emissions are present along the entire transportation route.

RFFAs: RFFAs within the Air Quality CESA that may contribute to impacts to air quality include dispersed recreation, transportation, mining and mineral activities, and ROWs. The pending RFFAs in LR2000 total approximately 14,494 acres within the CESA. Air quality impacts from RFFAs could include generation of fugitive dust during hard rock mining and exploration. Emissions may also be generated from processing facilities in the CESA, burning of fossil fuels by heavy equipment and other vehicles, vehicle travel on paved and unpaved roads, fugitive dust from travel on unpaved roads, and wildland fires. Some of these emissions would be localized and subject to air quality permits and compliance, development of mitigation measures, and implementation of operational performance standards. Other emissions would be more long-term and basin wide.

Cumulative Impacts: Each of the identified individual projects within the Air Quality CESA, including existing and proposed mining operations, emit air pollutants. With the possible exception of motor vehicle emissions, the existing and proposed mining operations are the major sources of criteria pollutants within the Air Quality CESA. The air quality modeling for the Proposed Action shows that the levels of these pollutants are below the applicable standards. The RFFAs would result in additional emissions similar to those currently emitted by the existing operations within the Air Quality CESA. The major sources of pollutants (except for motor vehicle emissions) within the Air Quality CESA, include the existing activities at the Project, which operate under permit conditions established by the State of Nevada. The cumulative emissions are generally dispersed, and the stationary sources would be regulated by the State of Nevada to ensure that impacts would be reduced to levels that are consistent with the ambient air quality standards. Therefore, the Proposed Action would not result in the airshed and basin being classified as a non-attainment area.

4.4.2 Cultural Resources

The Cultural Resources CESA represents the projected extent of the Fire Creek Archaeological District and encompasses 24,793 acres as shown on Figure 4-2.

Past and Present Actions: Most past actions did not consider potential effects to cultural resources. Projects and development disturbances conducted prior to 1966 (i.e., prior to the NHPA) or those activities without a federal or state nexus generally did not identify or quantify cultural resource sites or impacts to them. Given that eligibility determinations are based primarily on sites' surface characteristics, there is room for error given that surface manifestations do not always accurately reflect the nature and density of subsurface deposits. Other factors at play are the differences of opinion among professional archaeologists as to what research (and therefore archaeological sites) is important, and the evolving nature of archaeological research. In some cases, sites now thought to be lacking the ability to answer important questions may become important as archaeological method and theory progress but may not be preserved. The courts have determined that cultural resource management standards, such as those employed for the current Klondex operations at Fire Creek Project, meet the objectives of the NHPA and other pertinent statutes, but this does not necessarily imply that there are not project-specific or cumulative losses of cultural resources or information important to understanding the past.

Past and present actions within the Cultural Resources CESA that have the potential to create surface disturbance and contribute to the degradation of cultural artifacts could have included and may currently include the following: wildlife and game habitat management; livestock grazing; and dispersed recreation. In addition, quantifiable past and present actions in the Cultural Resources CESA include the following: approximately 16,400.5 acres of mineral activities (including the existing 150 acres associated with the Fire Creek Project); and approximately 295.4 acres of ROWs.

RFFAs: Planned activities in the Cultural Resources CESA include mineral exploration (approximately 4.99 acres). Dispersed recreation, livestock grazing, and wildland fires, are likely to continue within the Cultural Resources CESA.

Cumulative Impacts: There would be no cumulative impacts to eligible cultural resources from the Proposed Action, because sites would either be avoided or impacts would be mitigated through the continued implementation of the MOA and associated treatment plans, which dictate the management of the FCAD. The management of the resources within the FCAD constitutes the management of all of the cultural resources within the CESA. Therefore, based on the above analysis and findings, there would no incremental cumulative impacts to cultural resources as a result of the Proposed Action, when combined with the impacts from the past and present actions and RFFAs.

4.4.3 Wildlife Resources

The Wildlife CESA represents the immediate area of the Shoshone Mountain Range in which the Project Area is located, bounded by major roads and drainages thereby representing the use area for wildlife species. The Wildlife CESA measures 257,588 acres and is shown on Figure 4-2. This section addresses Migratory Birds, General Wildlife, and Special Status Wildlife species.

Past and Present Actions: Past and present actions that could have impacted and may be currently impacting migratory birds, special status wildlife, and general wildlife and their habitat include livestock grazing, wildlife and game habitat management, wildland fires, dispersed recreation, utility and other ROW construction and maintenance, mineral exploration, and mining. The existing Klondex operations at Fire Creek are authorized for up to 150 acres of disturbance. Impacts to these resources and their habitat have resulted from the following: 1) indirect impacts for the destruction of habitat associated with building roads and clearing vegetation; 2) indirect impacts from disruption of migratory bird habitat from human presence or noise from mining or other heavy equipment, water trucks, and four-wheel drive pickups; and 3) direct impacts or harm to migratory birds that result from the removal of trees and shrubs containing viable nests or ground nests destroyed by construction or ranching equipment. Impacts to habitat from grazing include trampling of vegetation or nesting areas near streams, springs, or riparian areas within the CESA. Impacts to habitat from recreation activities include destruction of native vegetation or nesting areas from off-road vehicles that traveled off established roadways.

The following quantifiable impacts to habitat were used in the analysis:

- Historic fires (1994-2014) have burned approximately 55,292 acres in the CESA, representing 21 percent of the Wildlife CESA.
- Authorized mineral exploration and mining Notices or plans of operation and material sites total approximately 20,641 acres of surface disturbance in the CESAs (including the current Fire Creek Plan of Operation (NVN-079769).
- Approximately 18,276 acres of ROWs were issued within the CESA.

Non-quantifiable past and present activities include dispersed recreation, livestock grazing and associated management that may create noise and disturbance to habitat. In addition, these activities could have contributed to the spread of noxious weeds, invasive and non-native species, which could have had an indirect effect on habitat.

RFFAs: Potential impacts to migratory birds and wildlife species and their habitat from livestock grazing, wildlife and game habitat management, dispersed recreation, mineral exploration,

mining, or loss of native vegetation associated with potential wildland fires could occur. There are no specific data to quantify impacts to migratory birds and wildlife or their habitat as a result of livestock grazing, wildlife and game habitat management, dispersed recreation, or potential wildland fires within the CESAs. Currently, a total of approximately 3,179 acres of mineral activities (including approximately 4.99 acres associated with Klondex's South Exploration Notice) and approximately 0.3 acres of ROW projects are proposed within the CESA. These pending projects are all required to incorporate protection measures for migratory birds and likely to have protection measures for sensitive wildlife species and, therefore are not expected to directly harm migratory birds or sensitive wildlife species but may result in habitat removal or alteration.

Cumulative Impacts: The Proposed Action would impact up to approximately 184.44 acres of habitat. When added to the past, present, and RFFA disturbance acres, the cumulative total is 42,278.46 acres (representing 16 percent of the CESA). Based on the above analysis and findings, incremental cumulative impacts to migratory birds, special status wildlife species, and general wildlife as a result of the Proposed Action would represent disturbance to an incremental disturbance of 0.4 percent within the CESA. Cumulative indirect effects would primarily be a result in human presence and disturbance during the construction phase of the Proposed Action, as wildlife may be displaced by activities, but would likely shift spatially into adjacent available habitat. Also increased noise levels may disturb wildlife species. There is similar habitat within and adjacent to the Project Area where mobile wildlife could relocate. The existing operations at the Project serve as baseline conditions for indirect effects and when added cumulatively to other activities within the CESA would be considered incremental and temporary in nature. Environmental protection measures incorporated into the Proposed Action and concurrent associated with Project activities would lessen the potential impacts. The Proposed Action would not alter or disturb the riparian or wetland vegetation in the Project Area that serves as a wildlife resource. The operational phase of the Proposed Action would be similar to existing conditions and is not anticipated to cumulatively indirectly impact wildlife resources, including migratory birds.

4.4.4 Noxious Weeds, Invasive and Non-native Species

The Immediate Watershed CESA serves as the CESA for Noxious Weeds, Invasive and Non-native species and measures 160,400 acres as shown in Figure 4-2.

Past and Present Actions: Past and present actions with impacts created from noxious weeds and invasive and non-native species could have included and may currently include livestock grazing, wildland fires, dispersed recreation, utility and other ROW construction and maintenance, mineral exploration, and mining. The existing Klondex operations at Fire Creek are authorized for up to 150 acres of disturbance. These actions could have disturbed vegetation and soils creating an opportunity for invasive plant colonization and the introduction of noxious weed, invasive or non-native species seeds, but current activities include weed management controls.

The following quantifiable impacts, creating surface disturbance and have the potential to promote impacts associated with noxious weeds and invasive species, were used in the analysis:

- Historic fires (1994-2014) have burned approximately 74,098 acres in the CESA, representing 46 percent of the CESA.

- Authorized mineral exploration and mining Notices or plans of operation and material sites total approximately 2,166 acres of surface disturbance in the CESA (including the current Fire Creek Plan of Operation (NVN-079769)).
- Approximately 17,913.5 acres of ROWs were issued within the CESA.

RFFAs: Potential impacts from noxious weeds and invasive and non-native species as a result of livestock grazing, dispersed recreation, mineral exploration, utility and other ROW construction and maintenance, or loss of native vegetation associated with potential wildland fires are expected to continue. There are 0 acres of pending ROW projects in the Immediate Watershed CESA, and approximately 2,340 acres of pending mineral projects (including approximately 4.99 acres associated with Klondex's South Exploration Notice).

Cumulative Impacts: The Proposed Action would impact up to approximately 184.44 acres. When added to the past, present, and RFFA disturbance acres, the cumulative total is 22,603.96 acres and 14 percent of the total CESA. Based on the above analysis and findings, incremental cumulative impacts resulting from disturbance associated with the Proposed Action would represent an incremental disturbance of 0.1 percent within the CESA. Impacts from noxious weeds and invasive and non-native species would primarily result from vehicle travel associated with temporary disturbance associated with construction of new facilities and surface exploration. Cumulative indirect effects would result during the construction phase of the Proposed Action, but environmental protection measures incorporated into the Proposed Action, implementation of the Weed Management Plan, and concurrent reclamation would lessen the potential impacts. The operational phase of the Proposed Action would be similar to existing conditions and are not anticipated to cumulatively indirectly impact resources from noxious weeds and invasive species.

