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

Utah

Sevier Playa Potash Project
Final Environmental Impact Statement

July 2019

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BLM Mission

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

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Sevier Playa Potash Project

Final Environmental Impact Statement

DOI-BLM-UT-W020-2014-0001-EIS

U. S. Department of the Interior
Bureau of Land Management
Fillmore Field Office

Cooperating Agencies
U. S. Department of Defense (Utah Test and Training Range)
U. S. Environmental Protection Agency
U. S. Fish and Wildlife Service
State of Utah
Millard County
Beaver County

July 2019

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Final Environmental Impact Statement
for the
Sevier Playa Potash Project

Type of Action: Mining Plan Approval
Right-of-Way Grants
Mineral Material Sales

Project Location: Millard County, Utah

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BLM Case Numbers

Mining Project	
UTU-88387	
Rights-of-Way	
Permanent	**Temporary**
UTU-90095	UTU-90095-01
UTU-90097	UTU-90096-01
UTU-92048	UTU-90097-01
UTU-92063	UTU-92064-01
UTU-92064	UTU-92067-01
UTU-92066	UTU-92068-01
UTU-92067	UTU-92069-01
UTU-92068	UTU-92100-01
UTU-92069	UTU-94227-01
UTU-92100	UTU-94232-01
UTU-94227	UTU-94233-01
UTU-94232	UTU-94234-01
UTU-94233	
UTU-94234	
Mineral Material Sales	
Unassigned	

Abstract

This Final Environmental Impact Statement (FEIS) has been prepared to analyze and disclose the potential effects of approving a Mining Plan, granting rights-of-way (ROWs), and approving mineral material sales to Peak Minerals, Inc. (dba Crystal Peak Minerals) (CPM) for the purpose of constructing, operating, maintaining, and decommissioning the Sevier Playa Potash Project (Project).

CPM controls through agreement the right to develop and operate potassium mineral leases on 117,814 acres of federal lands administered by the Bureau of Land Management (BLM) and an additional 6,409 acres of potash leases on state lands on or adjacent to the Sevier Playa, for a total of 124,223 acres. The Sevier Playa is located in central Millard County in southwestern Utah. CPM proposes to exercise its lease rights by constructing and operating the Project, which would produce at its peak 372,000 tons per year of potassium sulfate, also known as sulfate of potash, and associated minerals over the 32-year lifetime of the Project from potassium salts that are present in the brines of the Sevier Playa.

The proposed action for the Project is based on CPM's Mining Plan, Plan of Development (POD), and the Gravel Pit Mining Plan. The Mining Plan forms the basis for the mining components of CPM's proposed action. The POD is based on the off-lease infrastructure (to be located in ROWs) required to support the mining components of CPM's proposed action. The Gravel Pit Mining Plan is specific to mineral material sales from three gravel pits that CPM would operate to support development of mining components and off-lease infrastructure.

The FEIS analyzes the potential direct, indirect, and cumulative effects of the Project and addresses those issues identified by federal, state, or local agencies; Native American tribes; interested or affected parties; the public; the BLM Interdisciplinary Team; or where an analysis is required by law, regulation, or agency direction. The FEIS analyzes in detail the proposed action, five action alternatives, and a no-action alternative. The FEIS also responds to public and Cooperating Agency comments received by the BLM on the Draft Environmental Impact Statement (DEIS).

Executive Summary

ES-1.0 Introduction

The Final Environmental Impact Statement (FEIS) for the Sevier Playa Potash Project (Project) was prepared by the Bureau of Land Management (BLM) Fillmore Field Office in accordance with the National Environmental Policy Act of 1969, as amended (NEPA), the Federal Land Policy and Management Act of 1976, as amended (FLPMA), the Mineral Leasing Act of 1920, as amended (MLA), and the Materials Act of 1947, as amended. Cooperating Agencies for the FEIS include the U.S. Department of Defense (Utah Test and Training Range), the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the State of Utah, and Millard and Beaver Counties.

The MLA as amended authorizes the leasing of "chlorides, sulphates, carbonates, borates, silicates, or nitrates of potassium in lands belonging to the United States." Regulations promulgated for this activity are located at 43 Code of Federal Regulations (CFR) Part 3500. Any soluble salt containing potassium is defined as potash and there are many different varieties of potash. Leases issued under the MLA also allow for the extraction and sale of minerals associated with the potassium resource.

In February 2011, the BLM published an Environmental Assessment (EA) (the "Leasing EA") that analyzed the effects of leasing and development of the Sevier Lake competitive potassium lease tracts, which included 125,762 acres in 64 tracts (BLM 2011a). The Decision Record for the Leasing EA did not authorize development of the leases, which requires a separate NEPA review and decision (the objective of this EIS). The BLM published the Sevier Lake Potassium Lease Sale notice in March 2011. During the sale, 95,802 acres were leased to Peak Minerals, Inc. and 22,012 acres were leased to LUMA Minerals, LLC (LUMA). Approximately 7,950 acres that were included in the Leasing Proposal were not leased. Subsequent to the Lease Sale, Peak Minerals, Inc. and LUMA entered into a cooperative development agreement.

Peak Minerals, Inc., dba Crystal Peak Minerals (CPM) through agreement controls the rights to develop and operate potassium mineral leases on 117,814 acres of federal lands administered by the BLM and an additional 6,409 acres of potash leases on State of Utah lands managed by the School and Institutional Trust Lands Administration (SITLA) or adjacent to the Sevier Playa, for a total of 124,223 acres. The Sevier Playa is located in central Millard County in southwestern Utah, approximately 130 miles southwest of Salt Lake City, between the towns of Delta (30 miles to the northeast) and Milford (25 miles to the south-southeast) (see **Figure 1.1-1**). CPM proposes to exercise its lease rights by constructing and operating the Project, which would produce at its peak approximately 372,000 tons per year of potassium sulfate (K_2SO_4), also known as sulfate of potash (SOP), and associated minerals. The annual average production over the 32-year lifetime of the Project would be about 328,500 tons, with the minimum annual production approximately 246,000 tons.

The FEIS analyzes the potential direct, indirect, and cumulative effects of the Project and addresses those issues identified by federal, state, or local agencies; Native American tribes; interested or affected parties; the public; the BLM Interdisciplinary Team; or where an analysis is required by law, regulation, or agency direction. The FEIS analyzes in detail the proposed action, five action alternatives, and the no-action alternative.

ES-2.0 Bureau of Land Management's Purpose and Need

Fertilizer rich in potassium is in high demand to support national and global food production. The Food and Agriculture Organization of the United Nations has forecast a 2.4 percent annual increase in demand for potassium fertilizer, also known as potash, between 2015 and 2020. In the United States, agriculture relies on potash imports for 90 percent of its needs, with 85 percent of these imports originating in Canada. In recognition of its importance, the Department of the Interior has identified potassium as one of 35 critical minerals that the United States is almost completely reliant on importing from foreign markets. Presently, potash produced in the United States is mined from underground ores and the processing of

brines in Utah and New Mexico, and additional sources of potash are needed to meet the increasing national and global demands for fertilizer rich in potassium. The purpose of the Project is to help meet this need in an environmentally sound manner that, in accordance with 43 CFR § 3594.1, provides for the ultimate maximum recovery of potassium sulfate.

The BLM's purpose in preparing this FEIS is to consider CPM's proposed Mining Plan for use of federal lands and minerals consistent with CPM's valid existing lease rights, which allow for development of the mineral resource subject to lease stipulations and reasonable conditions of approval to avoid, minimize, and mitigate adverse environmental effects. The BLM's purpose is also to consider CPM's requests for rights-of-way (ROWs) and mineral material sales associated with the proposed Mining Plan. The need for action by the BLM is based on both the MLA and the FLPMA, which provide for the mining of potash on the public domain and require the BLM to respond to ROW grant requests while avoiding or minimizing adverse effects, in conformance with existing land use plans.

ES-3.0 Proponent's Interest and Objectives

CPM's objective for the Project is to accomplish economic recovery of potash resources from federal and state lands by commercial production, consistent with its rights to the maximum recovery of the mineral deposits. Development of a commercial project would have the potential to supplement the global supply of potash, a highly desirable and necessary potassium fertilizer, and to contribute to local, regional, and state economies.

ES-4.0 Decisions to be Made

The BLM will make the following decisions:

1) Whether or not to approve the Mining Plan, which includes full development of the Project by CPM, as described in **Chapter 2**, and under what terms and conditions.
2) Whether or not to grant ROWs to CPM for construction, operation, maintenance, and decommissioning of off-lease facilities associated with full development of the Project, and under what terms and conditions.
3) Whether or not to authorize sales of mineral materials that are needed to support full development of the Project and under what terms and conditions.

ES-5.0 Proposed Action

The proposed action for the Project is based on CPM's Mining Plan, Plan of Development (POD), and the Gravel Pit Mining Plan. The Mining Plan forms the basis for the on-lease mining components of CPM's proposed action. The POD is based on the off-lease infrastructure (to be located in ROWs) required to support the mining components of CPM's proposed action. The Gravel Pit Mining Plan is specific to mineral material sales from three gravel pits that CPM would operate to support development of mining components and off-lease infrastructure.

When reviewing and considering whether to approve proposed projects, BLM's approach is to first avoid, then minimize, and finally mitigate adverse effects. Applicant committed design features have been developed to avoid, minimize, or mitigate the potential adverse effects of the Project. **Appendix K** lists these design features, which are integral to all of the action alternatives (including the proposed action). These measures have been integrated into the Mining Plan, POD, and Gravel Pit Mining Plan as applicable. CPM would implement these design features regardless of which action alternative, or combination of alternatives, may be selected.

CPM developed several supplemental plans to address specific resource issues or management requirements. Each of these plans supplements information and requirements in the EIS, the Mining Plan, POD, and Gravel Pit Mining Plan, and is incorporated in these documents by reference. Some of these plans contain design features that CPM would implement in addition to the design features in **Appendix**

K. The analysis of effects in the EIS considers the design features in the supplemental plans to be integral to the proposed action and action alternatives.

In accordance with Secretarial Order 3355 and Executive Order 13807, the EIS was prepared in a streamlined format that summarizes extensive background information and analysis into a limited number of pages. Resource reports containing detailed discussions of the analysis area, regulatory framework, methods, affected environment, and environmental consequences were prepared for each resource analyzed in detail. The content of these reports was then summarized and incorporated into the EIS. Supporting information that is peripheral to the main analysis in the EIS was placed into appendices. **Figure ES-1** depicts the relationships among the various Project documents, reports, and appendices. The proposed action consists of three primary components, which are illustrated in **Figures 2.4-1** and **2.4-2**:

- **Mining Project** – Facilities that would be constructed and activities that would take place on leases controlled by CPM on or near the Sevier Playa as part of full commercial development of the potassium resource. During operation of the Mining Project, potassium-bearing brines would be extracted from trenches and wells on the Sevier Playa. The brine would be routed through a series of trenches and ponds, using solar evaporation to concentrate the brine. The preconcentration ponds would concentrate the brine, causing halite (NaCl, sodium chloride, also known as table salt) and other non-commercial salts to form and precipitate. These salts would be stored in the preconcentration ponds. The saturated brine would be transferred to the production ponds for further evaporation, causing potassium-rich salts to precipitate. The production ponds would be harvested year-round, with the potassium-rich salts moved directly to the Processing Facility for processing into SOP. The SOP would be trucked to the Rail Loadout Facility for distribution. The remaining brine, which is called purge brine and contains primarily magnesium chloride ($MgCl_2$), would be removed from the production ponds before harvesting begins and would be piped to a Purge Brine Storage Pond. Process by-products (solid tailings) from the Processing Facility would be trucked to the Tailings Storage Area.
- **Rights-of-Way** – Facilities that would be constructed and activities that would take place outside of leases controlled by CPM on ROWs issued by the BLM to support full development of the potassium resource. CPM has applied for ROW grants to use BLM-administered lands for the construction, operation, maintenance, and decommissioning of utilities and other facilities associated with the Project. CPM would complete similar agreements for use of state and private lands for these facilities. These Project components would be located outside of the potassium leases controlled by CPM, but are integral to successful development and operation of the Mining Project.
- **Mineral Materials** – Sale of mineral materials to CPM by BLM to support full development of the potassium resource. CPM estimates that 250,000 cubic yards (yd^3) of aggregate (gravel and similar material) would be needed over the life of the Project, primarily during construction. This estimate does not include about 50,000 yd^3 of railroad ballast and sub-ballast, which would be purchased from a commercial source. One proposed source (gravel pit) would be located on BLM-administered lands on the north side of Crystal Peak Road approximately eight miles west of the State Route (SR) 257. Two other proposed gravel pits would be located near the Processing Facility in the lease area.

ES-6.0 Alternatives

The alternatives carried forward for detailed analysis are presented as variations of specific Project components, rather than re-iterations of the entire Project in which only certain components are changed. If one or more of these alternatives are selected in the Record of Decision, the components of the selected alternative(s) would replace the corresponding components in the proposed action, while the remainder of the proposed action would be implemented as described above. The action alternatives are illustrated in **Figures 2.5-1** through **2.5-6**. The alternatives analyzed in detail are summarized as follows:

- Alternative 1 would replace the northern portion of the proposed action for the 69-kilovolt (kV) Power and Communication Line from the Black Rock Substation to the intersection of the SR 257 Cutoff Road and the Power Line Access Road. The purpose of this alternative would be to minimize new disturbance in previously undisturbed areas and minimize habitat fragmentation by following existing disturbance corridors.
- Alternative 2 would replace the southern portion of the proposed action for the 69-kV Power and Communication Line from the point where the proposed action leaves the Power Line Access Road and runs west toward the Processing Facility. The purpose of this alternative would be to minimize new disturbance in previously undisturbed areas and minimize habitat fragmentation by following existing disturbance corridors.
- Alternative 3 would replace the portion of the proposed action for the Natural Gas Pipeline between SR 257 on the east and the Rail Loadout Facility on the west. The purpose of this alternative would be to provide a route for the Natural Gas Pipeline that is entirely on BLM-administered land and avoids crossing private lands.
- Alternative 4 would replace the western portion of the proposed action for the Natural Gas Pipeline from the point where the pipeline leaves Crystal Peak Road and heads northwest, then west toward the Processing Facility. The purpose of this alternative would be to minimize new disturbance in previously undisturbed areas and minimize habitat fragmentation by following existing disturbance corridors.
- Alternative 5 would be an alternative method of diverting flows from the Sevier River into the recharge system. The purpose of this alternative would be to place the diversion within the boundary of the playa, which would minimize effects to riparian vegetation, wildlife habitat, and known cultural resources that may be present at the location of the proposed diversion.