4.4.5 Water Quality (Surface)

The Immediate Watershed CESA serves as the CESA for Surface Water Quality and measures 160,400 acres as shown in Figure 4-2. No impacts either to ground water quality or quantity were identified in the Proposed Action or alternatives, so the cumulative analysis below addresses surface water quality.

Past and Present Actions: Past actions that have potentially impacted water resources include minerals activities, ranching operations including grazing and irrigation from wells, ROWs, road construction and maintenance, dispersed recreation, and wildland fires that introduced sediment to ephemeral streams or springs or consumed water within the CESA. Impacts from grazing could include cattle congregating around water sources causing bank trampling, which in turn can cause increased sedimentation. Increased sedimentation could also occur when vehicles or cattle use stream crossings or remove vegetation from the sides of the streams. There are no specific data that quantify the amount of sedimentation. In addition, cattle can degrade water quality by adding bacteria and nitrate from their waste.

Historical fires (1994-2014) have burned approximately 74,098 acres in the CESA (approximately 46 percent of the CESA). Approved and closed mineral exploration and mining Notices or plans of operation total approximately 2,166 acres (approximately six percent of the CESA). State and federal regulations require project operators of Notices and plans of operation to provide financial assurance to guarantee that surface disturbance due to mineral activities would be reclaimed. Therefore, the Notices and plans of operation within the Immediate Watershed CESA have reclamation bonds to guarantee that the authorized surface disturbance

would be reclaimed when mineral exploration and mining activities have been completed. Therefore, areas reclaimed, would become naturally stabilized, decreasing the amount of sediment that reaches the waterways. Approximately 17,913.5 acres of ROWs were issued within the CESA that have the potential to create surface disturbance that could lead to sedimentation of waterways. The majority of the CESA is located livestock grazing allotments and active grazing contributes to the erosion of soils and degradation of stream zones.

RFFAs: Potential impacts to water resources could result from minerals activities, ranching operations including grazing and irrigation from wells, ROWs, road construction and maintenance, wildland fires, and dispersed recreation that could introduce sediment to ephemeral streams or springs. There are no specific data on the amount of sedimentation that could result from these activities. Impacts from RFFAs would be similar to those described for past and present actions. In addition, the majority of the regulated RFFAs would require BMPs or other mitigation for the protection of water resources.

Cumulative Impacts: The Proposed Action would impact up to approximately 184.44 acres. When added to the past, present, and RFFA disturbance acres, the cumulative total is 22,603.96 acres and 14 percent of the total CESA. Disturbance to vegetation and soils from past and present actions has impacted surface water resources; however, it is likely that some of the disturbance has been reclaimed, seeded, or otherwise revegetated, which would decrease the impacts from sedimentation. The past, present, and RFFAs would potentially directly affect surface water resources through increased erosion and sedimentation. The mining related cumulative actions would be required to implement erosion control measures that would limit their contribution to the cumulative impacts. Grazing has its own set of requirements that minimizes effects to surface water quality. Dispersed recreation actions would not have the same requirements and therefore, would have a proportionally greater effect on surface water resources by removing vegetation and decreasing bank stability near streams and springs. The implementation of BMPs and monitoring activities would reduce the impacts to surface water quality from the Proposed Action and, therefore the incremental contribution of the proposed surface disturbance activities would represent a minimal incremental cumulative effect to surface water quality in the Immediate Watershed CESA.

4.4.6 Grazing Management

The Grazing CESA is the Argenta Allotment and measures 331,521 acres.

Past and present actions: Past and present actions that have the potential to result in a loss of AUMs within the CESA include mining and mineral exploration, road construction and maintenance, ROWs, and wildland fires. Impacts from these activities include loss or disturbance to forage or restricted access to portions of the allotment.

Historic fires (1994-2014) have burned approximately 77,025 acres in the Grazing CESA (23 percent of the CESA). Past and present mineral exploration and mining Notices or plans of operation total approximately 4,423.4 acres (approximately 1 percent of the CESA). State and federal regulations require project operators of Notices and plans of operation to provide financial assurance to guarantee that surface disturbance due to mineral activities would be reclaimed. Therefore, the Notices and plans of operation within the CESA have reclamation bonds to guarantee that the authorized surface disturbance would be reclaimed when mineral

exploration and mining activities have been completed which would include the establishment of vegetation suitable for multi-use land including grazing. Approximately 18,428 acres of ROWs were issued within the Grazing CESA that have the potential to create surface disturbance reduce AUMs.

Reasonably Foreseeable Future Actions: Potential impacts to grazing management include roads, wildfires, ROWS, and minerals activities. There are no specific data on the potential impacts from dispersed recreation, grazing, or potential wildfires. Impacts associated with RFFAs would be similar to the impacts described for past and present actions. Continued reclamation of past mining and exploration disturbance and future restoration activities would mitigate productivity loss. No rangeland improvement projects are planned within the Grazing CESA.

Cumulative Impacts: The Proposed Action would disturb up to approximately 94.25 acres on public land which equates to 12 AUMs. The existing operations at Fire Creek have resulted in a 15 AUM reduction (BLM, 2008b). Other regulated activities within the Grazing CESA would account for AUM loss and the natural disturbance to grazing management does not account for AUM loss within the context of this EA. Therefore, when the Proposed Action is combined with the existing operations, the Project would have a cumulative loss of 27 AUMs. This represents 0.16 percent of the 17,199 AUMs within the Grazing CESA.

4.4.7 Social Values and Economics

The CESA for social values and economics is defined as Lander County.

Past and present actions: Past and present actions that have are currently influencing social values and economics include the existing operations at Fire Creek (employment of 93 workers), construction and development projects in the County, livestock grazing, utility and other ROW construction and maintenance, wildland fires, recreation, land development, and mineral development and exploration. Impacts to social values and economics from these activities include increased population, increased demand for public services, increased employment opportunities, increased revenues from the communities within the CESA, and increased expenditures by the communities within the CESA. The extent of these impacts vary with the type of activity and have not been quantified; however, the majority of the impacts from past and present activities do not have any ongoing impacts and are considered to be part of the existing social and economic climate within the CESA. No specific projects have been identified within the CESA to use in a quantitative analysis.

RFFAs: Continued growth, albeit minimal in the four-year Project life, is expected in Lander County and similar projects and activities would continue to influence social and economic values. No specific projects have been identified within the CESA to use in a quantitative analysis.

Cumulative Impacts: The Proposed Action would add 97 employees to the Project workforce and when combined with the current anticipated levels at the mine, a total of 190 employees would comprise the workforce. As discussed, in Section 3.11 of this EA, the Proposed Action is not anticipated to stress housing demand or any other resource in the County. Therefore, no

cumulative impacts would result from the Proposed Action within the CESA other than the beneficial tax revenues that would be generated by the facilities and operations expansion.

4.4.8 Soils

The Immediate Watershed CESA serves as the CESA for Soils and measures 160,400 acres as shown in Figure 4-2.

Past and present actions: Past and present actions that have potentially impacted soils include mining, mineral exploration, ranching operations (grazing), road construction, road maintenance, ROWs, wildland fires, or dispersed recreation. Impacts from these activities include loss of soils productivity due to changes in soil physical properties, soil fertility, soil movement in response to water and wind erosion, and loss of soil structure due to compaction.

Historic fires (1994-2014) have burned approximately 74,098 acres in the Immediate Watershed CESA (46 percent of the CESA). Past and present mineral exploration and mining Notices or plans of operation total approximately 2,166 acres (approximately one percent of the CESA). State and federal regulations require project operators of Notices and plans of operation to provide financial assurance to guarantee that surface disturbance due to mineral activities would be reclaimed. Therefore, the Notices and plans of operation within the CESA have reclamation bonds to guarantee that the authorized surface disturbance would be reclaimed when mineral exploration and mining activities have been completed which would include the replacement of topsoil and growth media. Approximately 17,913.5 acres of ROWs were issued within the Immediate Watershed CESA that have the potential to create surface disturbance and disturb soils. The majority of the CESA is located within an active grazing allotment and livestock grazing contributes to the erosion of soils particularly in drainages or riparian areas.

Reasonably Foreseeable Future Actions: Potential impacts to soils could result from grazing, dispersed recreation, roads, wildfires, ROWs, and minerals activities. There are no specific data on the potential impacts to soils from dispersed recreation, grazing, or potential wildfires. Impacts associated with RFFAs would be similar to the impacts described for past and present actions. Approximately 0 acres of a pending sand and gravel operation is present within the Watershed CESA. Continued reclamation of past mining and exploration disturbance and future restoration activities would mitigate soil movement and productivity loss. Soil salvaged and used in reclamation would become viable and would be expected to return to pre-disturbance productivity once vegetation was established. Seeding and or natural revegetation of areas that have been burned would reduce soil movement and loss.

Cumulative Impacts: The Proposed Action would disturb up to approximately 184.44 acres of soils. When added to the past, present, and RFFA disturbance acres, the cumulative total is 22,603.96 acres and 14 percent of the total CESA. In addition, the impacts from the Proposed Action would be localized and minimized due to implementation of environmental protection measures and BMPs. Therefore, the incremental impacts to soils as a result of the Proposed Action when added to the past and present actions and RFFAs would be minimal.

4.4.9 Transportation, Access, and Public Safety

The CESA for Transportation, Access, and Public Safety is the 132 mile transportation route between the Project Area and the Midas Mine.

The trucking of approximately ore to Midas Mine would generate additional truck traffic on SR 306, I-80, and SR 789. Employing trucks, operating seven days per week throughout the year,

would result in an estimated 38 additional round trips per day, including loaded trips outbound from the Project Area and empty returns from the Midas Mine. Although heavy truck movements would result in some delays for other traffic on the state highway segments where passing is prohibited, existing traffic is light enough that adverse effects on traffic flows likely would be minor. The Project-related increase in traffic would not be sufficient to degrade traffic LOS below the existing LOS A on SR 306 and I-80 or below the existing LOS A on SR 789.

Highway safety is partially a function of traffic levels. Therefore, the addition of a small volume of traffic would increase the risk of accidents on the route, although the increased risk likely would be small.

The Proposed Action would have no measurable effect either on public access or public safety with coordination with Lander County to ensure the Project access road is operated and maintained at conditions suitable to residential users.

4.4.10 Vegetation

The Immediate Watershed CESA serves as the CESA for Vegetation and measures 160,400 acres as shown in Figure 4-2.

Past and Present Actions: Past and present actions that have affected vegetation include the development of roads, power lines and other utilities, livestock grazing, agricultural activities, dispersed recreation, and land development. Impacts to vegetation from these activities include removal of vegetation, compaction, mixing, and erosion of soils. The extent of these impacts varies with the type of activity.

Historic Fires (1994-2004) have burned approximately 74,098 acres in the Immediate Watershed CESA (46 percent of the CESA). Within the CESA, wildfire represents the major factor in vegetation structure change and introduction of non-native species. Approved and closed mineral exploration and mining Notices or plans of operation total approximately 2,166 acres (less than one percent of the CESA). State and federal regulations require reclamation; therefore, it is reasonable to assume that some areas have been reclaimed and some areas have naturally revegetated over time. Approximately 17,913.5 acres of ROWs were issued within the CESA that have the potential to create surface disturbance and remove or alter vegetation structure. The majority of the Vegetation CESA is located within livestock grazing allotments and associated management contributes to changes in vegetation structure and the spread of invasive species. Other activities within the CESA, including off highway vehicle use and any activity that disturbs soils also have the potential to introduce and spread invasive species.

RFFAs: Potential impacts to vegetation from grazing, road construction and maintenance, ROWs, minerals and mining activities, dispersed recreation, or wildland fires that alter the structure, composition, and ecology of plant communities in the CESA could occur. There are no specific data on the potential impacts to vegetation from dispersed recreation, grazing, or potential wildland fires. There are 2,334 acres of pending Notices, plans of operations, and sand and gravel projects within the Vegetation CESA.

Cumulative Impacts: Vegetation alteration would occur from the past, present and RFFAs due to reclamation of mining and exploration areas and disturbance associated with ROWs and seeding or natural regrowth in burn areas that would favor herbaceous species over shrubs. The primary impact to vegetation relates to changes in dominant plant communities that affect habitat for wildlife (i.e., conversion from sagebrush to grasslands). Wildfires combined with displacement of native species by invasive annual grasses such as cheatgrass are the primary factors that have altered the structure, composition, and ecology of plant communities in the CESA. Vegetation impacts from reclamation of exploration roads and drill pads would initially alter the dominant vegetation communities, which would be converted to grass and forb species that can exist in the environment of northeastern Nevada, are proven species for revegetation, or are native species found in the existing plant communities. In time, the reclaimed and seeded areas should result in stable plant communities with densities that are similar to the pre-disturbance plant densities. Impacts to vegetation from dispersed recreation activities would include destruction of native vegetation from off highway vehicles that travel off of established roadways. Impacts to vegetation from grazing would include trampling of vegetation near streams, springs, or riparian areas. Disturbed sites and recently seeded areas are candidates for invasion by undesirable species such as noxious weeds and cheatgrass.

When combined with the Proposed Action, quantifiable past and present actions and RFFAs total approximately 22603.96 acres, approximately 14 percent of the CESA. Some of the past actions are expected to have occurred far enough in the past that the disturbance has stabilized. The Proposed Action would disturb up to 184.44 acres of vegetation (approximately 0.1 percent of the CESA). This disturbance would not occur all at one time but potentially over a four-year period followed by up to two years of reclamation and revegetation. In addition, the reclamation bond for the Proposed Action would not be released until the revegetation success criteria have been met. The incremental impacts to vegetation from the Proposed Action when added to the past and present actions and RFFAs would be minimal.

4.5 Cumulative Impacts from the No Action Alternative

The cumulative impact analysis for the No Action Alternative is in large the same cumulative impact analysis for the in Section 5.2 of the 2008 EA for the existing operations at Fire Creek (BLM, 2008b), which analyzes the existing surface and underground exploration operations. The total disturbance from the No Action Alternative from mine operations totals 150 acres of surface disturbance on private and public land. The past and present actions and RFFAs used in this analysis for the Proposed Action would have the same incremental contribution to the No Action Alternative. Therefore, the No Action Alternative would overall have similar but slightly less cumulative impacts than the Proposed Action.

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5 CONSULTATION AND COORDINATION

This EA was prepared at the direction of the BLM, MLFO, BMD by Rubicon Environmental Consulting under a contract with Klondex. Following is a list of persons, groups, organizations, and agencies consulted, as well as a list of individuals responsible for the preparation and review of this EA.

5.1 Persons, Groups, Organizations, and Agencies Consulted

Federal Agencies

USFWS

State Agencies

NDOW

NNHP

Native Americans

Battle Mountain Band of the Te-Moak Tribe of Western Shoshone, Duckwater Shoshone Tribe, Elko Band of the Te-Moak Tribe of Western Shoshone, Te-Moak Tribe of Western Shoshone, and Yomba Shoshone Tribe.

5.2 Preparers and Reviewers

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Alden Shallcross	Surface Water Resources, Wetland and Riparian Zones
John Kinsner	Cultural Resources, Paleontological Resources
Craig Nicholls	Air Quality
William O'Neill	Wildlife Resources
Tom Olsen	Water Quality (Surface and Groundwater)
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Juan Martinez	Native American Concerns
Kent Bloomer	Noxious Weeds, Invasive, and Non-native Species
Jessica Kahler	Wastes and Materials (Hazardous and Solid)
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APPENDIX A

CULTURAL RESOURCES WITHIN THE PROJECT AREA

**APPENDIX A
CULTURAL RESOURCES WITHIN THE FIRE CREEK MINE PROJECT AREA**

BLM Site No.	State Site No.	Site Name	Age	Site Type	NRHP Status
62-5389	26La3320	FCAD	Multicomponent	District	Eligible
	26La3320	Locus A/R	Prehistoric	Simple Open Camp; Historic Refuse Scatter	Contributing
	26La3320	Locus A/R	Prehistoric	Simple Open Camp; Historic Refuse Scatter	Contributing
	26La3329	Locus AA	Prehistoric	Lithic Scatter	Non-Contributing
	26La3345	Locus AB	Prehistoric	Lithic Scatter	Non-Contributing
	26La3320	Locus AC	Multicomponent	Temporary Camp	Contributing
	26La3320	Locus AD	Multicomponent	Prehistoric Lithic Scatter; Prehistoric Hunting Blinds; Historic Refuse Scatter	Non-Contributing
	26La3321	Locus AE	Historic	Refuse Scatter	Non-Contributing
	26La3323	Locus AF	Multicomponent	(unknown)	Non-Contributing
	26La3320	Locus AG	Multicomponent	Prehistoric Lithic Scatter; Historic Camp	Contributing
	26La3344	Locus AH	Multicomponent	Prehistoric Simple Open Camp; Historic Mining/Prospecting Site; Indeterminate Stacked Rock Features	Contributing
	26La3326	Locus AI	Prehistoric	Lithic Scatter	Non-Contributing
	26La3320	Locus AJ	Prehistoric	Lithic Scatter; Quarry	Contributing
	26La3322	Locus AK	Prehistoric	Lithic Scatter	Non-Contributing
		Locus AL	Multicomponent	Prehistoric Lithic Scatter; Historic Refuse Scatter	Non-Contributing

**APPENDIX A
CULTURAL RESOURCES WITHIN THE FIRE CREEK MINE PROJECT AREA**

BLM Site No.	State Site No.	Site Name	Age	Site Type	NRHP Status
		Locus AM	Prehistoric	Lithic Scatter	Non-Contributing
		Locus AN	Prehistoric	Lithic Scatter	Non-Contributing
		Locus AO	Prehistoric	Lithic Scatter	Non-Contributing
		Locus AP	Prehistoric	Lithic Scatter	Non-Contributing
		Locus AQ	Prehistoric	Camp Site	Contributing
		Locus AS	Prehistoric	Lithic Scatter	Non-Contributing
		Locus AT	Prehistoric	Lithic Scatter; Stacked Rock Feature	Non-Contributing
		Locus AU	Prehistoric	Lithic Scatter	Non-Contributing
		Locus AV	Prehistoric	Lithic Scatter; Stacked Rock Features	Contributing
		Locus AW	Prehistoric	Lithic and Groundstone Scatter	Contributing
		Locus AX	Prehistoric	Lithic Scatter	Non-Contributing
		Locus AY	Prehistoric	Lithic Scatter	Non-Contributing
		Locus AZ	Prehistoric	Lithic Scatter	Non-Contributing
26La3328		Locus B	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus BA	Prehistoric	Lithic Scatter	Unevaluated
		Locus BB	Prehistoric	Lithic Scatter; Hunting Blind	Non-Contributing
		Locus BC	Prehistoric	Simple Lithic Scatter	Unevaluated
		Locus BD	Prehistoric	Simple Lithic Scatter	Unevaluated
		Locus BE	Prehistoric	Simple Open Camp	Contributing
		Locus BG	Prehistoric	Simple Lithic Scatter	Unevaluated