Council on Environmental Quality regulations require the analysis of a no-action alternative. The potassium leases controlled by CPM provide it with the exclusive right to extract potassium and associated minerals on lands leased from BLM and SITLA on and around the Sevier Playa, subject to the terms and conditions in the leases. The leases also give CPM the right to use the surface of the leased land as needed for the development of the potassium resource. A potassium lease is not cancellable except by due process in cases where the lessee does not meet the terms and conditions of the lease. Thus, the no-action alternative does not imply that the leases controlled by CPM would never be developed, only that they would not be developed as proposed in the Mining Plan, the POD, the Gravel Pit Mining Plan, or the action alternatives evaluated in detail in the EIS. Under the no-action alternative, the Mining Project, associated activities on ROWs, and the mineral material sales would not be approved for construction or operation. Selection of the no-action alternative would not preclude mining of the potassium resource in the future, which would require submittal of a new Mining Plan, POD, and Gravel Pit Mining Plan, as well as completion of a new NEPA process.

ES-7.0 Environmental Effects

Extensive resource studies, as well as existing data, were used to identify the current conditions for each resource and their relevant characteristics that may be affected by the Project. **Chapter 3** references the resource reports, which contain baseline information for each resource. **Chapter 4** describes in detail the analysis areas; methods used; and the direct, indirect, and cumulative effects of the proposed action and alternatives. **Table ES-1** summarizes and compares the environmental effects of the proposed action and action alternatives for each resource topic analyzed. In general, the effects of each of the action alternatives would be similar to those of the proposed action; any instances where they would be substantially different are identified. As a summary, **Table ES-1** provides a general comparison, but does not capture some subtle differences among the alternatives; this information is contained in **Chapter 4**.

Table ES-1 Summary of Effects, by Alternative						
Resource	**Proposed Action**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Air Quality and Climate						
Fugitive dust emissions	Emissions of fugitive dust would increase above background levels. Mitigated by the Fugitive Dust Control Plan.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Other emissions	Emissions of criteria pollutants would increase above background levels.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
National Ambient Air Quality Standards (NAAQS)	The Project may exceed the NAAQS for 24-hour PM_{10}, depending on how emissions are calculated; however, the more realistic methods predict the NAAQS for 24-hour PM_{10} would not be exceeded. The Project would exceed the NAAQS for 1-hour NO_2. Cumulative emissions would exceed the NAAQS for 1-hour NO_2; however, the Project contribution to the cumulative exceedance would be small.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Prevention of Significant Deterioration (PSD) increments	Even though the Project is not a PSD major source, 24-hour and annual PM_{10} and 24-hour and annual $PM_{2.5}$ are predicted to be above the PSD increments.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Air Quality Related Values (AQRVs) in Class I and Sensitive Class II areas	The Project would not affect AQRVs in Class I areas or inside Class II areas of interest. The Project may affect visibility outside some locations associated with Class II areas of interest.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Greenhouse Gas (GHG) emissions	The Project would contribute minimally to the production of GHGs at the regional and national levels.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Climate change	No quantifiable effects on climate change are predicted.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Biological Resources						
Vegetation and habitat disturbance (general)	Construction and, to a more limited extent operation, maintenance, and decommissioning, would degrade or destroy vegetation. Despite use of measures to minimize disturbance, productivity of vegetation and wildlife habitat would be reduced.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Vegetation and habitat disturbance	1,329 acres (off-playa) 114,073 acres (on-playa)	+53 acres (off-playa) -2 acres (on-playa)	+38 acres (off-playa) +2 acres (on-playa)	Same as Proposed Action	+3 acres (off-playa) +1 acres (on-playa)	+1 acre (off-playa) -3 acres (on-playa)

Table ES-1 Summary of Effects, by Alternative						
Resource	**Proposed Action**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Introduction and spread of noxious weeds	Disturbance would increase the potential for invasion or expansion of existing occurrences of noxious weeds. Reclamation would reduce effects to vegetation and wildlife habitat. Other design features would minimize invasion or expansion of noxious weeds.	Slightly increased risk of invasion or spread because of larger disturbance area.	Slightly increased risk of invasion or spread because of larger disturbance area and existing infestations.	Slightly increased risk of invasion or spread because the alternative crosses existing infestations.	Slightly increased risk of invasion or spread because of larger disturbance area and existing infestations.	Same as Proposed Action
Wetlands and riparian areas (habitat for amphibians, fish, bats, waterfowl, shorebirds)	Small amounts of low quality wetlands and riparian areas would be lost at the Sevier River diversion. The addition of recharge water to the river would increase wetlands and riparian areas, offsetting this loss and providing improved habitat for some wildlife. Habitats would return to current conditions at the end of the Project, when recharge water is no longer available.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Reduced loss of wetland / riparian area
Injury to or mortality of wildlife from equipment or traffic	The potential exists, especially during construction, but would be mitigated by speed limits and other design features.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Injury to or mortality of wildlife related to power lines	The potential exists, but would be mitigated by the use of Avian Power Line Interaction Committee standards and other design features.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Injury to or mortality of wildlife related to hypersaline brine (trenches, ponds)	The potential exists, but would be mitigated through monitoring and adaptive management, in accordance with the Adaptive Wildlife Management Plan.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Effects to California condor	Highly unlikely, mitigated by speed limits and other design features. The Biological Assessment concluded the Project would be “not likely to adversely affect” the condor.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Cultural Resources						
Effects to eligible resources (direct)	Measures in the Programmatic Agreement (PA) would be implemented to avoid, minimize, or mitigate adverse effects. The potential would remain for loss of eligible resources in the unlikely case that they are not identified during Class III surveys. Data recovery would take place for any known eligible sites subject to damage or loss; however, the sites may still be damaged or destroyed after mitigation.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Reduced potential to encounter known resources.
Effects to eligible resources (indirect)	The existing setting or views from sensitive cultural properties could be altered, potentially diminishing their integrity.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action

Table ES-1 Summary of Effects, by Alternative						
Resource	**Proposed Action**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Effects to ineligible resources	Ineligible resources may be damaged or destroyed.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Reduced potential to encounter known resources.
Geology and Minerals						
Mineral removal	The Project would produce approximately 10 million tons of SOP and 250,000 yd^3 of gravel over its life. Despite these beneficial uses, their removal would reduce reserves.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Distribution of remaining minerals	Other minerals would be redistributed within the playa. Whether this would be considered an adverse effect would depend on potential future uses of the resources. If sale of the minerals were commercially viable, such concentration could be beneficial.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Geologic hazards	No substantial effects expected.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Active mining claims	No effects.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Lands and Access						
Conflict with existing ROWs and land use	CPM would work with ROW holders to avoid conflicts.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Access	Existing roads and trails would remain open to their current allowed uses, except that users of lands in the analysis area may experience short-term road or trail closures or restrictions as needed to protect public safety, primarily during construction.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Traffic	Traffic would increase on general access and Project access roads, but is not expected to measurably reduce travel speeds or increase travel time over current conditions.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
At-grade railroad / highway crossings	Traffic is not expected to have any adverse effects on public use of roads, except for short periods of delay when trains are crossing Headlight Canyon Road or SR 257.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Native American Religious Concerns						
Effects to Traditional Cultural Properties (TCPs)	The Project is not expected to cause any effects because no traditional cultural properties or other concerns have been identified at this time. Consultation will continue as outlined in the PA. If any TCPs or other concerns are identified, they will be evaluated in accordance with the PA.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Paleontology						

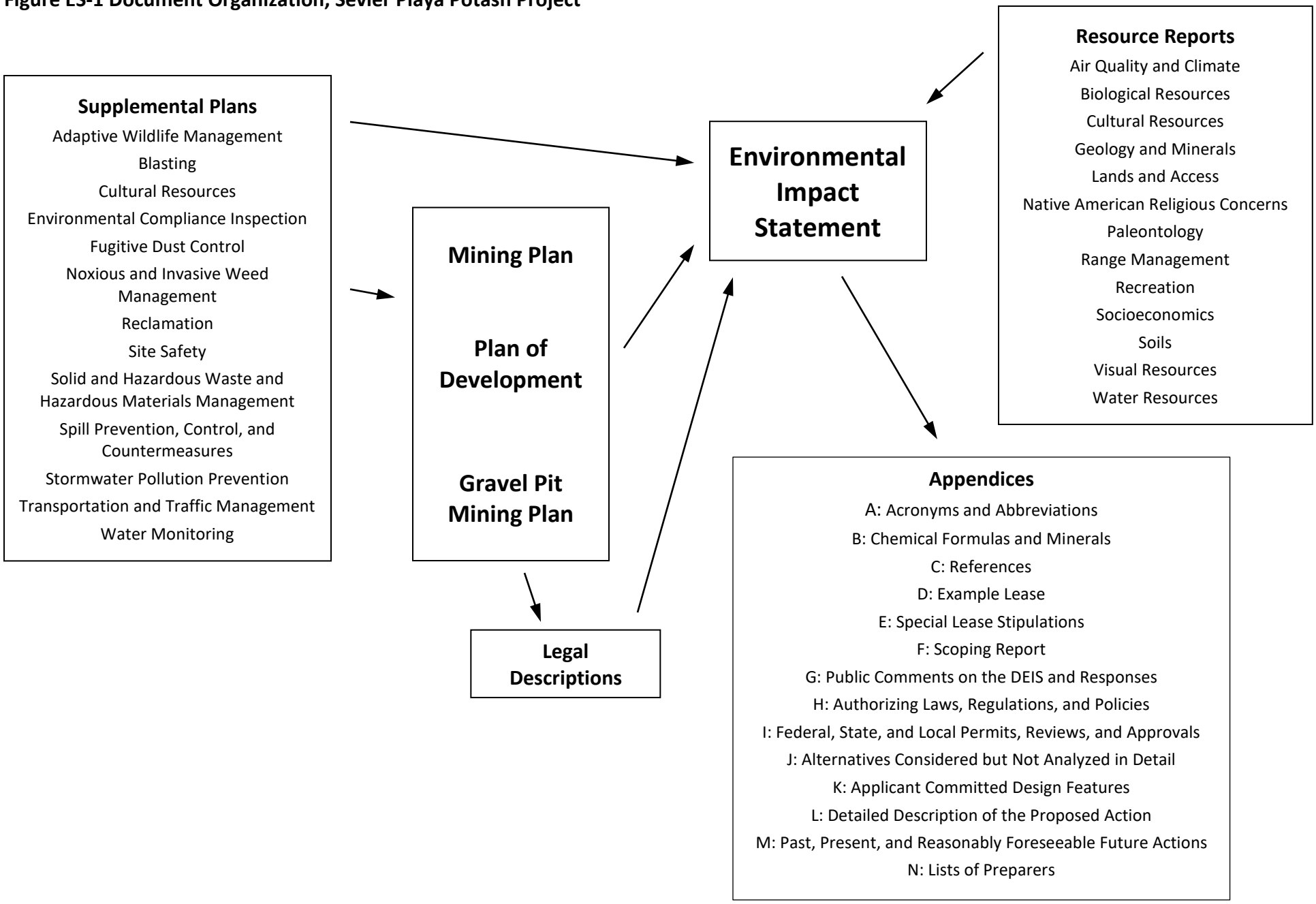
Table ES-1 Summary of Effects, by Alternative						
Resource	**Proposed Action**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Effects to paleontological resources	Facilities would only be constructed in areas of low, very low, or unknown potential for paleontological resources. Design features would be implemented to avoid, minimize, or mitigate adverse effects. The potential would remain for damage or loss of resources.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Range Management						
Disturbance of rangelands (general)	Most disturbance would be on the playa, which does not provide forage for livestock. Outside of the playa, the Project would degrade some grazing lands and prevent use of small areas of some allotments.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Disturbance of rangelands (acres, off playa)	283 acres (short-term) 1,251 acres (long-term)	No change (short-term) +43 acres (long-term)	No change (short-term) +40 acres (long-term)	No change (short-term) +<1 acres (long-term)	+ 3 acres (short-term) +4 acres (long-term)	No change (short-term) No change (long-term)
Potential reduction in Animal Unit Months (AUMs) (general)	Minimal potential losses of livestock forage (expressed in terms of AUMs) are predicted. No change in allocated AUMs is expected. Interim reclamation would partially mitigate these effects, while final reclamation is expected to substantially replace lost grazing resources in the long-term.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Potential reduction in AUMs (numbers)	24 (short-term) 93 (long-term) Note: No change in allocated AUMs is expected.	0 (short-term) +1 (long term)	0 (short-term) +4 (long term)	+<1 (short-term) +<1 (long-term)	+<1 (short-term) +1 (long-term)	-<1 (short-term) +<1 (long-term)
Conflicts with allotment management	CPM, in coordination with the BLM and grazing permittees, may need to adaptively respond to conflicts with allotment management.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Conflicts with Project activities	CPM, in coordination with the BLM and grazing permittees, may need to adaptively respond to conflicts with Project activities.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Achievement of Rangeland Health Standards	Project activities, mitigated by interim and final reclamation, would allow achievement of Rangeland Health Standards.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Recreation						

Table ES-1 Summary of Effects, by Alternative						
Resource	**Proposed Action**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Conflict with construction activities	Existing roads or trails could be closed to use during construction for short periods to protect public safety. Project facilities and activities would remove a small fraction of the lands in the analysis area from use for recreation; however, the vast majority of the analysis area, including all existing recreation sites, roads, and trails, would remain open to public use. Despite implementation of design features, the use of guy wires would increase the potential risk of collision by OHV users.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Socioeconomics						
Employment and revenue	Would provide long-term employment and revenue to local communities. How the jobs, revenues, and other benefits of the Project would balance adverse effects is unknown.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Housing and other services	The magnitude of any potential adverse effects on housing or services is largely dependent on the timing of construction of the Project in relation to construction and closure of other projects in Millard and Beaver Counties, which is currently unknown.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Effects of acquisition of recharge water	The effects of acquisition of recharge water depend on the current uses of that water, which is estimated to be 40 percent agriculture, 40 percent industry, and 20 percent other. Specific water rights that may be acquired and their current uses are unknown; therefore, any estimate of potential socioeconomic effects would be speculative.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Soils						
Disturbance of soils (general)	Construction, and to a more limited extent operation, maintenance, and decommissioning of the Project, would disturb soils. Despite use of design features to minimize adverse effects, disturbance may compact or loosen soils, remove vegetation, increase the potential for spread of noxious weeds, increase the risk of wind or water erosion, and otherwise reduce soil productivity. Interim and final reclamation, as applicable, would reduce effects to soils.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Disturbance of soils	1,821 acres (off-playa) 115,084 acres (on-playa)	+59 acres (off-playa) -16 acres (on-playa)	+40 acres (off-playa) No change (on-playa)	+<1 acres (off-playa) No change (on-playa)	+6 acres (off-playa) No change (on-playa)	-4 acres (off-playa) +5 acres (on-playa)
Reclamation potential	Productivity and reclamation potential would be limited by environmental conditions (for example, low annual precipitation), requiring extra efforts to achieve successful reclamation.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Visual Resources						