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CULTURAL RESOURCES WITHIN THE FIRE CREEK MINE PROJECT AREA

BLM Site No.	State Site No.	Site Name	Age	Site Type	NRHP Status
	26La3320	Locus BH	Prehistoric	Lithic scatter	Non-Contributing
		Locus BJ	Prehistoric	Simple Lithic Scatter	Unevaluated
		Locus BK	Prehistoric	Simple Lithic Scatter	Unevaluated
		Locus BL	Prehistoric	Simple Lithic Scatter	Unevaluated
		Locus BN	Prehistoric	Simple Lithic Scatter	Unevaluated
		Locus BO	Prehistoric	Simple Lithic Scatter	Unevaluated
		Locus BP	Prehistoric	Simple Lithic Scatter	Unevaluated
	26La3320	Locus BQ	Prehistoric	Simple Lithic Scatter	Unevaluated
	26La3320	Locus BR	Prehistoric	Simple Lithic Scatter	Unevaluated
	26La3320	Locus BS	Prehistoric	Simple Lithic Scatter	Unevaluated
	26La3320	Locus BT	Multicomponent	Prehistoric Simple Open Camp, Historic Mining Site	Contributing
	26La3320	Locus BU	Historic	Historic Road	Non-Contributing
	26La3320	Locus BV	Prehistoric	Simple Lithic Scatter	Unevaluated
	26La3320	Locus BW	Multicomponent	Prehistoric Lithic Scatter; Historic Refuse Scatter	Contributing
	26La3320	Locus BX	Multicomponent	Prehistoric Lithic Scatter; Historic Cairns	Non-Contributing
	26La3320	Locus BY	Prehistoric	Lithic scatter	Non-Contributing
	26La3320	Locus BZ	Prehistoric	Lithic scatter	Non-Contributing
	26La3320	Locus C	Historic	Historic Road, 10th Street.	Non-Contributing
	26La3320	Locus CA	Prehistoric	Lithic Scatter	Contributing
	26La3320	Locus CC	Multicomponent	Prehistoric Lithic Scatter; Historic Refuse Scatter; Historic Cairns	Contributing
		Locus CG	Prehistoric	Lithic Scatter	Non-Contributing

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CULTURAL RESOURCES WITHIN THE FIRE CREEK MINE PROJECT AREA

BLM Site No.	State Site No.	Site Name	Age	Site Type	NRHP Status
		Locus CH	Prehistoric	Lithic Scatter	Non-Contributing
		Locus CI	Prehistoric	Lithic Scatter	Non-Contributing
		Locus CJ	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus CK	Prehistoric	Lithic Scatter	Non-Contributing
		Locus CL	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus CM	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus CN	Historic	Refuse Scatter	Non-Contributing
26La3320		Locus CO	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus CP	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus CR	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus CS	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus CT	Prehistoric	Lithic Scatter	Non-Contributing
		Locus CU	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus CV	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus CW	Prehistoric	Lithic Scatter; Hunting Blind	Non-Contributing
26La3320		Locus CX	Historic	Historic Road; Refuse Scatter	Non-Contributing
26La3320		Locus CY	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus CZ	Prehistoric	Lithic Scatter	Non-Contributing
26La3332		Locus D	Prehistoric	Lithic Scatter	Contributing
26La3320		Locus DA	Prehistoric	Lithic Scatter	Contributing

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CULTURAL RESOURCES WITHIN THE FIRE CREEK MINE PROJECT AREA

BLM Site No.	State Site No.	Site Name	Age	Site Type	NRHP Status
	26La3320	Locus DB	Prehistoric	Quarry; Hunting Blind	Contributing
	26La3320	Locus DD	Prehistoric	Lithic Scatter	Contributing
	26La3320	Locus DE	Prehistoric	Lithic Scatter	Non-Contributing
	26La3320	Locus DF	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus DG	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus DH	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus DI	Prehistoric	Lithic Procurement and Reduction Locus	Unevaluated
	26La3320	Locus DJ	Prehistoric	Lithic Procurement and Reduction Locus	Unevaluated
	26La3320	Locus DK	Prehistoric	Lithic Procurement and Reduction Locus	Unevaluated
	26La3320	Locus DL	Prehistoric	Simple Flaked Stone Assemblage Locus	Non-Contributing
	26La3320	Locus DM	Prehistoric	Lithic Procurement and Reduction Locus	Unevaluated
	26La3320	Locus DN	Prehistoric	Single Reduction Locus	Non-Contributing
	26La3320	Locus DO	Prehistoric	Lithic Procurement and Reduction Locus	Unevaluated
	26La3320	Locus DP	Prehistoric	Simple Flaked Stone Assemblage Locus	Non-Contributing
	26La3320	Locus DQ	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus DR	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus DS	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus DT	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus DU	Prehistoric	Lithic Procurement and Reduction Locus	Unevaluated

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CULTURAL RESOURCES WITHIN THE FIRE CREEK MINE PROJECT AREA**

BLM Site No.	State Site No.	Site Name	Age	Site Type	NRHP Status
	26La3320	Locus DV	Prehistoric	Lithic Procurement and Reduction Locus	Unevaluated
	26La3320	Locus DW	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus DX	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus DY	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus DZ	Multicomponent	Lithic Procurement and Reduction; Mining-related Locus	Unevaluated
	26La3346	Locus E	Prehistoric	Lithic Scatter	Non-Contributing
	26La3320	Locus EA	Prehistoric	Lithic Procurement and Reduction Locus	Unevaluated
	26La3320	Locus EB	Prehistoric	Lithic Procurement and Reduction Locus	Unevaluated
	26La3320	Locus EC	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus ED	Prehistoric	Lithic Procurement and Reduction Locus	Unevaluated
	26La3320	Locus EE	Prehistoric	Single Reduction Locus	Non-Contributing
	26La3320	Locus EF	Prehistoric	Lithic Procurement and Reduction Locus	Non-Contributing
	26La3320	Locus EG	Prehistoric	Simple Flaked Stone Assemblage Locus	Non-Contributing
	26La3320	Locus EH	Prehistoric	Lithic Procurement and Reduction Locus	Unevaluated
		Locus EU	Prehistoric	Lithic Scatter	Non-Contributing
		Locus EX	Prehistoric	Lithic Scatter	Non-Contributing
		Locus EY	Prehistoric	Lithic Scatter	Non-Contributing
	26La3347	Locus F	Prehistoric	Lithic Scatter	Non-Contributing

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CULTURAL RESOURCES WITHIN THE FIRE CREEK MINE PROJECT AREA**

BLM Site No.	State Site No.	Site Name	Age	Site Type	NRHP Status
		Locus FC	Prehistoric	Single Reduction Locus	Non-Contributing
		Locus FD	Prehistoric	Lithic Scatter	Non-Contributing
		Locus FG	Prehistoric	Lithic Scatter	Non-Contributing
		Locus FH	Prehistoric	Lithic Scatter	Non-Contributing
		Locus FI	Prehistoric	Lithic Scatter	Non-Contributing
		Locus FJ	Prehistoric	Lithic Scatter	Unevaluated
		Locus FK	Prehistoric	Lithic Scatter	Non-Contributing
		Locus FL	Prehistoric	Lithic Scatter	Non-Contributing
		Locus FM	Prehistoric	Lithic Scatter	Non-Contributing
		Locus FN	Prehistoric	Hunting Blinds	Contributing
		Locus FO	Prehistoric	Single Reduction Locus	Non-Contributing
		Locus FP	Prehistoric	Lithic Scatter	Non-Contributing
		Locus FQ	Prehistoric	Lithic Scatter	Non-Contributing
		Locus FR	Prehistoric	Lithic Scatter	Non-Contributing
		Locus FS	Prehistoric	Lithic Scatter	Non-Contributing
		Locus FT	Prehistoric	Simple Flaked Stone Assemblage	Contributing
		Locus FU	Prehistoric	Simple Flaked Stone Assemblage	Non-Contributing
		Locus FV	Prehistoric	Simple Flaked Stone Assemblage	Non-Contributing

**APPENDIX A
CULTURAL RESOURCES WITHIN THE FIRE CREEK MINE PROJECT AREA**

BLM Site No.	State Site No.	Site Name	Age	Site Type	NRHP Status
		Locus FW	Multicomponent	Prehistoric Simple Open Camp; Historic Mining/Prospecting Site; Indeterminate Stacked Rock Feature	Unevaluated
		Locus FX	Multicomponent	Prehistoric Complex Flaked Stone/Feature Assemblage; Historic Mining/Prospecting Site	Contributing
26La3335		Locus G	Prehistoric	Lithic Scatter	Non-Contributing
26La3337		Locus H	Prehistoric	Lithic Scatter and Procurement Locus	Contributing
26La3340		Locus I	Prehistoric	Lithic Scatter and Procurement Locus	Contributing
26La3331		Locus J	Prehistoric	Lithic Scatter	Non-Contributing
26La3342		Locus K	Prehistoric	Lithic Scatter	Non-Contributing
26La3347		Locus L	Prehistoric	Lithic Scatter	Non-Contributing
26La3339		Locus M	Prehistoric	Lithic Scatter	Non-Contributing
26La3334		Locus N	Multicomponent	Prehistoric Lithic Scatter; Isolated Historic Can	Non-Contributing
26La3336		Locus O	Prehistoric	Lithic Scatter and Procurement Locus	Non-Contributing
26La3338		Locus P	Prehistoric	Lithic Scatter	Non-Contributing
26La3333		Locus Q	Prehistoric	Lithic Scatter	Non-Contributing
26La3320		Locus S	Prehistoric	Temporary Camp	Contributing
26La3327		Locus T	Prehistoric	Ceramic Scatter	Contributing
26La3320		Locus U	Prehistoric	Temporary Camp	Contributing

**APPENDIX A
CULTURAL RESOURCES WITHIN THE FIRE CREEK MINE PROJECT AREA**

BLM Site No.	State Site No.	Site Name	Age	Site Type	NRHP Status
	26La3320	Locus V	Prehistoric	Prehistoric Temporary Camp; Historic Refuse Scatter	Contributing
	26La3325	Locus W	Multicomponent	Prehistoric Simple Flaked Stone Assemblage; Historic Mining/Prospecting Site; Indeterminate Stacked Rock Feature	Non-Contributing
	26La3324	Locus X	Historic	Mining-related Locus	Non-Contributing
	26La3320	Locus Y	Prehistoric	Temporary Camp	Contributing
	26La3320	Locus Z	Prehistoric	Lithic Scatter	Non-Contributing
62-4663			Prehistoric	Lithic Scatter	Not Eligible
62-4665			Prehistoric	Lithic Scatter with Rock Features	Eligible
62-4666			Prehistoric	Lithic Scatter	Not Eligible
62-4673			Prehistoric	Quarry	Not Eligible
62-5373			Prehistoric	Lithic Scatter	Not Eligible
62-5374			Prehistoric		Not Eligible
62-5375			Prehistoric	Lithic Scatter	Not Eligible
62-5376			Prehistoric	Lithic Scatter	Not Eligible
62-5378			Historic		Not Eligible
62-5380			Historic	Refuse Scatter with Foundations	Not Eligible
62-5381			Prehistoric		Not Eligible
62-5382			Prehistoric	Lithic Scatter	Not Eligible
62-5383			Prehistoric		Not Eligible
62-5384			Prehistoric		Not Eligible
62-5385			Historic		Not Eligible
62-5386			Prehistoric	Lithic Scatter	Not Eligible

APPENDIX A
CULTURAL RESOURCES WITHIN THE FIRE CREEK MINE PROJECT AREA

BLM Site No.	State Site No.	Site Name	Age	Site Type	NRHP Status
62-5390			Prehistoric	Lithic Scatter	Eligible
62-5391			Prehistoric	Lithic Scatter	Not Eligible
62-5392			Prehistoric		Unknown
62-5522			Prehistoric	Lithic Scatter	Not Eligible
62-5730			Prehistoric	Lithic Scatter; Quarry	Not Eligible
62-7752			Prehistoric	Lithic Scatter	Not Eligible
62-7753			Prehistoric	Hunting Blinds	Eligible
62-7754			Prehistoric	Lithic Scatter	Not Eligible
62-7755	26La6364		Prehistoric	Lithic Scatter	Not Eligible
62-7756	26La6365		Prehistoric	Quarry; Hunting Blinds	Eligible
62-7757			Prehistoric	Lithic Scatter	Not Eligible
62-7758	26La6366		Prehistoric	Lithic Scatter	Not Eligible
62-7759			Prehistoric	Lithic Scatter	Not Eligible
62-8204			Prehistoric	Lithic Scatter	Not Eligible
62-8205			Prehistoric	Lithic Scatter	Not Eligible
62-8206			Prehistoric	Lithic Scatter; Quarry	Not Eligible
62-8207			Historic	Refuse Scatter; Claim Marker	Not Eligible
62-8208			Prehistoric	Lithic Scatter	Not Eligible
62-8209			Prehistoric	Lithic Scatter; Quarry	Not Eligible
62-8210			Prehistoric	Lithic Scatter; Rock Feature	Not Eligible
62-8211			Prehistoric	Lithic Scatter; Quarry	Not Eligible
62-8212			Prehistoric	Lithic Scatter; Quarry	Not Eligible
62-8213			Prehistoric	Lithic Scatter	Not Eligible
62-8214			Prehistoric	Lithic Scatter	Not Eligible

APPENDIX A
CULTURAL RESOURCES WITHIN THE FIRE CREEK MINE PROJECT AREA

BLM Site No.	State Site No.	Site Name	Age	Site Type	NRHP Status
62-8215			Prehistoric	Lithic Scatter	Not Eligible
62-8216			Prehistoric	Quarry	Not Eligible
62-8217			Prehistoric	Lithic Scatter	Not Eligible
62-8218			Multicomponent	Refuse Scatter; Rock Feature	Not Eligible
62-8219			Prehistoric	Lithic Scatter; Quarry	Not Eligible
62-8220			Prehistoric	Lithic Scatter	Not Eligible
62-8221			Historic	Mine Shaft	Not Eligible
62-8222			Prehistoric	Lithic Scatter	Eligible
62-8223			Historic	Refuse Scatter	Not Eligible
62-9672			Prehistoric	Lithic Scatter	Not Eligible
62-9673			Prehistoric	Lithic Scatter	Not Eligible
62-9674			Prehistoric	Lithic Scatter	Not Eligible
62-9678			Prehistoric	Lithic Scatter	Not Eligible
62-9679			Prehistoric	Lithic Scatter	Not Eligible
62-9680			Prehistoric	Lithic Scatter	Not Eligible
62-9681	26La5594		Prehistoric	Lithic Scatter	Unevaluated
62-14584			Prehistoric	Lithic Scatter	Not Eligible

APPENDIX B

SENSITIVE SPECIES HABITAT EVALUATION

APPENDIX B SENSITIVE SPECIES HABITAT EVALUATION

This table was developed by Enviroscientists (2013b) prior to conducting field verification of habitat conditions. The rows shaded represent the species that had a potential to occur prior to field verification.

The following species that were originally identified as having potential habitat but were determined not to be present or have a potential to occur based on field observations and an evaluation of suitable habitat:

- All sensitive plant species
- Pygmy rabbit
- Bighorn sheep
- Pinon jay
- Columbia spotted frog
- Pallid bat
- Townsend's big eared bat
- Big brown bat
- Spotted bat
- Hoary bat
- Cave myotis
- Silver haired bat

SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Asclepias eastwoodiana</i> Eastwood milkweed	It is found in open areas on a wide variety of alkaline soils and in small washes, or other moisture-accumulating microsites. It occurs in elevations ranging from 3,500 to 7,080 feet amsl. It occurs in desert shrub and piñon-juniper vegetation types in Nevada.	Desert scrub in the Project Area should be considered suitable habitat.	NNHP 2001
<i>Astragalus cimae</i> var. <i>cimae</i> Cima milkvetch	Dry, open, relatively barren calcareous gravel slopes or clay hills. Mineral and Nye counties. Elevation 5,100-6,416 ft amsl.	None. Suitable habitat of calcareous clay slopes is not present in the Project Area.	NNHP 2001
<i>Astragalus eurylobus</i> Needle Mountains milkvetch	Generally found in deep, barren, sandy, gravelly, or clay soils derived from sandstone or siliceous volcanics, frequently in or along drainages. Elevation ranges from 4,600-5,750 ft amsl. Lincoln and Nye counties.	None. The Project Area is out of the geographic range of this species.	NNHP 2001
<i>Astragalus funereus</i> Black woolypod	Dry, open scree, talus, or gravelly alluvium derived from light-colored volcanic tuff, on east, south, less commonly west, rarely north aspects. Lincoln, Mineral and Nye counties. Elevation 3,200-7,680 ft amsl.	None. The Project Area is out of the geographic range of this species.	NNHP 2001

APPENDIX B
SENSITIVE SPECIES HABITAT EVALUATION

SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Astragalus pseudiodanthus</i> Tonopah milkvetch	Deep loose sandy soils of stabilized and active dune margins, old beaches, valley floors, or drainages, with <i>Sarcobatus vermiculatus</i> and other salt desert shrub taxa. Dependent on sand dunes or deep sand in Nevada. Mineral and Nye counties. Elevation 4,535-6,000 ft amsl.	None. Suitable habitat of sand dunes or deep sand is not present in the Project Area.	NNHP 2001
<i>Astragalus toquimanus</i> Toquima milkvetch	It is found on dry, stiff, sandy to gravelly, basic or calcareous soils in piñon-juniper or sagebrush vegetation zones, mostly on flats or gentle slopes. It frequently is found growing under shrubs. It occurs in elevations ranging from 6,200 and 7,500 ft amsl.	Piñon-juniper or sagebrush habitats should be considered suitable habitat although the Project Area is ~ 80 miles north of the known geographic range of this species.	NNHP 2001
<i>Astragalus uncialis</i> Currant milkvetch	Dry, open, sparsely-vegetated, calcareous sandy-clay soils on flats and gentle slopes of hillsides and alluvial fans. Nye County. Elevation 4,800-6,050 ft amsl.	None. The Project Area is out of the known geographic range of this species.	NNHP 2001
<i>Castilleja salsuginosa</i> Monte Neva paintbrush	Damp, open, alkaline to saline clay soils of hummocks and drainages on travertine hot-spring mounds with <i>Sarcobatus vermiculatus</i> , <i>Ericameria nauseosus</i> , <i>Sporobolus airoides</i> , etc. Aquatic or wetland-dependent. Eureka and White Pine counties. Elevation 5,965-6,130 ft amsl.	None. No travertine hot spring mounds are present in Project Area.	NNHP 2001
<i>Cordylanthus tecopensis</i> Tecopa birdbeak	Open, moist to saturated, alkali-cruste clay soils of seeps, springs, outflow drainages, and meadows. Dependent on wetland margin areas in Nevada. Esmeralda and Nye counties. Elevation 2,100-4,900 ft amsl.	None. No alkali crusted clay soils are present in Project Area.	NNHP 2001
<i>Cymopterus goodrichii</i> Goodrich biscuitroot	It is found on moderate to steep scree and talus slopes of dark angular slate or limestone in the upper subalpine and lower alpine zones. It occurs in elevations ranging from 7,300 and 11,100 ft amsl.	None. No alpine or subalpine communities are present in the Project Area.	NNHP 2001
<i>Epilobium nevadense</i> Nevada willowherb	Slopes with limestone outcrops or talus. Associated with singleleaf piñon (<i>Pinus monophylla</i>), and ponderosa pine (<i>P. ponderosa</i>). Clark, Eureka and Lincoln counties. Elevation 6,000 to 8,930 ft amsl.	None. Suitable habitat with singleleaf piñon and ponderosa pine are not present in the Project Area.	NNHP 2001

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SENSITIVE SPECIES HABITAT EVALUATION

SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Eriogonum anemophilum</i> Windloving buckwheat	At high elevations on dry, exposed, relatively barren and undisturbed, gravelly, limestone or volcanic ridges and ridgeline knolls, on outcrops or shallow rocky soils over bedrock. At low elevations on dry, relatively barren and undisturbed knolls and slopes of light-colored, platy volcanic tuff weathered to form stiff clay soils, on all aspects. Churchill, Humboldt, Lander, Pershing, and Washoe counties. Elevation 4,750-9,836 ft amsl.	Exposed, relatively barren ridges in the Project Area should be considered suitable habitat.	NNHP 2001
<i>Eriogonum beatleyae</i> Beatley buckwheat	Dry volcanic outcrops. Churchill, Esmeralda, Eureka, Lander (?), Mineral, and Nye counties. Elevation 5,600-8,745 ft amsl.	Volcanic outcrops in the Project Area should be considered suitable habitat.	NNHP 2001
<i>Eriogonum lewisii</i> Lewis buckwheat	Dry, exposed, shallow, relatively barren and undisturbed, rocky residual soils on convex ridge-line knolls and crests underlain by siliceous carbonate rocks, on flat to moderately steep slopes of all aspects, but with the densest stands on southerly aspects, codominating with <i>Artemisia arbuscula</i> and <i>Elymus elymoides</i> . Occasionally found at lower elevations on clay hills derived from silty carbonate or calcium-rich siliceous rock.	Exposed knolls, crests and clay hills in the Project Area should be considered potential habitat.	NNHP 2001
<i>Eriogonum tiehmii</i> Tiehm buckwheat	Dry, open, relatively barren, light-colored rocky clay soils derived from a formation of interbedded claystones, shales, tuffaceous sandstones, and limestones, on all aspects with slopes up to about 50 percent, in pure stands or with a sparse cover of <i>Atriplex confertifolia</i> , <i>Pleuraphis jamesii</i> , <i>Sporobolus airoides</i> , and a few other species. Esmeralda county. Elevation 5,960-6,200 ft amsl	None. The Project Area is out of the known geographic range of this species.	NNHP 2001
<i>Frasera gypsicola</i> Sunnyside green gentian	Found in open, dry, whitish, alkaline, often salt-crusted and spongy silty-clay soils on calcareous flats and barrens, with little if any gypsum content, in cushion-plant associations surrounded by sagebrush, greasewood, and occasionally barberry and swamp cedar (<i>Juniperus scopulorum</i>) vegetation. Elevation ranges from 5,180 to 5,510 ft amsl.	None. Suitable habitat of alkaline calcareous flats is not present in the Project Area.	NNHP 2001

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SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Glossopetalon pungens</i> var. <i>glabrum</i> Smooth dwarf greasebush	Crevice of carbonate cliffs and outcrops, generally avoiding southerly exposures, 6,000-7,800 feet amsl, in the piñon-juniper, mountain mahogany, and montane conifer zones. Clark county, restricted to Spring and Sheep ranges.	None. The Project Area is outside of the known geographic range of the species.	NNHP 2001
<i>Grusonia pulchella</i> Sand cholla	Mojave Desert, Great Plains, sandy to rocky flats or slopes, often at edges of dry washes and lakes. Elevation 3,600-5,700 ft amsl.	None. Suitable habitat of deep sand is not present in the Project Area.	NNHP 2001
<i>Ivesia arizonica</i> var. <i>saxosa</i> Rock purpusia	Found in crevices of cliffs and boulders on volcanic and possibly carbonate rocks in the upper mixed-shrub, sagebrush, and piñon-juniper zones. Elevation ranges from 4,925 to 6,800 ft amsl. Lincoln and Nye counties.	None. The Project Area is out of the known geographical range for the species.	NNHP 2001
<i>Jamesia tetrapetala</i> Waxflower	Found in crevices in limestone cliffs at elevations of 7,000 to 10,720 ft amsl.	None. The Project Area is out of the known geographical range for the species.	NNHP 2001
<i>Johanneshowellia crateriorum</i> Lunar crater buckwheat	Found in sandy, pumice flats and slopes in saltbush communities. Elevation ranges from 5,575 to 6,230 ft amsl. Only known from Lunar Crater area of Nye County.	None. The Project Area is out of the known geographic range for the species.	EFlora 2004
<i>Oryctes nevadensis</i> Oryctes	Deep loose sand of stabilized dunes, washes, and valley flats, on various slopes and aspects. Dependent on sand dunes or deep sand in Nevada.	None. Suitable habitat of deep sand is not present in the Project Area.	NNHP 2001
<i>Penstemon pahutnsis</i> Pahute Mesa beardtongue	In loose soil and rock crevices among boulders in piñon-juniper woodlands and sagebrush shrublands. Esmeralda and Nye counties. Elevation 5,360-8,240 ft amsl.	None. The Project Area is out of the known geographic range for the species.	NNHP 2001
<i>Penstemon palmeri</i> var. <i>macranthus</i> Lahontan beardtongue	Along washes, roadsides and canyon floors, particularly on carbonate-containing substrates, usually where subsurface moisture is available throughout most of the summer. Unknown if restricted to calcareous substrates. Churchill, Lander (?), Nye, and Pershing counties.	Washes, roadsides and canyon floors in the Project Area should be considered potential habitat.	NNHP 2001
<i>Penstemon pudicus</i> Bashful beardtongue	Crevice, soil pockets, and coarse rocky soils of felsic volcanic outcrops, boulder piles, steep protected slopes, and drainage bottoms, mostly on north and east aspects, in the subalpine sagebrush, mountain mahogany, and upper piñon-juniper zones. Nye county.	None. The Project Area is out of the known geographic range for the species.	NNHP 2001
<i>Penstemon tiehmii</i> Tiehm beardtongue	Neutral sandy-loam soil pockets on steep, southerly-facing volcanic talus and scree slopes. Lander county. Elevation 7,500-9,600 ft amsl.	Loam pockets on scree slope in the Project Area should be considered suitable habitat.	NNHP 2001

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SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Phacelia minutissima</i> Least phacelia	Vernally saturated, summer-drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows, at perimeters of <i>Veratrum californicum</i> (corn lily), <i>Wyethia amplexicaulis</i> , and/or <i>Populus tremuloides</i> (aspen) stands, in sagebrush swales, along creek bed high-water lines, or around springs, in flat to gently sloping areas. Aquatic or wetland-dependent in Nevada.	None. No springs or vernal pools are located in the Project Area.	NNHP 2001
<i>Phacelia parishii</i> Parish phacelia	Moist to superficially dry, open, flat to hummocky, mostly barren, often salt-crusted silty-clay soils on valley bottom flats, lake deposits, and playa edges, often near seepage areas, sometimes on gypsum deposits, surrounded by saltbush scrub vegetation but with few immediate associates such as <i>Atriplex confertifolia</i> , <i>Poa secunda</i> , <i>Sarcobatus vermiculatus</i> , etc. Aquatic or wetland-dependent in Nevada.	None. No salt encrusted valley bottom flats, lake deposits or playa edges are present in the Project Area.	NNHP 2001
<i>Polycytenium williamsiae</i> Williams combleaf	Relatively barren sandy to sandy-clay or mud margins and bottoms of non-alkaline seasonal lakes perched over volcanic bedrock in the sagebrush, piñon-juniper, and mountain sagebrush zones. Aquatic or wetland-dependent in Nevada. Douglas, Lyon, Mineral, Nye, and Washoe counties. Elevation 5,670-8,930 ft amsl.	None. No seasonal lakes over volcanic bedrock are located in the Project Area.	NNHP 2001
<i>Sclerocactus blainei</i> Blaine pincushion	Alkaline calcareous and volcanic gravelly-clay soils in open valley bottom areas in the shadscale and lower sagebrush zones. Nye county. Elevation 5,100-5,300 ft amsl.	None. Suitable habitat of open valley bottoms is not present in the Project Area.	NNHP 2001
<i>Sclerocactus nyensis</i> Tonopah pincushion	Dry rocky soils and low outcrops of rhyolite, tuff, and possibly other rock types, on gentle slopes in open areas or under shrubs in the upper salt desert and lower sagebrush zones. Esmeralda and Nye counties. Elevation 5,760-5,800 ft amsl.	None. The Project Area is out of the known geographic range of this species.	NNHP 2001

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SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Silene nachlingerae</i> Nachlinger catchfly	Generally found in dry, exposed or somewhat sheltered carbonate (rarely quartzite) crevices in ridgeline outcrops, talus, or very rocky soils on or at the bases of steep slopes or cliffs, on all aspects but predominantly on northwesterly to northeasterly exposures, mainly in the subalpine conifer zone. Elevation ranges from 7,160 to 11,250 ft amsl.	None. Suitable habitat of subalpine conifer is not present in the Project Area.	NNHP 2001
<i>Smelowskia holmgrenii</i> Holmgren smelowskia	Crevice, ledges, rubble, or small soil pockets on rock outcrops and cliffs, from high-elevation ridges to north-facing walls at lower elevations, on various rock types in the lower alpine, subalpine conifer, mountain sagebrush, and upper piñon-juniper zones. Humboldt, Lander, Nye, Pershing, and White Pine counties.	Suitable habitat of north facing walls in the mountain sagebrush and piñon-juniper zones should be considered potential habitat.	NNHP 2001
<i>Sphaeralcea caespitosa</i> var. <i>williamsiae</i> Railroad Valley globemallow	Found in Sevy Dolomite rock calcareous soil within mixed shrub, piñon-juniper, and grass communities, from 4,770 to 5,310 feet amsl. Known from Railroad Valley, Nye County, Nevada.	None. The Project Area is out of the known geographic range for the species.	NNHP 2001
<i>Tonestus graniticus</i> Lone Mountain goldenhead	Crevice of granitic cliffs and outcrops on protected exposures (north to east aspects, deep canyons, etc.) in the piñon-juniper zone. Esmeralda county. Elevation 7,800 ft amsl. One occurrence in Nevada.	None. The Project Area is out of the known geographic range for the species.	NNHP 2001
<i>Trifolium andinum</i> var. <i>podocephalum</i> Currant Summit clover	Found in crevices of volcanic or carbonate rock in the piñon-juniper zone. Elevation ranges from 6,900 to 7,400 ft amsl. Lincoln and Nye counties. Endemic to the White Pine and Egan ranges.	None. The Project Area is out of the known geographic range for the species.	NNHP 2001
<i>Viola lithion</i> Rock violet	Found in seasonally wet crevices in steep carbonate or quartzite outcrops in shaded northeast-facing avalanche chutes and cirque headwalls in the subalpine conifer zone. Elko, Nye, and White Pine counties.	None. Suitable habitat of subalpine conifer is not present in the Project Area.	NNHP 2001
BIRDS			
<i>Accipiter gentilis</i> Northern goshawk	Nests in various forest types with a preference for taller, mature stands with significant canopy cover. In Nevada, they commonly nest in aspen "stringers" that trace mountain streams and ephemeral drainages. Also occur in shrub-dominated habitats likely used for foraging.	None. No aspen or subalpine conifer is present in the Project Area.	NatureServe 2012