Table ES-1 Summary of Effects, by Alternative						
Resource	**Proposed Action**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Fugitive dust	Visibility may be impaired during high wind events.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Views	The Project's facilities and disturbance patterns would change the views and appearance of the landscape from some parts of the analysis area. Design features, such as the use of paint colors that blend with the surrounding landscape and interim reclamation of ground disturbance, would mitigate visual effects. The Project would create moderate to strong visual contrasts in some areas and for some viewers.	More visible than the equivalent segment of the Proposed Action	More visible than the equivalent segment of the Proposed Action	Same as Proposed Action	More visible than the equivalent segment of the Proposed Action	Same as Proposed Action
Visual Resource Management (VRM) classifications	The Project would meet the adopted VRM classification.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Water Resources						
Change to playa brine	Increases or decreases in major ions, depending on location.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Seepage of brine into the regional aquifer	Seepage of high total dissolved solids brine including purge brine is predicted to be minimal and no adverse effects are expected to the regional aquifer. Water quality would be monitored to ensure unacceptable effects do not occur, and CPM would be required to respond to any adverse effects in accordance with the lease stipulations.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Conveyance of recharge water	Conveyance of acquired recharge water down the Sevier River channel is expected to generally benefit local aquifers, wetlands, and riparian areas over the life of the Project; however, these benefits would cease at the end of the Project, when no further recharge water would be conveyed down the channel.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Slight increase in area receiving temporary benefits of recharge water.
Drawdown in the regional aquifer	Operation of the water supply wells would reduce water levels in the regional aquifer.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Decreased flows in springs	Effects of drawdown on springs are generally predicted to be unlikely. CPM would be required to respond to any adverse effects in accordance with the lease stipulations.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Sediment production	Project construction, and to a lesser extent operation, maintenance, and decommissioning, have the potential to increase sediment production through disturbance of vegetation and soils, leading to increased wind and water erosion. While the potential for these effects would be largely mitigated through application of design features, there would be some remaining risk that the design features would not be entirely effective.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action

Table ES-1 Summary of Effects, by Alternative						
Resource	**Proposed Action**	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Effects to water rights (freshwater wells)	Some water rights may be affected by drawdown caused by operation of the fresh water wells. Water levels would be monitored to ensure that unacceptable adverse effects do not occur, and CPM would be required to respond to any adverse effects in accordance with the lease stipulations.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Effects to water rights (acquisition of recharge water)	Water rights would be acquired (leased or purchased) from willing owners to provide recharge water for the Project. Specific water rights that may be acquired and their current uses are unknown. The use of acquired water may be different than current uses.	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action

Figure ES-1 Document Organization, Sevier Playa Potash Project



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Appendix J Alternatives Considered but Not Analyzed in Detail
Appendix K Applicant Committed Design Features
Appendix L Detailed Description of the Proposed Action
Appendix M Past, Present, and Reasonably Foreseeable Future Actions
Appendix N Lists of Preparers

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1.0 Purpose of EIS

This Final Environmental Impact Statement (FEIS) has been prepared to analyze and disclose the potential environmental consequences of the proposed Sevier Playa Potash Project (Project). Peak Minerals, Inc., (dba Crystal Peak Minerals) (CPM) proposes to construct and operate the Project, which would produce at its peak approximately 372,000 tons per year of potassium sulfate (K_2SO_4), also known as sulfate of potash (SOP), and associated minerals from potassium salts that are present in the brines of the Sevier Playa. The annual average production over the 32-year lifetime of the Project would be about 328,500 tons, with the minimum annual production approximately 246,000 tons.

This FEIS is a site-specific analysis of the potential effects of the Project and alternatives. It was prepared by the Bureau of Land Management (BLM) Fillmore Field Office (FFO) in compliance with the National Environmental Policy Act (NEPA), as amended, the Federal Land Policy and Management Act (FLPMA), as amended, the Mineral Leasing Act of 1920, as amended (MLA), and the Materials Act of 1947, as amended.

This FEIS uses a number of acronyms, which are defined on first use and listed in **Appendix A**. Similarly, minerals and chemical formulas are defined on first use and listed in **Appendix B**. References are listed in **Appendix C**.

1.1 Project Location

The Sevier Playa is located in central Millard County in southwestern Utah, approximately 130 miles southwest of Salt Lake City, between the towns of Delta (30 miles to the northeast) and Milford (25 miles to the south-southeast) (**Figure 1.1-1**). The Sevier Playa is a large terminal lakebed that is normally dry on the surface and contains subsurface potassium-bearing saline brines. The brine resource, along with the meteorological and topographic conditions at the Sevier Playa, make the site a viable location from which to produce potash and associated minerals (BLM 1987). The Sevier Playa is approximately 26 miles long by an average of 8 miles wide, and covers approximately 125,000 acres at an elevation of about 4,500 feet. The playa is located in western Utah's Sevier Desert in a broad valley that is 10 to 15 miles wide. The playa is bounded on the east by the Cricket Mountains and on the west by the Black Hills portion of the House Range, each reaching an elevation of approximately 8,000 feet.

1.2 Project Background

1.2.1 History of Mineral Exploration on the Sevier Playa

Crystal Peak Minerals Corporation (CPMC), which is not related to CPM, studied development of the mineral resources in the Sevier Playa basin between the late 1970s and the early 1990s. CPMC investigated the brines and playa muds for their potash potential. The BLM issued Preference Right Leases for potassium on the entire playa after the company showed that sufficient resources were present to justify economic development. CPMC, with BLM approval, constructed 3,000 acres of solar evaporation ponds, produced over one million tons of halite (NaCl, sodium chloride, also known as table salt), and constructed 4.8 miles of brine collection ditches. During this period, CPMC tested and characterized the mineral resources of the playa, developed a database for economic recovery, and completed some of the necessary infrastructure. In 1993, CPMC relinquished the BLM-issued leases following the death of a financier. During reclamation of these facilities by CPMC, the evaporation pond dikes were breached and lowered with the expectation that a rise in water level over time would obliterate them; however, some of these features remain on the playa.

In the late 1990s, Salada Minerals developed a Mining Plan for state (School and Institutional Trust Lands Administration [SITLA]) and federal (BLM) sodium leases it owned on the southern part of the playa. This Mining Plan was approved in 1997 based on a Finding of No Significant Impacts (FONSI); however, no work was completed on this project because Salada Minerals was unable to obtain adequate funding. SITLA cancelled the state leases in 2000 and the federal leases were relinquished in 2001.

1.2.2 History of the Sevier Playa Potash Project

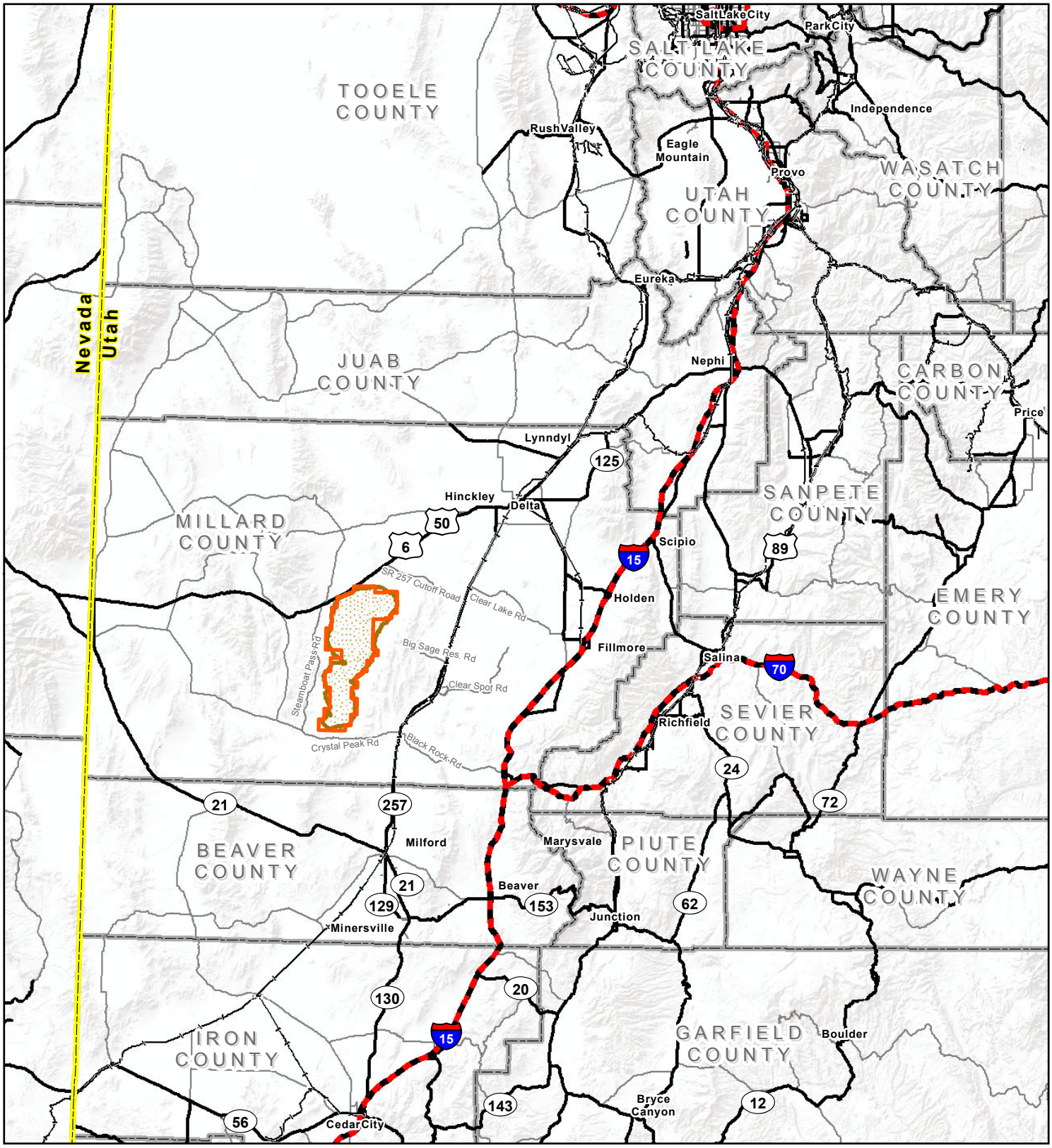
In February 2011, the BLM published an Environmental Assessment (EA) (DOI-BLM-UT-W020-2010-014-EA – the "Leasing EA") that analyzed the effects of leasing and development of the Sevier Lake competitive potassium lease tracts, which included 125,762 acres in 64 tracts (BLM 2011a). A series of terms, conditions, and stipulations were to be added to any leases issued. The Leasing EA was not limited to the assessment of leasing, but also analyzed the potential effects of reasonable scenarios for extraction of potassium based on known available processes and technology. The Decision Record (DR) for the Leasing EA allowed a competitive Sevier Lake potassium lease sale to move forward. The DR did not authorize development of the leases, which would require a separate NEPA review and decision.

The BLM published the Sevier Lake Potassium Lease Sale notice in March 2011. During the sale, 95,802 acres were leased to Peak Minerals, Inc. and 22,012 acres were leased to LUMA Minerals, LLC (LUMA). Approximately 7,950 acres that were included in the Leasing Proposal were not leased. The terms for these leases are 20 years, with provision for extension if the lessee continues to comply with the terms and conditions of the leases. An example of these leases is provided in **Appendix D**. Special stipulations to protect resources were attached to each lease. **Appendix E** reproduces these stipulations and explains how the lessees would comply with the terms and conditions. Subsequent to the Lease Sale, Peak Minerals, Inc. and LUMA entered into a cooperative development agreement. CPM through agreement controls the rights to develop and operate potassium mineral leases on 117,814 acres of federal lands administered by the BLM and an additional 6,409 acres of potash leases on lands under the jurisdiction of the SITLA (leased in 2008 by Emerald Peak Minerals LLC) on or adjacent to the Sevier Playa, for a total of 124,223 acres. Additional details on the leases and the relationship among the leaseholders are provided in **Table 1.2-1**.

Table 1.2-1 Summary and General Description of the Sevier Playa Leases

	Leaseholder		
	Peak Minerals, Inc.	**LUMA Minerals LLC**	**Emerald Peak Minerals LLC**
Relationship to CPM	Wholly-owned subsidiary of Crystal Peak Minerals, Inc. Yukon Corporation	Contractual agreement with Peak Minerals Inc.	In 2018, CPM became the owner of Emerald Peak Minerals LLC
Contractual Agreement with CPM	100 percent owned by CPM	Cooperative Development Agreement with Peak Minerals Inc. for leasehold operations	Owned by CPM
Acres Held	95,801.76	22,011.79	6,409.48
Land Manager	BLM	BLM	SITLA
Effective Date of Leases	June 1, 2011	June 1, 2011	September 1, 2008

Following issuance of the leases, the BLM completed a second EA (DOI-BLM-UT-W020-2011-0015-EA – the "Exploration EA") to analyze the potential effects of the Sevier Lake Potash Lease Minerals Exploration Program (BLM 2011b). CPM proposed three activities as part of the exploratory phase of development: 1) confirmation of the brine resource, 2) a hydrology analysis, and 3) a screening-level geotechnical study. The BLM issued the DR and FONSI for the Exploration EA in October 2011. The DR did not authorize full development of the leases, only limited exploratory activities, which began in 2011 and are continuing through 2018. Based on the exploration activities and the analysis in the Feasibility Study (CPM 2018a), CPM began developing the proposed Project. CPM and BLM worked collaboratively to refine the proposed Project, maintain its technical and economic feasibility, and avoid or minimize potential environmental effects (including developing the applicant committed design features), which led to the final proposed action (**Section 2.4**) for analysis in this EIS.



Legend

General Reference

- Interstate Highway
- US or State Highway
- Existing Railroad
- Sevier Playa Lease Boundary
- Sevier Playa
- County Boundary
- State Boundary

SEVIER PLAYA POTASH PROJECT

Figure 1.1-1
Regional Context

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Miles

BLM

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1.3 Bureau of Land Management's Purpose and Need

1.3.1 Bureau of Land Management's Regulatory and Decision-making Authority

The MLA as amended (30 United States Code [USC] § 181 *et seq.*, specifically §§ 281-287) authorizes the leasing of "chlorides, sulphates, carbonates, borates, silicates, or nitrates of potassium in lands belonging to the United States." Regulations promulgated for this activity are located at 43 CFR Part 3500. Any soluble salt containing potassium is defined as potash and there are many different varieties of potash. Leases issued under the MLA also allow for the extraction and sale of minerals associated with the potassium resource. A federal potassium lease provides the lessee the exclusive right to explore for, mine, extract, beneficiate, concentrate, process, and dispose of the potassium and other associated minerals and provides the United States with payment of rental and production royalties, bonding for both production and reclamation, prevention of mineral waste, and other special stipulation requirements. Once a lease is issued, the lessee has the right to conduct mining operations "in a manner to yield the ultimate maximum recovery of the mineral deposits, consistent with the protection and use of other natural resources and the protection and preservation of the environment—land, water and air" (43 CFR § 3594.1). Extraction, development, reclamation, mitigation, and monitoring are only allowed according to the lease stipulations under an approved Mining Plan with any conditions of approval attached to the plan. The State of Utah is required to issue a State Mining Permit for the Project under its regulations and authorities, which would include approval of the Mining Plan and reclamation bonding.