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SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Aquila chrysaetos</i> Golden eagle	Nests in rugged crags, canyons, cliffs, and mountains. Forages in areas surrounding nest sites and can be found in any habitat type. Most common habitat use reported for foraging in Nevada is sagebrush scrub and sagebrush steppe.	Suitable foraging habitat is present. Cliff nesting habitat may occur within four miles of the Project Area.	NatureServe 2012
<i>Athene cunicularia hypugaea</i> Western Burrowing Owl	Uses a variety of habitats that are open, arid, and treeless with low vegetation. Most common where mammal burrows are available for nesting. Will often breed near agricultural lands, golf courses, and roadsides, but will not tolerate highly disturbed areas.	Open treeless areas present in the Project Area should be considered suitable habitat.	NatureServe 2012
<i>Buteo regalis</i> Ferruginous hawk	Inhabits open country including grasslands and shrublands, while avoiding forests, steep terrain, and high elevations. Most likely to be found in sagebrush scrub, but may also occur in salt desert scrub and sagebrush steppe. May also be associated with piñon-juniper blocks.	Suitable habitat of open shrubland or grassland is present in the Project Area.	NatureServe 2012
<i>Buteo swainsoni</i> Swainson's hawk	Uses open grasslands and shrublands, and is well adapted to agricultural areas. Typically nests in scattered trees near open areas for foraging. Usually nests in junipers in the Great Basin.	None. Suitable habitat of isolated trees in grassland is not present in the Project Area.	NatureServe 2012
<i>Centrocercus urophasianus</i> Greater sage-grouse	Associated with sagebrush steppe habitats that include bunchgrass and forb components. Also requires sparsely vegetated sites within the sagebrush matrix for lekking, as well as riparian areas, wet meadows, springs, and seeps for brood foraging. Will move substantial distances to use seasonally appropriate microhabitats.	Suitable habitat may be present in the Project Area.	NatureServe 2012
<i>Charadrius alexandrinus nivosus</i> Western snowy plover	Nests on the ground on broad open beaches or salt or dry mud flats, where vegetation is sparse or absent. In Nevada, they generally require hypersaline playas with minimum vegetation.	None. Suitable habitat of hypersaline playas is not present in the Project Area.	NatureServe 2012
<i>Coccyzus americanus</i> Western yellow-billed cuckoo	Breeding habitat is usually mature riparian woodland, often consisting of dense stands of cottonwood and willow. May also use smaller patches of mesquite, tamarisk, hackberry, and other woody vegetation. Nonbreeding habitat includes various types of forest, woodland, and scrub.	None. Suitable habitat of riparian woodland is not present in the Project Area.	NatureServe 2012
<i>Dolichonyx oryzivorus</i> Bololink	Breeding habitat includes tall grass areas, flooded meadows, prairie, deep cultivated grains, and hayfields.	None. Suitable habitat of grasslands is not present in the Project Area.	NatureServe 2012

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SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Empidonax traillii exitimus</i> Southwestern willow flycatcher	This species is restricted to riparian habitat with a particular affinity for low elevation rivers and streams with a large floodplain that is subject to inundation.	None. Suitable habitat of riparian woodland is not present in the Project Area.	NatureServe 2012
<i>Falco peregrines</i> Peregrine falcon	May be found in a variety of habitat types. Known nest sites in Nevada have occurred on cliff ledges or high buildings. Nests in Nevada generally occur near lakes, wetlands, or river systems.	None. Suitable habitat of lakes, wetlands or river systems is not present in the Project Area.	NatureServe 2012
<i>Gymnorhinus cyanocephalus</i> Piñon jay	Nests and forages in piñon-juniper woodland and may forage in other habitats such as sagebrush shrublands. Strongly associated with occurrence of piñon pine.	Suitable habitat of piñon-juniper is present in the Project Area.	NatureServe 2012
<i>Haliaeetus leucocephalus</i> Bald eagle	Usually nests in forests or tall trees near large water bodies.	None. Suitable habitat of tall trees is not present in the Project Area.	NatureServe 2012
<i>Lanius ludovicianus</i> Loggerhead shrike	Nests in arid, open country with just a few perches or lookouts. Found throughout most habitat types in Nevada with lower probability of occurrence in forests, higher mountains, barren zones, and urban areas.	Suitable habitat is present in the Project Area.	NatureServe 2012
<i>Leucosticte atrata</i> Black rosy-finch	Barren, rocky or grassy areas and cliffs in alpine tundra atop high mountains. Usually nests in rock crevices or holes in cliffs about snow fields.	None. Suitable habitat of alpine tundra is not present in the Project Area.	NatureServe 2012
<i>Melanerpes lewis</i> Lewis's woodpecker	Nests in open forest and woodland, often logged or burned, including oak, coniferous forest, riparian woodland, orchards, and piñon-juniper. Primary habitat consists of burned coniferous woodlands and open riparian woodlands with a relatively intact grass or shrub understory.	Suitable habitat of piñon-juniper is present in the Project Area.	NatureServe 2012
<i>Oreoscoptes montanus</i> Sage thrasher	Associated with intact, dense stands of sagebrush. Primarily uses sagebrush scrub and sagebrush steppe habitat, but may also occur in other Great Basin shrublands.	Suitable habitat is present in the Project Area.	NatureServe 2012
<i>Spizella breweri</i> Brewer's sparrow	Strongly associated with sagebrush habitat including sagebrush scrub and sagebrush steppe. Also commonly found in salt desert scrub. May occur in most habitat types in Nevada.	Suitable habitat is present in the Project Area.	NatureServe 2012
<i>Toxostoma bendirei</i> Bendire's thrasher	Found in low elevation shrublands and open woodlands in Mojave habitat, most often in association with Joshua tree woodlands interspersed with dense grass.	None. The Project Area is outside of the known geographic range for the species.	NatureServe 2012

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Toxostoma lecontei Le Conte's thrasher	Usually found in featureless expanses of sun-baked, saltbrush covered valley floors and yucca woodlands.	None. The Project Area is outside of the known geographic range for the species.	NatureServe 2012
MAMMALS			
<i>Antrozous pallidus</i> Pallid bat	Arid deserts and grasslands, often near rocky outcrops and water. Less abundant in evergreen and mixed conifer woodland. Usually roosts in rock crevice or building, less often in cave, tree hollow, mine, etc. Prefers narrow crevices in caves as hibernation sites.	Caves and abandoned mine workings in the Project Area should be considered potential habitat. Suitable foraging riparian habitat is present in the Project Area.	NatureServe 2012
<i>Corynorhinus townsendii</i> Townsend's big-eared bat	Maternity and hibernation colonies typically are in caves and mine tunnels. Prefers relatively cold places for hibernation, often near entrances and in well ventilated areas. Uses caves, buildings, and tree cavities for night roosts. Throughout much of the known range, commonly occurs in mesic habitats characterized by coniferous and deciduous forests, but occupies a broad range of habitats.	Caves and abandoned mine workings in the Project Area should be considered potential habitat. Suitable foraging riparian habitat is present in the Project Area.	NatureServe 2012
<i>Eptesicus fuscus</i> Big brown bat	Various wooded and semi-open habitats, including cities. Much more abundant in regions dominated by deciduous forest than in coniferous forest areas. Summer roosts generally are in buildings; also hollow trees, rock crevices, tunnels, and cliff swallow nests; prefers sites that do not get hot. Typically roosts in twilight part of cave. Maternity colonies form in attics, barns and occasionally tree cavities. Caves, mines, and especially buildings and manmade structures are used for hibernation.	Suitable habitat of woodland cover may be present in the Project Area. Suitable foraging riparian habitat is present in the Project Area.	NatureServe 2012
<i>Euderma maculata</i> Spotted bat	Found in various habitats from desert to montane coniferous stands, including open ponderosa pine, piñon-juniper woodland, canyon bottoms, open pasture, and hayfields. Roosts in caves and in cracks and crevices in cliffs and canyons. Winter habits poorly known.	Suitable habitat of piñon-juniper woodland is present and foraging riparian habitat is present in the Project Area.	NatureServe 2012
<i>Lasionycteris noctivagans</i> Silver-haired bat	Prefers forested (frequently coniferous) areas adjacent to lakes, ponds, and streams. During migration, sometimes occurs in xeric areas. Summer roosts and nursery sites are in tree foliage, cavities, or under loose bark, sometimes in buildings.	Suitable foraging habitat is present in the Project Area.	NatureServe 2012

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SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Lasiurus blossevillii</i> Western red bat	California, western and southern Nevada, and Utah south through Arizona and New Mexico (scattered localities), and Texas (one record as of 1991) to Mexico, Central America, and South America. Rarely found in desert habitats.	None. The Project Area is outside of the known geographic range of the species.	NatureServe 2012
<i>Lasiurus cinereus</i> Hoary bat	Prefers deciduous and coniferous forests and woodlands. Roosts usually in tree foliage three to five meters above ground, with dense foliage above and open flying room below, often at the edge of a clearing and commonly in hedgerow trees. Sometimes roosts in rock crevices, rarely uses caves in most of range. Hibernating individuals have been found on tree trunks, in a tree cavity, in a squirrel's nest, and in a clump of Spanish-moss. Solitary females with young roost among tree foliage.	Suitable riparian foraging habitat is present in the Project Area.	NatureServe 2012
<i>Myotis californicus</i> California myotis	Western lowlands; sea coast to desert, oak-juniper, canyons, riparian woodlands, desert scrub, and grasslands. Often uses man-made structures for night roosts. Uses crevices of various kinds, including those in buildings, for summer day roosts. May roost also on small desert shrubs or on the ground. Hibernates in caves, mines, tunnels, or buildings. May form small maternity colonies in rock crevices, under bark, or under eaves of buildings.	Suitable roosting habitat may be present and foraging riparian habitat is present in the Project Area.	NatureServe 2012
<i>Myotis cilolabrum</i> Western small-footed myotis	Generally inhabits desert, badland, and semiarid habitats; more mesic habitats in southern part of range. Roosts in summer in rock crevices, caves, tunnels, under boulders, beneath loose bark, or in buildings. Hibernates in caves and mines. Maternity colonies often are in abandoned houses, barns, or similar structures.	Suitable riparian foraging habitat is present in the Project Area.	NatureServe 2012
<i>Myotis evotis</i> Long-eared myotis	Mostly forested areas, especially those with broken rock outcrops; also shrubland, over meadows near tall timber, along wooded streams, over reservoirs. Often roosts in buildings, also in hollow trees, mines, caves, fissures, etc. Forages over water or among trees.	Suitable roosting habitat of rock outcrops and riparian foraging habitats are present in the Project Area.	NatureServe 2012

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SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<p><i>Myotis lucifugus</i> Little brown myotis</p>	<p>Considered a permanent resident of Nevada. Has adapted to using human-made structures for resting and maternity sites; also uses caves and hollow trees. Foraging habitat requirements are generalized; usually forages in woodlands near water. In winter, a relatively constant temperature of about 40° F and 80 percent relative humidity is required; uses caves, tunnels, abandoned mines, and similar sites. Maternity colonies commonly are in warm sites in buildings and other structures; also infrequently in hollow trees.</p>	<p>Suitable riparian foraging habitat is present in the Project Area.</p>	<p>NatureServe 2012</p>
<p><i>Myotis thysanodes</i> Fringed myotis</p>	<p>Considered a permanent resident of Nevada. Primarily at middle elevations of 3,940 to 7,050 feet in desert, grassland, and woodland habitats. Roosts in caves, mines, rock crevices, buildings, and other protected sites. Nursery colonies occur in caves, mines, and sometimes buildings.</p>	<p>Suitable foraging riparian habitat is present in the Project Area.</p>	<p>NatureServe 2012</p>
<p><i>Myotis velifer</i> Cave myotis</p>	<p>Deserts, grasslands; frequents watercourses. In Arizona, never more than a few miles from some water source. Roosts in caves and mines, usually near the entrance, in summer; occasionally in buildings.</p>	<p>Suitable foraging riparian habitat is present in the Project Area.</p>	<p>NatureServe 2012</p>
<p><i>Myotis volans</i> Long-legged myotis</p>	<p>Primarily in montane coniferous forests, in the south most often at 6,560 to 9,840 ft amsl; also riparian and desert habitats. May change habitats seasonally. Uses caves and mines as hibernacula, but winter habits are poorly known. Roosts in abandoned buildings, rock crevices, under bark, etc. In summer, apparently does not use caves as daytime roost site. In some areas hollow trees are the most common nursery sites, but buildings and rock crevices are also used.</p>	<p>Suitable foraging riparian habitat is present in the Project Area.</p>	<p>NatureServe 2012</p>
<p><i>Nyctinomops macrotis</i> Big free-tailed bat</p>	<p>Rocky areas in rugged country with cliffs and talus in desert or woodland habitats.</p>	<p>Cliffs and talus habitat may be present in the Project Area .</p>	<p>NatureServe 2012</p>

APPENDIX B
SENSITIVE SPECIES HABITAT EVALUATION

SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Pipistrellus Hesperus</i> Western pipistrelle	Deserts and lowlands, desert mountain ranges, desert scrub flats, and rocky canyons. Day and night roosts include rock crevices, under rocks, burrows and sometimes buildings or mines. May hibernate in cave, mine, or rock crevice. Typically visits water and drinks immediately after emergence each evening. Young are born in rock crevices or in buildings.	Suitable roosts and riparian foraging habitats are present in the Project Area.	NatureServe 2012
<i>Tadarida brasiliensis</i> Brazilian free-tailed bat	Roosts primarily in caves in the southwestern U.S. May use rock crevice, bridge, sign, or cliff swallow nest as roost during migration. Generally roosts high (at least three meters) above ground to allow free fall required to attain flight. Large maternity colonies inhabit buildings and caves; also uses culverts and bridges.	Suitable rock crevice roosting sites and foraging riparian habitat are present in the Project Area.	NatureServe 2012
<i>Brachylagus idahoensis</i> Pygmy rabbit	Generally use burrows found in the taller and denser big sagebrush in an area. May be found in broad valley floors, drainage bottoms, alluvial fans, and other areas with friable soils. May also occur in areas of large dense rabbitbrush and greasewood. Understory can vary from none too dense grasses and forbs.	Tall dense sagebrush in the Project Area should be considered suitable habitat.	NatureServe 2012
<i>Microdipodops megacephalus</i> Dark kangaroo mouse	In loose sands and gravel. Found in shadscale scrub, sagebrush scrub, and alkali sink plant communities. May occur in sand dunes near margins of range. Underground when inactive.	None. Suitable habitat of deep sandy soils in shadscale and sagebrush communities are not present in the Project Area.	NatureServe 2012
<i>Microdipodops pallidus</i> Pale kangaroo mouse	Habitat is nearly restricted to fine sands in alkali sink and desert scrub dominated by shadscale or big sagebrush. This mouse often burrows in areas of soft, windblown sand piled at the bases of shrubs.	None. Suitable habitat of deep sandy soils in shadscale and sagebrush communities are not present in the Project Area.	NatureServe 2012
<i>Ochotona princeps</i> American pika	Restricted to rocky talus slopes, primarily the talus-meadow interface. Often above treeline up to limit of vegetation. Also found at lower elevations in rocky areas within forests or near lakes. Occasionally on mine tailings, or piles of lumber or scrap metal. Does not dig burrows but may enlarge den or nest site under rock.	None. Suitable habitat of talus slopes is not present in the Project Area.	NatureServe 2012

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SENSITIVE SPECIES HABITAT EVALUATION

SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Ovis Canadensis</i> Bighorn sheep	Occur in mesic to xeric, alpine to desert grasslands or shrub-steppe in mountains, foothills, or river canyons. Many of these grasslands are fire-maintained. Suitable escape terrain (cliffs, talus slopes, etc.) is an important feature of the habitat.	Suitable habitat of hills, cliffs, and talus slopes may be present in the Project Area.	NatureServe 2012
<i>Thomomys bottae abstrusus</i> Fish Spring pocket gopher	Species is wide-ranging, occurring in a variety of habitats soil suitable for burrowing. Habitat types include cropland, desert, grassland, savanna, chaparral, and woodland. Nye county.	None. The Project Area is out of the known geographic range for this species.	NatureServe 2012
<i>Thomomys bottae curatus</i> San Antonio pocket gopher	Species is wide-ranging, occurring in a variety of habitats, soil suitable for burrowing. Habitat types include cropland, desert, grassland, savanna, chaparral, and woodland. Nye county.	None. The Project Area is out of the known geographic range for this species.	NatureServe 2012
REPTILES			
<i>Gopherus agassizii</i> Desert tortoise	The desert tortoise lives in a variety of habitats from sandy flats to rocky foothills, including alluvial fans, washes and canyons where suitable soils for den construction might be found from near sea level to 5,000 feet in elevation.	None. The Project Area is out of the elevation range and suitable habitat of sandy flats is not present.	NatureServe 2012, USFWS 2010
<i>Sauromalus ater</i> Chuckwalla	Inhabits rocky flats and hillsides, lava flows, and large outcrops in the Mojave desert.	None. The Project Area is out of the known geographic range for the species.	NatureServe 2012
AMPHIBIANS			
<i>Bufo nelsoni</i> Amargosa toad	Toads require relatively open water that persists long enough for the tadpoles to metamorphose into toadlets and leave the water. Nye county.	None. The Project Area is out of the known geographic range for the species.	NatureServe 2012
<i>Rana luteiventis</i> Colombia spotted frog	Highly aquatic; rarely found far from permanent quiet water; usually occurs at the grassy/sedgy margins of streams, lakes, ponds, springs, and marshes. May disperse into forest, grassland, and brushland during wet weather, and may traverse uplands to reach wintering sites. Uses stream-side small mammal burrows as shelter. Breeds usually in shallow water in ponds or other quiet waters.	Riparian areas in the Project Area should be considered suitable habitat.	NatureServe 2012
FISH			
<i>Crenichthys nevadae</i> Railroad Valley springfish	Found in thermal isolated springs and outflows.	None. Suitable habitat is not present in the Project Area.	NatureServe 2012

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SENSITIVE SPECIES HABITAT EVALUATION

SPECIES	HABITAT	POTENTIAL TO OCCUR	DATA SOURCE
<i>Gila bicolor</i> ssp. 4 Fish Lake Valley tui chub	Found in spring pools. Aquatic dependant.	None. Suitable habitat is not present in the Project Area.	NatureServe 2012
<i>Gila bicolor</i> ssp. 5 Hot Creek Valley tui chub	Found in spring pools. Aquatic dependant.	None. Suitable habitat is not present in the Project Area.	NatureServe 2012
<i>Gila bicolor</i> ssp. 7 Railroad Valley tui chub	Found in spring pools. Aquatic dependant.	None. Suitable habitat is not present in the Project Area.	NatureServe 2012
<i>Rhinichthys osculus</i> spp. 5 Monitor Valley speckled dace	Found in spring pools. Aquatic dependant.	None. Suitable habitat is not present in the Project Area.	NatureServe 2012