The Project would be located on federal public lands and would extract federal minerals, both of which are administered by the BLM. Therefore, the Project would be a federal action requiring compliance with NEPA, which requires that an EIS be prepared before a federal agency undertakes any major action that may have significant effects on the human or natural environment. The Project would also include components on SITLA lands and would extract minerals under State jurisdiction. Although the BLM does not have jurisdiction over SITLA lands and does not have authority to approve or disapprove extraction of State minerals, the use of SITLA lands and extraction of State minerals are included in this FEIS as connected actions, as required by NEPA.

The BLM, as the lead agency, has evaluated the Project's potential to affect the natural and human environment and to affect existing land use and resource management plans. This FEIS describes the potential environmental effects and present and future conflicts with existing land use and resource management plans that could result from implementation of the Project. This FEIS describes approaches for minimizing the identified effects and resolving conflicts (40 CFR § 1502.16). The analysis also considers the potential effects of any alternatives to the proposed action.

Potassium (as potash) is one of the 35 mineral commodities considered critical to the economic and national security of the United States as identified by the Department of the Interior in accordance with Executive Order (EO) 13817. In addition, under Section 103(b) of FLPMA (43 USC § 1702(b)), the BLM is mandated to manage the federal public lands and their various resources so they will best meet the present and future needs of the American people (for example, the need for potash fertilizer). Authorization of the Project would be consistent with FLPMA Section 103(b) as well as Section 102(a) (43 USC § 1702(a)(12), in which Congress indicates it is the policy of the United States that the public lands be managed in a manner which recognizes the Nation's need for domestic sources of minerals. Consistent with these mandates, the BLM FFO is responsible for management of the Sevier Playa for multiple uses, including mineral extraction.

Siting of the Project's potash extraction and processing facilities on leased federal public lands would not require a right-of-way (ROW) grant from the BLM. However, the location of any ancillary facilities on non-leased federal lands would require a BLM ROW grant. The BLM has a responsibility under Section 501 of FLPMA (43 USC § 1761) to consider requests for ROW grants while avoiding or minimizing adverse effects to other resource values and allowing for ROW uses in conformance with existing land use plans. Temporary ROW grants issued for the Project would be for a variable period, depending on the time required for construction and interim reclamation of each Project component. Permanent ROW

grants issued for the Project would be for 30 years with an option to extend as long as the potash leases and associated facilities are in use.

CPM has included the purchase of mineral materials from the BLM in its proposed action (**Section 2.4.3**). The Materials Act of 1947 (30 USC §601 *et seq*.) provides the BLM with the authority to dispose of sand, gravel, and other mineral materials that are not subject to mineral leasing or location, under regulations at 43 CFR Part 3600. The BLM may not sell mineral materials at less than fair market value, which it determines by appraisal (valuation) (43 CFR § 3602).

1.3.2 Bureau of Land Management's Purpose and Need

Fertilizer rich in potassium is in high demand to support national and global food production. The Food and Agriculture Organization (FAO) of the United Nations has forecast a 2.4 percent annual increase in demand for potassium fertilizer, also known as potash, between 2015 and 2020 (FAO 2017). In the United States, agriculture relies on potash imports for 90 percent of its needs, with 85 percent of these imports originating in Canada. In recognition of its importance, the Department of the Interior has identified potassium as one of 35 critical minerals that the United States is almost completely reliant on importing from foreign markets. Presently, potash produced in the United States is mined from underground ores and the processing of brines in Utah and New Mexico, and additional sources of potash are needed to meet the increasing national and global demands for fertilizer rich in potassium. The purpose of the Project is to help meet this need in an environmentally sound manner that, in accordance with 43 CFR § 3594.1, provides for ultimate maximum recovery of potassium sulfate.

The BLM's purpose in preparing this FEIS is to consider CPM's proposed Mining Plan for use of federal lands and development of federal minerals consistent with CPM's valid existing lease rights, which allow for development of the mineral resource subject to lease stipulations and reasonable conditions of approval to avoid, minimize, and mitigate adverse environmental effects. The BLM's purpose is also to consider CPM's requests for ROWs and mineral material sales associated with the proposed Mining Plan. The need for action by the BLM is based on both the MLA and the FLPMA, which provide for the mining of potash on the public domain, mandate the management of federal public lands to meet the present and future needs of the American people, and require the BLM to respond to ROW grant requests while avoiding or minimizing adverse effects, in conformance with existing land use plans.

1.4 Decisions to be Made

The BLM will make the following decisions:

1) Whether or not to approve the Mining Plan, which includes full development of the Project by CPM, as described in **Chapter 2**, and under what terms and conditions.
2) Whether or not to grant ROWs to CPM for construction, operation, maintenance, and decommissioning of off-lease facilities associated with full development of the Project, and under what terms and conditions.
3) Whether or not to authorize sales of mineral materials that are needed to support full development of the Project and under what terms and conditions.

1.5 Proponent's Interest and Objectives

CPM's objective for the Project is to accomplish the economic recovery of potash resources from federal and state lands by commercial production, consistent with its valid existing lease rights to the maximum recovery of the mineral deposits. Development of a commercial project would have the potential to supplement the global supply of potash, a highly desirable and necessary potassium fertilizer, and to contribute to local, regional, and state economies. Nitrogen, phosphorus, and potassium are the three basic nutrients needed for healthy plant development. Chemical fertilizers that supply these nutrients are an integral part of food production in modern society. The Project would help meet the growing need for fertilizer to support national and global food production.

The potassium fertilizer market comprises four primary products: 1) potassium chloride (KCl), also known as muriate of potash (MOP); 2) SOP; 3) potassium magnesium sulfate ($K_2Mg_2[SO_4]_3$), also known as sulfate of potassium magnesium (SOPM); and 4) potassium nitrate (KNO_3), also known as nitrate of potassium (NOP) (CH2M HILL 2013a). MOP represents the largest component of global demand at approximately 88 percent with SOP, SOPM, and NOP composing approximately 8, 2, and 2 percent of global demand, respectively. SOP rarely occurs naturally; most is produced synthetically or through beneficiation and processing. SOP exhibits a historical price premium of 30 to 60 percent over MOP because of the relative scarcity of primary producers and the requirement for MOP as an input to synthetic production of SOP.

The main factors for potassium-based fertilizer selection are the total amount of potassium required by a plant, solubility, chloride sensitivity, and nutrient composition (CH2M HILL 2013b). For example, crops such as grains typically require a smaller amount of potassium per plant and have a high tolerance for chloride; therefore, MOP is the preferred and most economical source of potassium for them. High-value crops such as fruits, tree nuts, tobacco, and vegetables are chloride-sensitive, or in some cases chloride-intolerant, and require larger amounts of potassium; thus, SOP is preferred over MOP. In addition, SOP contains sulfur, another important plant nutrient, and does not contain chloride. SOP also provides additional flexibility for potassium applications in environments with saline soils or poor quality of irrigation water.

1.6 Scoping and Public Involvement

During scoping, the BLM solicited input from the public; interested federal, state, and local agencies; and Native American tribes. Information received during scoping was used by the BLM to identify potential issues, alternatives, and mitigation measures.

1.6.1 Process Summary

The BLM published a Notice of Intent (NOI) to prepare an EIS for the Project in the *Federal Register* on March 12, 2014 (BLM 2014). Publication of the NOI initiated the public scoping process and provided for a 30-day comment period. The NOI stated that in order for comments to be included in the Draft EIS (DEIS), they must be received prior to the close of the 30-day scoping period or 15 days after the last public meeting, whichever is later. Because of delays with development of the proposed action for the Project, the comment period was extended until after the public scoping meeting, which was held on August 5, 2015. The scoping comment period ended on August 31, 2015. In addition to the publication of the NOI, scoping and public involvement activities included:

- Advertisements placed in five publications in July 2015, informing the public of the upcoming scoping meeting and the opportunity to comment. These publications included the Salt Lake Tribune, Deseret News, Millard County Chronicle Progress, Nephi Times-News, and Beaver County Journal.
- A news release distributed in July 2015 to inform the public of the upcoming scoping meeting and the opportunity to comment.
- Flyers placed in public locations in towns near the Project in July 2015, informing the public of the upcoming scoping meeting and the opportunity to comment.
- A letter briefly describing the Project (including a map) and opportunities to provide comment was distributed to interested parties on the Project mailing list, including federal, state, and local agencies; Native American tribes; interest groups; landowners; ROW and permit holders near the Project; and interested individuals
- An interagency meeting held at BLM's office in Fillmore, Utah on August 5, 2015 to discuss the Project and solicit comments from potential cooperating and other interested agencies.
- The BLM's Interdisciplinary Team (IDT) completed an IDT checklist for the Project to identify preliminary resource issues and concerns.
- A public scoping meeting held on August 5, 2015, in Delta, Utah to describe the Project, explain the planning and permitting process, and solicit comments from the public.

A detailed discussion of each of these activities, as well as the comments received, and a summary of the issues that were identified, are presented in the Scoping Report (**Appendix F**).

1.6.2 Issue Development

One purpose of the scoping process is to determine relevant issues that may influence the scope of the environmental analysis, including alternatives and mitigation, and guide the process of developing the EIS. The issue development process is described in detail in **Appendix F**.

1.6.3 Issues Analyzed in Detail

Table 1.6-1 presents a summary of the issues and concerns that are analyzed in detail in the EIS, including those issues and concerns used to identify and refine potential alternatives to the Project. For each general resource, specific focus topics are identified based on comments received from the BLM, Cooperating Agencies, and the public during scoping.

Table 1.6-1 Issues Analyzed in Detail

Resource	Issues to Be Addressed
Air Quality and Climate	• Fugitive dust emissions (Project-specific, cumulative) • Other emissions (including construction and operation equipment) • Compliance with National Ambient Air Quality Standards (NAAQS) • Prevention of Significant Deterioration (PSD) increments • Effects to Class I and Class II areas of interest • Greenhouse gas (GHG) emissions • Effects of GHG emission on climate change
Biological Resources	• Vegetation Excluding Special Status Species o Loss or degradation of native / desirable vegetation o Loss or degradation of habitat for wildlife and forage for livestock • Wetlands and Riparian Areas o Loss or degradation of wetlands / Waters of U.S. o Loss or degradation of riparian area near the outlet of the Sevier River (diversion structure and associated facilities) o Loss or degradation of riparian areas / vegetation caused by changes in hydrology • Invasive Species and Noxious Weeds o Introduction of noxious weeds o Spread of existing and new weed infestations • Wildlife and Fish Excluding Special Status Species o Loss or degradation of habitats, including loss of habitat suitability o Influence of noise, traffic, vehicle collisions, and human activity on movement, foraging, nesting, and breeding of wildlife • Migratory Birds o Influence of noise, traffic, vehicle collisions, and human activity on foraging, nesting, roosting, and breeding o Attraction of birds to evaporation ponds or other Project facilities, with subsequent injury / mortality o Importance of habitats to migrating waterfowl and shorebirds • Effects to Special Status Wildlife Species o Utah / BLM Sensitive Species (kit fox, burrowing owl) o Bats o Raptors (golden eagle, ferruginous hawk) o Birds of Conservation Concern o Priority Species for Conservation Action • Federally Listed Wildlife Species o Loss of potential (unoccupied) habitat for the Utah prairie dog o Wildlife / livestock collisions with Project vehicles and subsequent risk of vehicle collisions with California condors that may scavenge road-kill.

Table 1.6-1 Issues Analyzed in Detail

Resource	Issues to Be Addressed
Cultural Resources	• Effects to eligible properties
Geology and Minerals	• Removal of mineral resources • Interactions with geologic hazards (subsidence, landslides, dune migration) • Effects to active mining claims
Lands / Access	• Conflicts with other ROW holders • Conflicts with other land users • Effects on access to public lands • Effects of Project-generated traffic • Effects of new at-grade railroad / highway / road crossings
Native American Religious Concerns	• Effects to traditional cultural properties
Paleontology	• Loss or degradation of paleontological resources
Range Management	• Conflicts with allotment management • Attraction of livestock to open water (brine or recharge water) and potential for livestock fatalities • Loss, reduction, or degradation of water sources used by livestock • Loss of forage, including off-playa ROWs • Potential for livestock fatalities from increased Project-related traffic • Achievement of rangeland health standards
Recreation	• Conflict with construction activities
Socioeconomics	• Increased local employment and revenue • Increased demand for housing and services • Economic effects of water right acquisition
Soils	• Soil erosion • Loss of productivity • Ability to successfully reclaim and revegetate disturbed areas with desirable species
Visual Resources	• Visibility of Project facilities (on- and off-lease facilities) • Effects of fugitive dust

Water Resources	• Alteration of quantity or quality of surface or groundwater
	  o Decreased groundwater levels, including reduced flows from springs
	  o Reduced quality of groundwater, including springs
	  o Increased or decreased flows in ephemeral drainages
	  o Decreased water quality in ephemeral drainages
	• Alteration of quantity or quality of groundwater near the Sevier Playa
	  o Increased or decreased water levels of playa brines
	  o Altered chemistry of playa brines
	  o Decreased bedrock groundwater (freshwater) levels or quality
	• Alteration of the Sevier River channel, flow paths, or floodplain by conveyance of recharge water, diversion facilities, or other Project components
	• Alteration of the location, extent, and water quality of wetlands by conveyance of recharge water in the Sevier River channel
	• Alteration of the quantity or quality of surface water or groundwater by conveyance of recharge water in the Sevier River channel
	• Alteration of patterns of surface water flow or water quality by Project components including roads, pipelines, or culverts
	• Loss, reduction, or degradation of groundwater that supports existing water rights

1.6.4 Resource Issues Eliminated from Detailed Study

Several resources, including farmlands (prime or unique), fire and fuels management, property boundary evaluation, and wastes (hazardous or solid) were eliminated from detailed analysis because the Project would have minimal if any effects, or because design features would minimize or eliminate any effects, to these resources of concern. The rationale for eliminating these resources from detailed analysis is contained in **Appendix F**. Ten potential resources (Areas of Critical Environmental Concern, BLM Natural Areas, environmental justice, lands with wilderness characteristics, National Historic Trails, special status plant species, Wild and Scenic Rivers, wild horses and burros, Wilderness / Wilderness Study Areas, and woodlands / forestry) were identified based on their discussion in the Warm Springs Resource Area (WSRA) Resource Management Plan (RMP) (BLM 1987), more recent land management planning activities, or federal laws and regulations. These resources were analyzed in sufficient detail (in **Appendix F**) to determine that they are not present and would not be affected by any alternatives for the Project; therefore, they are not analyzed further in this EIS.

1.7 Comments on the Draft EIS

Appendix G describes the process the BLM used to solicit comments on the DEIS for the Project. It summarizes comments submitted during review of the DEIS and provides responses to those comments. Attachments to **Appendix G** contain marked-up comments, the EPA and BLM Notice of Availability (NOA), the BLM's notification mailing and mailing list, and BLM's news release.

The EPA published a NOA for the DEIS in the *Federal Register* on November 30, 2018 (EPA 2018a). Publication of the NOA initiated the public review and comment process for the DEIS and provided for a 45-day review and comment period, ending January 14, 2019. The BLM published a NOA for the DEIS in the *Federal Register* on November 30, 2018 (BLM 2018). In addition to the NOAs, BLM took several other actions to notify the public of the availability of the DEIS for review and comment, including:

- The BLM distributed a mailing to 155 agencies, organizations, Native American tribes, and individuals using the mailing list developed for the Project.
- The BLM issued a news release to local and regional print and broadcast media announcing the availability of the DEIS for public review.
- Electronic versions of the DEIS and supporting documents were published on BLM's ePlanning website.
- Paper and digital copies of the DEIS and supporting documents were made available for review at the BLM Fillmore Field Office, the BLM West Desert District Office; the Fillmore City Library, and the Delta City Library.

Opportunities to provide comments were provided via mail, fax, and a Project-specific email account. Contact information, including telephone number, physical address, and email address for the BLM's Project Manager was provided for questions or additional information on the Project. The BLM's NOA stated that to ensure comments would be considered, the BLM must receive them within 45 days following the date the EPA publishes its NOA in the *Federal Register*. Based on the publication date of EPA's NOA, the comment period ended on January 14, 2019. Subsequent to publication of the DEIS, a lapse in funding resulted in a partial government shutdown (including the BLM, EPA, and USFWS) from December 22, 2018 through January 25, 2019. The final 24 days of the comment period were during the shutdown. During this period, the DEIS remained available on the ePlanning website and at the Delta and Fillmore City Libraries.

The EPA and USFWS were prevented from submitting comments on the DEIS during the public comment period because of the partial government shutdown. After the conclusion of the shutdown, the BLM informed the EPA and USFWS that they could have additional time to submit comments (until February 13, 2019) because of their Cooperating Agency status and their inability to review the DEIS or consult with the BLM during the comment period.

The BLM received six comment letters or other communications from individuals, agencies, or organizations during the public comment period. The BLM received four additional communications after the end of the comment period, but determined these comments could be included in the analysis and response because of delays related to the partial government shutdown. This included two comments received after the end of the comment period, but before the comment analysis began, as well as comments from two Cooperating Agencies (EPA and USFWS) that were delayed because of the shutdown. The BLM reviewed all of the communications to identify substantive comments. Comments in favor of or against the proposed action or alternatives, or those that only agree or disagree with agency policy, are not considered substantive. BLM's IDT reviewed and responded to all substantive comments. To the extent possible, the responses indicate where supporting information can be found in the EIS, appendices, resource reports, or other Project documents.

1.8 NEPA and Plan Conformance

1.8.1 Relationship to BLM Policies, Plans, and Programs

Applicable BLM land use planning and management objectives for federal lands are contained in the WSRA RMP (BLM 1987). The Sevier Playa is located in a portion of the WSRA planning area that is designated as suitable for mineral extraction operations. The goals of BLM's mineral program (WSRA RMP, page 47) are to:

1) Provide for the discovery, development, and use of minerals on public land consistent with applicable laws and regulations
2) Require the least restrictive stipulations necessary to adequately protect other resources
3) Continue to meet public demand for saleable and free-use mineral materials on a case-by-case basis

Page 48 of the WSRA RMP, regarding saleable minerals (such as gravel) states: "Sale permits will be processed on a case-by-case basis, with appropriate mitigating measures and stipulations attached to protect other resource values."

Page 49 of the WSRA RMP, regarding solid, non-energy leasable minerals (such as potassium) states: "Leases will be issued and mining plans evaluated in order to define appropriate stipulations to protect other resources."

The objectives of the BLM's Lands program (WSRA RMP, page 39) are to:

1) Provide more effective public land management and to improve land use, productivity, and utility.
2) Accommodate community expansion and economic development needs.
3) Authorize legitimate uses of public lands.

Page 39 of the WSRA RMP states: "These [objectives] are accomplished by processing use authorizations (e.g., rights-or-way, leases, permits, and State land selections) in response to demonstrated public needs."

Both the Leasing and Exploration EAs disclosed that their respective proposed actions (leasing and exploration) were in conformance with the WSRA RMP (BLM 2011a, 2011b). The proposed action and action alternatives in this EIS would also conform to the WSRA RMP. Conformance of specific aspects of the Project with the WSRA RMP is discussed in **Section 4.3**.

1.8.2 Collaboration

The BLM promotes an open NEPA process through collaboration with other agencies, stakeholders, and the public. Throughout development of this EIS, the BLM has made formal and informal efforts to involve federal, state, and local agencies; Native American tribes; interest groups; landowners, ROW and permit holders near the Project; and other members of the public. These interactions have helped ensure that all interested parties are aware of the Project, have opportunities to provide input to the planning process, and that their interests are considered and incorporated into analysis and decision-making.

1.8.3 Intergovernmental, Interagency, and Tribal Relationships

1.8.3.1 *Cooperating Agencies*

As part of scoping, an interagency meeting held at BLM's office in Fillmore, Utah on August 5, 2015 to discuss the Project and solicit comments from potential cooperating and other interested agencies. The BLM invited agencies to participate as Cooperating Agencies for the EIS in a letter sent on August 22, 2015. In response, the following Cooperating Agencies decided to participate in the Project:

- U. S. Department of Defense (DOD), Utah Test and Training Range (UTTR)
- U. S. Environmental Protection Agency (EPA)
- U. S. Fish and Wildlife Service (USFWS)
- State of Utah
  - Utah Public Lands Policy Coordinating Office (PLPCO)
  - Utah Department of Environmental Quality (UDEQ)
  - Utah Department of Transportation (UDOT)
  - Utah Division of Air Quality (UDAQ)
  - Utah Division of Oil, Gas, and Mining (UDOGM)
  - Utah Division of Water Quality (UDWQ)
  - Utah Division of Water Rights (UDWRi)
  - Utah Division of Wildlife Resources (UDWR)
  - SITLA
  - Utah Division of State History
  - University of Utah Telescope Array (TA) Project
- Millard County
- Beaver County

The BLM invited the following Native American Tribes to participate as Cooperating Agencies in a letter sent on April 7, 2016.

- Confederated Tribes of the Goshute
- Hopi Tribe
- Kaibab Band of Paiute Indians
- Kanosh Band of Paiute Indians
- Navajo Nation
- Paiute Indian Tribe of Utah
- Skull Valley Band of Goshute
- Ute Indian Tribe

In a letter dated April 22, 2016, the Hopi Tribe declined to participate as a Cooperating Agency, but stated they would participate in the Project through the National Historic Preservation Act (NHPA) Section 106 process. No other tribes responded to the Cooperating Agency invitation. The BLM received no requests from any other entities to participate as Cooperating Agencies.

The BLM worked closely with the Cooperating Agencies throughout the NEPA process. Monthly Cooperating Agency updates (meetings, conference calls, or written updates) were held beginning in November 2015 and continuing through August 2019. The Cooperating Agencies were provided the opportunity to review and comment on early drafts of the Mining Plan, POD, Gravel Pit Mining Plan, the proposed action and alternatives, supplemental plans, resource reports, the Administrative Draft EIS (DEIS), and the Administrative FEIS.

1.8.3.2 *Consultation*

The BLM is required to conduct NEPA analyses (such as this EIS) in coordination with any studies or analyses required by the Fish and Wildlife Coordination Act of 1934 (16 USC § 661 et seq.), the NHPA of 1966 (54 USC § 300101 et seq.), the Endangered Species Act (ESA) of 1973 (16 USC § 1531 et seq.),

and other environmental review laws and executive orders (40 CFR 1502.25(a)), which are listed in **Appendix H**. The following sections describe consultation related to biological and cultural resources. Other interagency consultation (for example, with the U. S. Army Corps of Engineers [USACE] in regard to the Clean Water Act [CWA]) is described in the appropriate resource sections in **Chapter 4** of this EIS or in the resource reports.

1.8.3.2.1 Air Resources

An air resources working group was formed early in the development of the EIS from a subset of the Cooperating Agencies with an interest in air resources. The primary members of the air group were the BLM (including its contractors), CPM (including its contractors), the EPA, and UDAQ. The purpose of the air group was to review and provide input on the Fugitive Dust Control Plan, air modelling protocol, emission inventory, and air modelling results for the Project. This group met occasionally through development of the air modelling, DEIS, and FEIS for this purpose.

1.8.3.2.2 Biological Resources

A Biological Assessment (BA) (BLM and ENValue 2018) was prepared to evaluate whether the Project may affect any federally-listed species or designated critical habitat under the ESA. The BA determined that the Project would not affect or would not be likely to adversely affect any listed species, nor would it destroy or adversely modify any designated critical habitat. The BLM requested and received concurrence from the USFWS on the determinations the BLM made in the BA. The BA and concurrence letter from USFWS are provided in Appendices A and B, respectively, in the resource report for Biological Resources (ENValue 2019a). After completion of the DEIS and BA, CPM completed detailed engineering for several Project components that resulted in some changes to the Project description. The BLM conducted informal discussions of these changes with the USFWS, concluding that a revised BA did not need to be prepared and that the findings of the BA remained valid, including USFWS's concurrence with those findings.

The USFWS is also responsible for administration of the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). The BLM, in cooperation with CPM, UDWR, and USFWS prepared an Adaptive Wildlife Management Plan (AWMP) (CPM 2019a) to identify measures that CPM would implement during the construction, operation, maintenance, and decommissioning phases of the Project to avoid, minimize, mitigate, monitor, and if necessary compensate for effects to wildlife and wildlife habitats associated with the Project. The measures in the AWMP would avoid, minimize, or mitigate effects to migratory birds and eagles as required by the MBTA and BGEPA, including minimizing the risk of "take".

The BLM actively collaborates with the UDWR to protect, promote, and manage wildlife and habitat identified in the Utah Wildlife Action Plan, which identifies sensitive species and their habitats, threats, limiting factors, and crucial data gaps. The plan also provides guidance for improving habitats and strengthening wildlife populations (Utah Wildlife Action Plan Joint Team 2015). The BLM's Special Status Species list of sensitive and priority species is based on the list of species identified in the Utah Wildlife Action Plan.

The Wildlife Working Group (WWG) was formed early in the development of the EIS from a subset of the Cooperating Agencies with an interest in biological resources. The primary members of the WWG were biologists from BLM (including its contractors), USFWS, and UDWR. As needed and appropriate, representatives from CPM and its contractors were invited to join WWG meetings. The purpose of the WWG was to discuss and resolve questions or concerns related to wildlife, including providing input to and review of the AWMP (CPM 2019a). Once the NEPA process is complete (after the ROD is issued), the WWG will transition into the Technical Advisory Committee (TAC). The TAC will be composed of one representative each from BLM, USFWS, UDWR, and CPM. The TAC will be responsible for reviewing monitoring results, evaluating mitigation effectiveness, determining if resource objectives are being met, and if necessary recommending adjustments to elements of the AWMP (for example, incorporating new mitigation measures or adjusting monitoring requirements) to the BLM.

1.8.3.2.3 Cultural Resources

Section 106 of the NHPA requires the lead federal agency to consider the effects of the agency's undertakings on properties listed or eligible for listing in the National Register of Historic Places (NRHP). A Programmatic Agreement (PA) has been prepared for the Project (BLM et al. 2018). A PA is a document that sets forth the terms and conditions agreed upon to resolve potential effects to historic properties of a federal agency program or complex undertaking in accordance with Section 106 of the NHPA.

In a letter dated December 11, 2015, the tribes listed in **Section 1.8.3.1** were invited to participate in the PA process as Consulting Parties. The Hopi tribe responded to the invitation on December 16, 2015, deferring to the SHPO and other participating tribes, and requesting continued consultation on the Project. The Paiute Indian Tribe of Utah and the Ute Indian Tribe declined to participate as Consulting Parties. No response was received from the other tribes.

The PA for this Project defines the general and specific measures that would be undertaken by BLM, CPM, and the State Historic Preservation Office (SHPO) to ensure that the agencies' objectives and responsibilities are fulfilled regarding protection of historic properties under the NHPA. Signatories of the PA included the BLM and SHPO. Invited signatories of the PA included SITLA, UDOGM, and CPM. Concurring parties included Millard County, PLPCO, Utah Rock Art Research Association, and Southern Utah Wilderness Alliance. The Advisory Council on Historic Preservation declined to participate in this Project. The signed PA will be incorporated by reference into the Record of Decision (ROD) for the Project.

1.8.3.2.4 Consultation and Coordination with Federally Recognized Indian Tribes

The BLM has consulted with Native American tribes on a government-to-government basis in accordance with EO 13175 and other policies. Interested tribes were invited to participate in the Project as Cooperating Agencies (**Section 1.8.3.1**) and in development of the PA. In addition to the formal consultation described below, the BLM conducted less formal consultation in the form of emails or phone conversations on an occasional basis. Tribal concerns, including, but not limited to, effects to Indian trust assets, effects to eligible properties (cultural resources), and effects to traditional cultural properties were considered during development of the EIS.

As part of scoping (**Section 1.6**), the BLM mailed Project notification letters to the tribes listed in **Section 1.8.3.1** on July 17, 2015 to inform them about the Project, the NEPA process, and to solicit any comments or relevant information. The Hopi tribe responded to the scoping letter on July 27, 2015, requesting continued consultation on the Project. No other responses were received from the tribes in response to scoping.

The Native American tribes were included in the notification of the availability of the DEIS for review (**Section 1.7**). The BLM did not receive any comments from the tribes on the DEIS.

As part of ongoing consultation, the BLM sent letters to the tribes on November 19, 2018 summarizing the status of the Project and the environmental analysis, the status of the PA as finalized, and the status of efforts taken to date to address cultural resource concerns. The Hopi responded on December 3, 2018, requesting additional information on the cultural resource surveys and reiterating their desire for continued consultation on the Project. The requested documents were sent to the Hopi on December 17, 2018. The Hopi responded on December 27, 2018 thanking BLM for the information and requesting continued consultation.

On June 21, 2019, the BLM sent letters to the tribes providing an update on the current status of the environmental review and inviting continued consultation on the Project. The BLM followed up on these letters with phone calls to some of the tribes that have been more involved in the PA and NEPA processes.

1.9 Related Plans

In 2006, the United States Congress acknowledged the importance of the Great Basin region by designating the Great Basin National Heritage Area. The heritage area includes all of Millard County and encompasses the analysis area for the Project. A management plan (Great Basin Heritage Area Partnership 2013) containing goals and strategies has been prepared for the heritage area. These include support for land use planning and sustainable economic development. The management plan for the Great Basin National Heritage Area did not amend the WSRA RMP, nor is there any requirement that actions taken in the analysis area, such as the Project, conform with the plan.

The BLM reviewed the land use and resource management plans of the State of Utah and Millard County to ensure that the Project would be consistent with their respective management objectives and policies.

The State of Utah's (2018a) Resource Management Plan contains objectives, policies, and guidelines designed to promote cooperation, coordination, and consistency between the interests of state and local governments and the management of federal lands. The state's plan is supported by Millard County's (2018) Resource Management Plan, which shares similar objectives, policies, and guidelines. The State of Utah (through PLPCO) and Millard County have been involved in the Project since the beginning of the NEPA process as Cooperating Agencies, consistent with the state and county Resource Management Plans.

State lands that would be affected by the Project are managed by SITLA. The state's primary management goal for SITLA lands is to produce funding for the state's school system. The Project's uses of SITLA lands would generate revenue for the state's school system, which would be consistent with this goal.

The Millard County General Plan (2013) supports the responsible use and development of natural resources in the County, consistent with the General Plan and without adverse permanent effects to the environment or water and air quality. Millard County has been involved throughout the NEPA process and is a Cooperating Agency on this EIS, consistent with the General Plan.

1.10 Authorizing Laws, Regulations, and Policies

Laws, regulations, and policies govern what the BLM considers during the NEPA process. They help establish the outline of the analysis, provide focus for the issues identified during scoping, and guide preparation of the EIS. This EIS has been prepared in compliance with laws, regulations, and policies that govern aspects of the planning, approval, construction, operation, maintenance, and decommissioning of the Project, which are listed in **Appendix H**.

1.11 Federal, State, and Local Permits

Other federal, state, or local agencies may choose to adopt this EIS to provide approvals or issue permits for relevant portions of the Project. **Appendix I** lists the federal, state, and local statutes and regulations, and the agency-approved permits that may apply to construction, operation, maintenance, or decommissioning of the Project.

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2.0 Proposed Action and Alternatives

This chapter discusses the proposed action, as well as alternatives to the proposed action, including the no action alternative, which are analyzed in detail.

2.1 Development of the Proposed Action and Alternatives

2.1.1 Mining Plan, Pre-feasibility Study, and Feasibility Study

CPM began development of the preliminary Mining Plan (CH2M HILL 2013b) for the Project concurrently with activities authorized by the Exploration EA. The Mining Plan describes the applicant's objectives for the Project, environmental compliance needs, geologic setting, mineral resources, components of Project development and operation, reclamation and abandonment plans, and environmental factors to be considered. The preliminary Mining Plan was followed by development of a Pre-Feasibility Study (PFS) (CH2M HILL 2013a). In 2016, CPM began the Feasibility Study (CPM 2018a) to further refine the processes and components of the Project. Analysis in the Feasibility Study led to development of the current Mining Plan (CPM and Stantec 2019a). The Mining Plan formed the basis for the mining components of CPM's proposed action. Each version of the Mining Plan was developed and revised in accordance with the federal regulations for Solid Minerals Management (Other than Coal) at 43 CFR § 3592.1 and subject to review by BLM.

2.1.2 Plan of Development

CPM submitted an Application for Transportation and Utility Systems and Facilities on Federal Lands (Standard Form [SF] 299) to the BLM for ROW grants for the off-lease infrastructure associated with the Project. The original application was submitted on September 6, 2013. An updated application was submitted on May 13, 2019, reflecting the most recent update of the POD. The BLM is considering the application in accordance with 43 CFR Part 2800 (FLPMA ROWs) and 43 CFR Part 2880 (MLA ROWs). The BLM, in accordance with 43 CFR § 2804.25(b), requires that a Plan of Development (POD) be prepared in support of any ROW grants. The POD explains in detail how the Project would be developed – through construction, operation, maintenance, and decommissioning. The Standard Form 299 and POD form the basis for the ROW components of the proposed action. The current version of the POD (CPM 2019b) is based on the off-lease infrastructure required to support the mining components of CPM's proposed action described in the Mining Plan (CPM and Stantec 2019a). CPM submitted an updated SF-299 to the BLM on May 13, 2019, reflecting the most recent update of the POD.

2.1.3 Development of Alternatives

Early in the development of its proposed action for extraction of potassium from these leases, CPM identified several options (potential alternatives) for various Project components. During the process of completing the PFS (CH2M Hill 2013a), Feasibility Study (CPM 2018a), Mining Plan (CPM and Stantec 2019a), and POD (CPM 2019b), CPM determined that these options were not technically or economically feasible, or would not result in the ultimate maximum recovery of the potassium resource as required by 43 CFR § 3594.1. The BLM examined information from CPM on the options and determined that they would not substantially reduce or eliminate resource effects, otherwise address unresolved conflicts, or provide for ultimate maximum recovery of the potassium resource; therefore, they did not need to be developed into complete alternatives or analyzed in detail in the EIS. Although these options were not developed into complete alternatives, they are included in **Appendix J** to illustrate the iterative process BLM and CPM used to refine the proposed action.

During scoping for the Project, various stakeholders suggested potential alternatives. Some of these alternatives were eliminated from detailed study because they were outside of the scope of the Project or were not technically or economically feasible. These alternatives are discussed in **Appendix J**.

The BLM evaluated the remaining potential alternatives to determine if they would address one or more issues (**Section 1.6.3**) while meeting the purpose of and need for the Project (**Section 1.3**). The BLM also requested information from CPM on the technical and economic feasibility of each of the alternatives.

Based on technical, economic, and environmental factors, as well as legal and regulatory constraints, some alternatives were carried forward for detailed analysis in the EIS. These alternatives are discussed in **Section 2.5**. The BLM determined that the other remaining alternatives were not technically, economically, or environmentally feasible and eliminated from detailed analysis. These alternatives are discussed in **Appendix J**.

2.1.4 Changes Between DEIS and FEIS

Since completion of the DEIS, CPM has continued detailed engineering studies for some Project facilities. These studies and additional Project refinements led to a number of relatively minor changes to the Project, which are summarized here. All changes to CPM's proposed action and alternatives have been incorporated in **Section 2.4, Section 2.5,** and **Appendix L**, as appropriate.

- CPM has provided additional information on the sources of acquired recharge water. CPM has estimated that 40 percent of the acquired recharge water would come from water that is currently being used for agriculture, 40 percent from industrial use, and 20 percent from other uses. This water would come from existing water rights on the Sevier River; however, the specific water rights that would be acquired are not currently known.
- The design of Alternative 5 (Sevier River Diversion) was refined, which increased the total disturbance area by 4.5 acres, mainly because the disturbed area for the Diversion Channel increased (by 4.1 acres).
- Excess soil would be stockpiled outside the fence line at the Processing Facility, in an area of about 9.6 acres. CPM would not segregate topsoil and subsoil because of the poor quality (high salinity, high pH) of the topsoil.
- In the DEIS, two one-way Haul Roads were proposed to connect the Perimeter Road to the Processing Facility. This was changed to one two-way Haul Road for the FEIS.
- All of the power and communication lines would include angle (dead-end) structures with guy wires as needed to stabilize the lines between H-frame and single-pole (tangent) structures. All guy wires would include design features including yellow sleeves and bird flight diverters to minimize the risk of collision by the public and birds. The estimated number of angle structures with guy wires for each power line would be:
    - 69-kilovolt (kV) Power and Communication Line: 9 of 237 structures (4 percent) would have guy wires
    - 25-kV Power Line: 11 of 429 structures (3 percent) would have guy wires
    - 12.47-kV Power Line: 36 of 685 structures (5 percent) would have guy wires
    - 12.47-kV Power and Communication Line: 32 of 323 structures (10 percent) would have guy wires
    - 12.47-kV power line spurs: 5 of 99 structures (5 percent) would have guy wires
- All of the power and communication lines were re-aligned to minimize the number of angle structures that would require guy wires. At the same time, the widths of some ROWs were increased to accommodate the guy wires. These changes include:
    - 69-kV Power and Communication Line
        - Length decreased by 1.87 miles
        - Permanent ROW decreased by 29.6 acres
        - Temporary ROW increased by 7.3 acres (mostly because of the addition of eight temporary Power Line Access Road spurs)
    - 25-kV Power Line
        - Length decreased by 6.25 miles
        - Permanent ROW increased by 25.2 acres (mostly because the ROW width was increased from 15 to 60 feet to accommodate guy wires)
        - Temporary ROW decreased by 11.5 acres
    - 12.47-kV Power Line
        - Added 5.44 miles of ROW (in the DEIS, this power line was entirely on-lease)

        - Length increased by 21.92 miles (mostly because this power line was extended north along both the west and east edges of the playa to provide power to recharge canal and Brine Transfer Canal pumps. In the DEIS, power to these pumps was proposed to be provided by solar arrays.)
        - Permanent ROW increased by 39.5 acres (no permanent ROW in the DEIS)
        - Temporary ROW increased by 23.1 acres (no temporary ROW in the DEIS)
    - 12.47-kV Power and Communication Line:
        - Length increased by 0.16 mile
        - Permanent ROW increased by 65.9 acres (mostly because the ROW width was increased from 15 to 60 feet to accommodate guy wires)
        - Temporary ROW increased by 0.6 acres
    - 12.47-kV power line spurs:
        - Length decreased by 0.45 mile
        - Permanent ROW increased by 19.7 acres (mostly because the ROW width was increased from 15 to 60 feet to accommodate guy wires)
        - Temporary ROW decreased by 1.9 acres
- The location of the North Playa Substation was moved about 0.25 miles northwest, away from the Power Line Access Road, because of the re-alignment of the 69-kV Power and Communication Line.
- At the Rail Loadout Facility, topsoil and excess subsoil would be segregated and stockpiled inside the fence line. The fence line area was expanded by 22 acres to accommodate the stockpiles.
- Part of Access Road Segment E was shifted to a different, nearby existing road to provide access to one of the off-lease monitoring wells. The change increased the length of this access road by 0.38 mile and increased the area of the ROW by 1.1 acres.
- Perimeter Road Spur 4 was shifted to match the change in Access Road Segment E, which decreased its length by 0.20 mile.
- CPM identified the locations of 20 groundwater monitoring wells (12 on-lease and 8 off-lease). The off-lease wells would require 1.8 acres of temporary ROW and 0.1 acre of permanent ROW.
- A 6.50-mile-long ROW would be added for the Monitoring Well Access Road, which is an existing road, but which would be improved as needed. This road also has several short, on-lease segments totaling 0.64 miles in length.

2.2 Applicant Committed Design Features

When reviewing and considering whether to approve proposed projects, BLM's approach is to first avoid, then minimize, and finally mitigate adverse effects. Applicant committed design features have been developed to avoid, minimize, or mitigate the potential adverse effects of the Project. **Appendix K** lists these design features, which are integral to all of the action alternatives (including the proposed action). CPM would implement these design features regardless of which action alternative, or combination of alternatives, may be selected.

2.3 Supplemental Plans

CPM developed several supplemental plans to address specific resource issues or management requirements. Each of these plans supplements information and requirements in the EIS, the Mining Plan (CPM and Stantec 2019a), and the POD (CPM 2019b), and is incorporated in these documents by reference. These plans would also apply to BLM's sale of mineral materials to CPM. Some of these plans contain applicant committed design features that CPM would implement in addition to the design features listed in **Appendix K**. The analysis of effects in **Chapter 4** considers the design features in the supplemental plans to be integral to the proposed action and action alternatives. These supplemental plans include:

- Adaptive Wildlife Management Plan (AWMP) (CPM 2019a)

- Blasting Plan (CPM 2019c)
- Cultural Resource Plan (CPM 2019d)
- Environmental Compliance Inspection Plan (ECIP) (CPM 2019e)
- Fugitive Dust Control Plan (FDCP) (CPM 2019f)
- Noxious and Invasive Weed Management Plan (CPM 2019g)
- Reclamation Plan (CPM 2019h)
- Site Safety Plan (CPM 2019i)
- Solid and Hazardous Waste and Hazardous Materials Management Plan (CPM 2019j)
- Spill Prevention, Control, and Countermeasures Plan (SPCC) (CPM 2019k)
- Stormwater Pollution Prevention Plan (SWPPP) (CPM 2019l)
- Transportation and Traffic Management Plan (CPM 2019m)
- Water Monitoring Plan (CPM 2019n)

2.4 Summary of the Proposed Action

The proposed action is made up of three primary components:

1) Mining Project – Facilities that would be constructed and activities that would take place on leases controlled by CPM on or near the Sevier Playa as part of full commercial development of the potassium resource.
2) Rights-of-Way – Facilities that would be constructed and activities that would take place outside of leases controlled by CPM on ROWs issued by the BLM, along with equivalent agreements on state and private lands, to support full development of the potassium resource.
3) Mineral Materials – Sale of mineral materials to CPM by BLM and SITLA to support full development of the potassium resource.

The following sections summarize the components of the Mining Project, ROWs, and Mineral Material sales. It is important to note that some Project components would be divided into on-lease and off-lease portions. For example, the 69-kilovolt (kV) Power and Communication Line would be located primarily in a ROW; however, about two miles of the line would be located in the lease area. Additional details of the proposed action are provided in **Appendix L**. The BLM (2019a) has prepared a complete listing of the legal description for the Project. The description of the proposed action represents the best available information, based on the Mining Plan (CPM and Stantec 2019a), POD (CPM 2019b), and Gravel Pit Mining Plan (CPM and Stantec 2019b). CPM is continuing work on additional engineering and refinement of processes concurrently with development of the EIS. Detailed engineering may lead to changes to the design of facilities, activities, and processes described in the EIS. BLM will review these changes, determine the adequacy of the analysis of effects in the EIS, and conduct any additional NEPA analysis required.

2.4.1 Mining Project

During operation of the Mining Project, potassium-bearing brines would be extracted from trenches and wells on the Sevier Playa. The brine would be routed through a series of trenches and ponds, using solar evaporation to concentrate the brine. Key components of the Mining Project (shown on **Figure 2.4-1** and listed in **Table 2.4-1**) would include:

- The playa has been divided into Brine Mining Units (BMUs) based on recent exploration and analysis in the Feasibility Study (CPM 2018a). Each BMU consists of portions of the extraction and recharge systems.
- Extraction trenches and canals would be excavated to allow for gravity drainage of brine from the playa. Extraction wells with solar-powered pumps would also contribute to brine extraction.
- Water diverted from the Sevier River would provide the majority of recharge water. CPM would acquire (lease or purchase) water from upstream users to supplement natural flows in the river. A berm constructed across the Sevier River near the playa inlet would divert river water through a canal into the recharge system.

R13W R12W R11W R10W R9W

T19S T20S T21S T22S T23S T24S T25S

UTAH

Project Location

Long Ridge Res. Rd

SR 257 Cutoff Road

50

6

Sevier River Diversion

BMU14

P-1

P-2

P-3

Preconcentration Ponds

BMU15

BMU01

BMU16

P-4

P-10

P-9

P-8

P-7

P-6

P-5

HB

BMU02

BMU17

BMU03

BMU04

BMU19

BMU05

BMU18

BMU21

BMU22

BMU20

Steamboat Pass Rd

BMU07

BMU06

BMU08

BMU09

Perimeter Road

Headlight Canyon Road

BMU11

Purge Brine Storage Pond

BMU10

Tailings Storage Area

BMU13

Production Ponds

Tailings Leach Pipeline

Process Recycle Brine Pipeline

Rail Loadout Facility

Process Recycle Buffer Pond

Processing Facility

Crystal Peak Spur Road

Crystal Peak Rd

Wah Wah Valley Rd

Iron Mine Pass Rd

Black Rock Rd

257

Drop Structure

Diversion Berm

Diversion Canal Concrete Box Culvert

Diversion Sump

Sevier River Diversion Detail

Legend

Proposed Mine Features (On-Lease)
- Recharge Trench
- Recharge Collector
- Extraction Trench
- Recharge Canal
- Extraction Canal
- Brine Transfer Canal / Pipeline
- Purge Brine Pipeline
- Purge Brine Canal
- Brine Feed Canal
- Process Recycle Brine Pipeline
- Tailings Leach Pipeline
- Haul Road and Spurs
- Brine Mining Unit Boundary

- Perimeter Road & Spurs
- Diversion Canal
- Diversion Canal Spoils Pile
- Concrete Box Culvert
- Diversion Sump
- Drop Structure
- Pump Station
- Preconcentration Pond Weir
- Waste Product Storage Area
- Preconcentration and Production Ponds
- Processing Facility

Proposed Off-Lease Facilities
- Recharge Canal
- Natural Gas Pipeline
- 69-kV Power & Communication Line
- 25-kV Power Line
- 12.47-kV Power & Communication Line
- 12.47-kV Power Line
- 12.47-kV Power Line Spur
- Water Supply Pipeline
- Water Supply Pipeline Spurs
- Substation
- Water Supply Well
- Pumping Station
- Gravel Pit
- Monitoring Well
- Access Road
- Off-lease Perimeter Road
- Rail Spur and Access Corridor
- Rail Loadout Facility
- Preconcentration Ponds

Land Ownership
- Bureau of Land Management
- State
- Private

General Reference
- US or State Highway
- Class B Road
- Dirt Track Road
- Railroad
- Lease Boundary
- Sevier Playa
- Township / Range Boundary

SEVIER PLAYA POTASH PROJECT

Figure 2.4-1 Project Overview Mining Project

0 1 2 3 Miles

BLM

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

04-04-19

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- Recharge canals, collectors, and trenches would be excavated to recharge the shallow brine aquifer on the playa and promote consistent brine production. Pump stations would maintain the flow of water in the recharge canals.
- Evaporation ponds, including preconcentration and production ponds, would be constructed on the playa. The preconcentration ponds would concentrate the brine causing halite (NaCl, sodium chloride, also known as table salt) and other non-commercial salts to precipitate. These salts would be stored in the preconcentration ponds. A combination of pump stations and weirs would provide for brine flow through the preconcentration ponds.
- Additional pump stations would convey the saturated brine via the Brine Transfer Canal from the preconcentration ponds to the production ponds for further evaporation, causing potassium-rich salts to precipitate. A combination of pump stations and weirs would provide for brine flow in and around the production ponds. The production ponds would be harvested year-round, with the potassium-rich salts moved directly to the Processing Facility for processing into SOP.
- A Processing Facility would be located adjacent to the southern end of the playa on a parcel leased by CPM from SITLA. The Processing Facility would be contained within a fenced yard and would include three main structures (a wet plant, a dry plant, and a compaction building / bagging plant), and other support facilities. An administration building would provide office space. A communication tower would support telephone and data communication. SOP would be trucked from the Processing Facility to the Rail Loadout Facility for distribution.
- A Waste Product Storage Area would consist of a Purge Brine Storage Pond and a Tailings Storage Area surrounded by containment berms and access roads. Purge brine containing primarily magnesium chloride ($MgCl_2$), would be removed from the production ponds and piped to a Purge Brine Storage Pond before harvesting. Process by-products (solid tailings) from the Processing Facility would be trucked to the Tailings Storage Area.
- A 69-kV Power and Communication Line would provide power for the Project.
- A 25-kV Power Line would provide power to pump stations around the preconcentration ponds.
- A 12.47-kV Power Line would provide power to pump stations around the production ponds, along the recharge canals, and along the Brine Transfer Canal and Pipeline.
- A 12.47-kV Power and Communication Line would provide power and communication from the Processing Facility to the Rail Loadout Facility as well as power for the water supply wells.
- A Natural Gas Pipeline would provide natural gas to the Processing Facility.
- A Water Supply Pipeline would transmit water from the water supply wells to the Processing Facility.
- A Perimeter Road would be constructed around the perimeter of the playa, with Perimeter Road Spurs from off-lease access roads, to provide access to Project facilities. A haul road would connect the Processing Facility to the Perimeter Road, with haul road spurs to the production ponds and Waste Product Storage Area.
- Monitoring wells would be constructed for monitoring of the potential effects of the Project on groundwater. The Monitoring Well Access Road would be used to access some of these wells. Other existing and proposed roads would access the remaining wells.

Table 2.4-1 Mining Project Summary

Facility Type		Number of Features	Ownership				Total Length (miles)	Total Area (acres)
			BLM		State			
			Length (miles)	Area (acres)	Length (miles)	Area (acres)		
Extraction System								
Extraction Trenches		159	294.03	n/a [A]	12.49	n/a [A]	306.52	n/a [A]
Extraction Canal		1	25.12	n/a [A]	0.00	n/a [A]	25.12	n/a [A]
Extraction Wells	BLM	2,264	n/a	n/a	n/a	n/a	n/a	n/a

Table 2.4-1 Mining Project Summary

Facility Type	Number of Features	Ownership				Total Length (miles)	Total Area (acres)
		BLM		State			
		Length (miles)	Area (acres)	Length (miles)	Area (acres)		
State	102	n/a	n/a	n/a	n/a	n/a	n/a
Recharge System							
West Recharge Canal	1	33.80	n/a [A]	3.95	n/a [A]	37.76	n/a [A]
East Recharge Canal	1	18.26	n/a [A]	1.55	n/a [A]	19.81	n/a [A]
Recharge Collectors	152	32.92	n/a [A]	2.62	n/a [A]	35.54	n/a [A]
Recharge Trenches	155	272.09	n/a [A]	8.68	n/a [A]	280.76	n/a [A]
Diversion Berm	1	n/a	0.4	n/a	0.0	n/a	0.4
Diversion Canal	1	0.28	4.3	0.00	0.0	0.28	4.3
Evaporation Ponds							
Preconcentration Ponds	11	n/a	15,372.6	n/a	0.0	n/a	15,372.6
Brine Transfer Canal / Pipeline	1	22.03	267.0	1.67	20.2	23.69	287.2
Production Ponds	18	n/a	2,272.9	n/a	416.7	n/a	2,689.6
Processing and Waste Storage Facilities							
Processing Facility	1	n/a	0.0	n/a	47.7	n/a	47.7
Purge Brine Storage Pond	1	n/a	800.5	n/a	0.0	n/a	800.5
Tailings Storage Area	1	n/a	461.7	n/a	0.0	n/a	461.7
Utility Lines [B]							
69-kV Power and Communication Line	1	2.01	24.4	0.15	1.8	2.15	26.1
25-kV Power Line	1	11.09	127.7	0.00	0.0	11.09	127.7
12.47-kV Power Line	1	18.14	208.9	5.24	60.4	23.39	269.3
12.47-kV Power and Communication Line	1	0.52	6.0	0.15	1.7	0.67	7.7
Natural Gas Pipeline	1	1.99	12.1	0.16	1.0	2.15	13.0
Water Supply Pipeline	1	0.49	3.0	0.11	0.7	0.60	3.6
Access Roads [B]							
Perimeter Road	1	53.26	516.5	6.85	66.4	60.11	582.9
Perimeter Road Spurs	6	4.03	39.1	0.52	5.0	4.55	44.1
Haul Road and Spurs	2	0.04	0.2	0.45	3.1	0.48	3.4
CPM Spur Road	1	0.30	2.2	0.06	0.5	0.36	2.6
Monitoring Wells [B]							
Monitoring Wells	12	n/a	2.8	n/a	0.0	n/a	2.8
Monitoring Well Access Road	1	0.64	1.9	0.0	0.0	0.64	1.9

Notes: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.
n/a: Not applicable to this feature.
[A] The total acreage of the areas for the extraction and recharge systems has not been calculated. For the analysis of effects, it is assumed that the entire lease area inside the Perimeter Road would be disturbed. The majority of the extraction and recharge systems, except the Sevier River Diversion, would be located within this disturbed area.
[B] Acreage was calculated using the ROW width for the off-lease portion of these features. For features that are entirely on-lease, widths were determined as follows: Perimeter Road Spurs – same as Perimeter Road; Haul Road and Spurs – as listed in Mining Plan; CPM Spur Road – same as Rail Loadout Facility Access Roads.

2.4.2 Rights-of-Way

CPM has applied for ROW grants to use BLM-administered lands for the construction, operation, maintenance, and decommissioning of utilities and other facilities associated with the Project (**Table 2.4-2**). CPM would complete similar agreements for use of state and private lands for these facilities. These Project components would be located outside of the potassium leases controlled by CPM, but are integral to successful development and operation of the Mining Project. Permanent and temporary ROWs, as appropriate, would be issued for each off-lease component of the Project. Temporary ROWs would be required for construction purposes such as equipment movement, equipment parking, or material laydown. Permanent ROWs would be required for facilities or activities that continue for the life of the Project, such as power lines or access roads to other permanent facilities. Temporary ROWs would typically be located adjacent to permanent ROWs. Key off-lease Project components (shown on **Figure 2.4-2**) would include:

- A 69-kV Power and Communication Line to provide electrical power and communications for the Project, along with use of the existing Power Line Access Road and several temporary Power Line Access Road spurs.
- A 25-kV Power Line connecting with the on-lease portion of the line, with an associated access road, and the North Playa substation connecting to the 69-kV Power and Communication Line.
- A 12.47-kV Power Line would provide power to pump stations around the production ponds, along the recharge canals, and along the Brine Transfer Canal and Pipeline.
- A 12.47-kV Power and Communication Line to supply electricity and communications to the Rail Loadout Facility, and electricity to the power line spurs to the water supply wells.
- Temporary and permanent communication towers to support Project communications.
- A propane tank at the Rail Loadout Facility to supply energy for the early phases of the Project.
- A Natural Gas Pipeline to meet long-term energy needs at the Processing and Rail Loadout Facilities, including access roads for construction use. A portion of this pipeline may be constructed aboveground to avoid potential adverse effects to springs.
- A Rail Loadout Facility, Rail Spur, and Access Corridor to support shipment of products by rail.
- Water supply facilities, including water supply wells, access roads, power line spurs, and pipelines from the wells to the Processing Facility, to support the Project's needs for fresh water.
- Use of existing, improved, or new roads to access the Perimeter Road and other Project facilities, along with off-lease segments of the Perimeter Road.
- Portions of the preconcentration ponds and associated pump stations would be located outside the lease area, but still within the playa boundary.
- Several segments of the recharge canals, recharge collectors, and Brine Transfer Canal would be constructed off-lease, generally parallel to the off-lease segments of the Perimeter Road.
- Monitoring wells would be constructed for monitoring of the potential effects of the Project on groundwater. The Monitoring Well Access Road would be used to access some of these wells. Other existing and proposed roads would access the remaining wells.

Table 2.4-2 Right-of-Way Summary

Facility Type	Ownership						Total Length (miles)	Total Area (acres)
	BLM		State		Private			
	Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)		
Temporary ROWs								
Power and Communication Lines	25.25	174.8	0.89	15.3	--	--	26.14	190.1
Communication Facilities	3.66	11.2	1.72	5.2	--	--	5.38	16.4
Natural Gas Facilities	25.95	62.9	1.10	2.7	1.07	2.6	28.12	68.2
Rail Facilities	2.39	14.6	--	--	1.08	7.9	3.48	22.5

Table 2.4-2 Right-of-Way Summary

Facility Type	Ownership						Total Length (miles)	Total Area (acres)
	BLM		State		Private			
	Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)		
Water Supply Facilities	12.20	41.7	1.30	5.5	--	--	13.50	47.2
Access and Perimeter Roads	12.40	30.1	1.18	2.9	--	--	13.58	32.9
Preconcentration Ponds	--	13.7	--	--	--	--	--	13.7
Recharge System	10.29	25.1	1.06	2.6	--	--	11.35	27.7
Brine Transfer System	--	--	--	--	--	--	--	--
Monitoring Wells	--	1.8	--	--	--	--	--	1.8
Total Temporary ROWs	92.14	375.9	7.25	34.1	2.16	10.5	101.55	420.5
Permanent ROWs								
Power and Communication Lines	94.57	709.9	7.97	75.7	--	--	102.54	785.6
Communication Facilities	0.62	2.3	--	--	--	--	0.62	2.3
Natural Gas Facilities	38.94	133.7	1.96	6.6	4.05	12.9	44.95	153.3
Rail Facilities	4.21	151.1	--	--	2.16	9.8	6.37	160.9
Water Supply Facilities	14.45	57.3	1.98	8.6	--	--	16.44	65.8
Access and Perimeter Roads	32.30	150.8	2.72	13.3	--	--	35.02	164.0
Preconcentration Ponds	--	2,338.6	--	--	--	--	--	2,338.6
Recharge System	10.29	149.6	1.06	15.5	--	--	11.35	165.1
Brine Transfer System	0.52	6.3	--	--	--	--	0.52	6.3
Monitoring Wells	6.50	19.8	--	--	--	--	6.50	19.8
Total Permanent ROWs	202.39	3,719.3	15.69	119.6	6.21	22.8	224.30	3,861.8

Note: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.
--: Indicates this type of feature does not occur on this ownership.

2.4.3 Mineral Materials

CPM estimates that 250,000 cubic yards (yd^3) of aggregate (gravel and similar materials) would be needed over the life of the Project, primarily during construction (CPM and Stantec 2019b). This estimate does not include about 50,000 yd^3 of railroad ballast and sub-ballast, which would be purchased from a commercial source. One proposed source (gravel pit) would be located on BLM-administered lands on the north side of Crystal Peak Road approximately eight miles west of SR 257. The other two gravel pits would be located near the Processing Facility in the lease area.

2.4.4 Construction

Not all of the facilities would be needed initially; therefore, CPM has proposed phased construction to defer capital expenses and bring the facilities online as they are needed. A preliminary construction schedule is provided in **Appendix L, Figure L-10**. The construction phase would generally include the first four years of the Project. During this period, facilities required to be in operation prior to the startup of the Processing Facility would be constructed, including many of the extraction and recharge trenches and collectors, the extraction canal, most of the recharge canal (including the Sevier River diversion), the evaporation ponds and pump stations, initial stages of the Waste Product Storage Area, the Perimeter Road and spurs, 69-kV Power and Communication Line, the 12.47-kV Power and Communication Line (from the Processing Facility to Water Supply Well 4 Access Road), the communication towers, the water supply facilities, most of the access roads, and the Processing Facility. Different facilities may be constructed concurrently, using multiple crews specializing in various components of the Project.

R13W R12W R11W R10W R9W R8W

T18S T19S T20S T21S T22S T23S T24S T25S

UTAH

Project Location

Long Ridge Communication Tower

Long Ridge Res. Rd

50

6

SR 257 Cutoff Road

Black Rock Substation

Black Rock Communication Tower

Pot Mtn Rd

Miller Canyon Rd

257

25-kV Power Line

Steamboat Pass Rd

MILLARD COUNTY

Big Sage Res. Rd

Clear Spot Rd

Headlight Canyon Road

Coyote Springs Rd

Twin Peak Rd

Processing Facility Substation

Processing Facility

Processing Facility Communication Tower

Rail Loadout Facility Substation

Crystal Peak Spur Road

Crystal Peak Rd

Iron Mine Pass Rd

South Peak Rd

Black Rock Rd

Kern River Valve Station

Legend

Proposed Features

- Substation
- Communication Tower
- Water Supply Well
- Gravel Pit
- Monitoring Well
- Pump Station
- Off-Lease Pump Station
- Drop Structure
- Natural Gas Pipeline
- 69-kV Power & Communication Line
- 12.47-kV Power & Communication Line
- 25-kV Power Line
- 12.47-kV Power Line
- 12.47-kV Power Line Spur
- Water Supply Pipeline
- Water Supply Pipeline Spurs
- Access Road
- Perimeter Road & Spurs
- Off-Lease Perimeter Road
- Off-Lease Recharge Canal
- On-Lease Recharge Canal
- Brine Transfer Canal / Pipeline
- Rail Spur and Access Corridor
- Rail Loadout Facility
- Off-Lease Preconcentration Ponds

Land Ownership

- Bureau of Land Management
- State
- Private

General Reference

- US or State Highway
- Class B Road
- Dirt Track Road
- Kern River Natural Gas Pipeline
- Railroad
- Lease Boundary
- Sevier Playa
- Township / Range Boundary
- Black Rock Substation
- Kern River Valve Station

SEVIER PLAYA POTASH PROJECT

Figure 2.4-2 Project Overview Off-Lease Features

0 1 2 3 Miles

BLM

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

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Construction would occur at different locations throughout the development of the Project. In some cases, a particular activity could be carried out concurrently at a number of locations. Following construction of each facility, interim reclamation would address temporary disturbance as described in the Reclamation Plan (CPM 2019h).

2.4.5 Operation and Maintenance

The operation phase would begin at the end of the construction phase, once the Processing Facility is in operation. Although the focus would be on operation and maintenance, some facilities would be constructed or expanded during this phase (**Appendix L, Figure L-10**). This would include development of additional extraction and recharge trenches, extension of the extraction and recharge canals, development of the extraction wells, expansion of the Waste Product Storage Area, maintenance of the evaporation ponds (including berm raises for the preconcentration ponds), construction of the Rail Loadout Facility and Rail Spur, extension of the 12.47-kV Power and Communication Line, construction of the 25-kV Power Line, and construction of the Natural Gas Pipeline. After construction, routine maintenance of Project facilities would be necessary to optimize performance and to detect and repair malfunctions. Routine maintenance activities may include selective vegetation clearing, blading, resurfacing, dust abatement, spot repairs, culvert cleaning, noxious weed control, reseeding, regrading, snow removal, and repair, upgrades, or replacement of support structures. Operation and maintenance of the Project, including on- and off-lease facilities, would require approximately 175 full-time employees, distributed among on-playa operations, the Processing Facility, drivers for transport of SOP to the Rail Loadout Facility, operation of the Rail Loadout Facility, and miscellaneous off-playa maintenance and operations tasks. The majority of the employees would be full-time over the calendar year and throughout the anticipated life of the Project.

2.4.6 Decommissioning and Reclamation

CPM would be required to post surety bonds in accordance with 43 CFR § 3504.50 (for the BLM) and UAC Rule R647 (for UDOGM) covering anticipated reclamation costs. When the Project is at the end of its useful life, CPM would prepare and implement a Decommissioning Plan (to be approved by the BLM and the UDOGM) that would provide specific details and a schedule regarding how and when decommissioning of the Project would be accomplished. The Decommissioning Plan may be an amendment of the Reclamation Plan, with updates including additional site information and novel reclamation practices, or the Decommissioning Plan may be an entirely new plan based on the framework provided by the Reclamation Plan. The Decommissioning Plan would be consistent with the Reclamation Plan (CPM 2019h) and UAC Rule R647. The Decommissioning Plan would also be consistent with any closure requirements of the UDWQ, including any requirements in CPM's Groundwater Discharge Permit. BLM would consult with interested parties, including UDOGM and other agencies, to determine if any facilities should be retained for alternate uses. Any facilities not decommissioned would become the responsibility of an entity other than CPM. For example, Millard County may request an assignment of the ROW for an access road that it would like to maintain as a county road. The final disposition of facilities would be approved by BLM and UDOGM. In general, decommissioning would involve disassembling infrastructure and salvaging valuable equipment. Demolition or removal of equipment and facilities would meet applicable environmental, health, and safety regulations. Following facility removal, the site would undergo final cleanup and reclamation. Foundations and new access roads would be removed, re-contoured, and reseeded, as appropriate. Areas disturbed during removal of facilities would be reclaimed and rehabilitated as near as possible to their original condition and would be available for the same uses that existed prior to the Project. Fences and other previously existing structures would be reestablished to as good a condition or better than the original. The Reclamation Plan contains more detail on specific reclamation activities.

2.5 Alternatives to the Proposed Action

The alternatives carried forward for detailed analysis are presented as variations of specific Project components, rather than re-iterations of the entire Project in which only certain components are changed.

If one or more of these alternatives were to be selected in the ROD, the components of the selected alternative(s) would replace the corresponding components in the proposed action, while the remainder of the proposed action would be implemented as described in **Section 2.4**. An overview of the alternatives analyzed in detail is shown in **Figure 2.5-1**. Alternatives 1 through 4 are related to linear components of the Project (**Table 2.5-1)**. Alternative 5 (Sevier River diversion) is summarized in **Table 2.5-2**. Each Project component for which alternatives were developed has been divided into segments, with end points (referred to as "nodes") placed at the intersection of two segments and at each end of the component. The segments of each Project component have been given single-letter identifiers as follows:

- **G**: Natural Gas Pipeline segments
- **P**: Perimeter Road segments
- **R**: Recharge Canal segments
- **S**: Perimeter Road Spur 1 segments
- **T**: 69-kV Power and Communication Line segments

The purpose of identifying segments and nodes (end points of each segment) is to allow direct comparison between each of the alternatives and the portion of the proposed action they would replace if they were selected for implementation. The identification of segments also allows for display of these differences on alternative figures (**Figures 2.5-1** through **2.5-5**). The identifiers are used on these figures in the labels for each segment and are referred to throughout the remainder of this section.

Table 2.5-1 Summary, Proposed Action and Alternatives 1 through 4

Alternative	Segments	Change From Proposed Action
69-kV Power and Communication Line (T segments)		
Proposed Action	T1, T2, T3, T4	n/a
Alternative 1	T5, T2, T3, T4	T5 replaces T1
Alternative 2	T1, T2, T6, T4	T6 replaces T3
Natural Gas Pipeline (G segments)		
Proposed Action	G1, G2, G3, G4, G5, G6	n/a
Alternative 3	G1, G7, G3, G4, G5, G6	G7 replaces G2
Alternative 4	G1, G2, G3, G4, G8, G6	G8 replaces G5

Table 2.5-2 Summary, Proposed Action and Alternative 5

Project Component	Segments	Change From Proposed Action
Proposed Action		
Diversion Berm and Canal	n/a	n/a
Perimeter Road	P2	n/a
Perimeter Road Spur 1	S2	n/a
Recharge Canal	R2	n/a
Alternative 5		
Diversion Channel	n/a	Diversion Berm and Canal replaced by Diversion Channel
Perimeter Road	P3	P3 replaces P2
Perimeter Road Spur 1	S3	S3 replaces S2
Recharge Canal	R3	R3 replaces R2

R13W R12W R11W R10W R9W R8W

T18S T19S T20S T21S T22S T23S T24S T25S

UTAH

Project Location

Long Ridge Communication Tower

Long Ridge Res. Rd

SR 257 Cutoff Road

Miller Canyon Rd

Steamboat Pass Rd

50

6

T1

T2

T5

Black Rock Substation

Black Rock Communication Tower

Pot Mtn Rd

Clear Lake Rd

257

MILLARD COUNTY

Processing Facility Substation

Processing Facility

Processing Facility Communication Tower

G6 T3 T4 T6 G5 G8 G4

Crystal Peak Spur Road

Crystal Peak Rd

Iron Mine Pass Rd

Rail Loadout Facility Substation

Rail Loadout Facility

G7 G2 G3 G1

Headlight Canyon Rd

Twin Peak Rd

Black Rock Rd

Kern River Valve Station

Clear Spot Rd

Sevier River Diversion Detail

S1 Drop Structure

Sevier River Diversion Channel

S3 Diversion Berm

Alternative Culvert Crossing Location

S2 Diversion Canal

Concrete Box Culvert

Alternative Diversion Sump

P3 R3 R2 P2 Diversion Sump

R1 P1

Legend

Proposed Features

- Substation
- Communication Tower
- Water Supply Well
- Natural Gas Pipeline
- 69-kV Power & Communication Line
- 12.47-kV Power & Communication Line
- 25-kV Power Line
- 12.47-kV Power Line
- 12.47-kV Power Line Spur
- Water Supply Pipeline
- Water Supply Pipeline Spurs
- Access Road
- Perimeter Road and Spurs
- Off-Lease Perimeter Road
- Diversion Canal
- Diversion Canal Spoils Pile
- Recharge Canal
- Rail Spur and Access Corridor
- Sevier River Diversion Berm
- Concrete Box Culvert
- Diversion Sump
- Drop Structure
- Rail Loadout Facility Boundary Fence

Alternative Features

- Natural Gas Pipeline (Black Rock)
- Natural Gas Pipeline (West End)
- 69-kV Power & Communication Line (South End)
- 69-kV Power & Communication Line (North End)
- On-Lease Perimeter Road and Spurs
- Recharge Canal
- Sevier River Diversion Channel
- Diversion Culvert
- Diversion Sump

Other Project Features

- A1 Segment Name
- Segment Node

Land Ownership

- Bureau of Land Management
- State
- Private

General Reference

- US or State Highway
- Class B Road
- Dirt Track Road
- Railroad
- Lease Boundary
- Sevier Playa
- Township / Range Boundary
- Black Rock Substation
- Kern River Valve Station

SEVIER PLAYA POTASH PROJECT

Figure 2.5-1 Alternative Overview

0 1 2 3 Miles

BLM

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2.5.1 Alternative 1 – 69-kV Power and Communication Line (North End)

Alternative 1 would be an alternative route (Segment T5) that would replace the northern portion of the proposed action (Segment T1) for the 69-kV Power and Communication Line from the Black Rock Substation to the intersection of the SR 257 Cutoff Road and the Power Line Access Road (**Figure 2.5-2**). This alternative route exits the Black Rock Substation and runs along the south side of the substation access road east to SR 257. It would then turn south, running parallel to and west of SR 257 to the SR 257 Cutoff Road. The route would then turn west, running parallel to and south of the SR 257 Cutoff Road to the Power Line Access Road, where it would re-join the route of the proposed action for the 69-kV Power and Communication line (at the beginning of Segment T2). Alternative 1 would be located entirely outside the lease area in a ROW that would be granted to CPM by the BLM. It would also cross state and private lands. The purpose of this alternative would be to minimize new disturbance in previously undisturbed areas and minimize habitat fragmentation by following existing disturbance corridors (the Black Rock Substation Access Road, SR 257, and the SR 257 Cutoff Road). Table 2.5-3 compares the length, width, and area of the ROWs for Alternative 1 (Segment T5) and the section of the proposed action (Segment T1) that Alternative 1 would replace if it were selected.

Table 2.5-3 Comparison of the Proposed Action and Alternative 1

Alternative, ROW Type	ROW Width (feet)	Total Length (miles)	Total Area (acres)	BLM		State		Private	
				Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)
Proposed Action (Segment T1)									
Temporary ROW [A]	Variable		9.5	Variable	8.4	Variable	1.2	--	--
Permanent ROW	100	7.87	95.4	6.90	83.6	0.98	11.9	--	--
Alternative 1 (Segment T5)									
Temporary ROW [A]	Variable		13.9	Variable	11.3	Variable	1.6	Variable	1.0
Permanent ROW	100	11.43	138.5	9.32	113.0	1.30	15.8	0.81	9.8

Notes: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.
A: The exact location and extent of the temporary ROW associated with the 69-kV Power and Communication Line has not been determined. It has been estimated as 10 percent of the permanent ROW.

2.5.2 Alternative 2 – 69-kV Power and Communication Line (South End)

Alternative 2 would be an alternative route (Segment T6) that would replace a segment of the proposed action (Segment T3) for the 69-kV Power and Communication Line from the point where the proposed action leaves the Power Line Access Road and runs west toward the Processing Facility (**Figure 2.5-3**). This alternative route would continue to follow the Power Line Access Road south to Crystal Peak Road. It would then turn west, running along the north side of Crystal Peak Road, before turning north and running along the east side of Crystal Peak Spur Road to a point near the Processing Facility, where it re-joins the route of the proposed action (at the beginning of Segment T4). Alternative 2 would be located partially in the lease area and partially outside the lease area in a ROW that would be granted to CPM by the BLM. The purpose of this alternative would be to minimize new disturbance in previously undisturbed areas and minimize habitat fragmentation by following existing disturbance corridors (Power Line Access Road, Crystal Peak Road, and Crystal Peak Spur Road). **Table 2.5-4** compares the length, width, and area of the ROWs for Alternative 2 (Segment T6) and the section of the proposed action (Segment T3) that Alternative 2 would replace if it were selected.

Table 2.5-4 Comparison of the Proposed Action and Alternative 2

Alternative, ROW Type	ROW Width (feet)	Total Length (miles)	Total Area (acres)	BLM		State		Private	
				Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)
Proposed Action (Segment T3)									

Table 2.5-4 Comparison of the Proposed Action and Alternative 2

Alternative, ROW Type	ROW Width (feet)	Total Length (miles)	Total Area (acres)	BLM		State		Private	
				Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)
Temporary ROW [A]	Variable		1.8	Variable	1.8	--	--	--	--
Permanent ROW	100	1.46	17.7	1.46	17.7	--	--	--	--
On-lease [B] – temporary [A]	Variable		2.2	Variable	2.2	--	--	--	--
On-lease [B] – permanent	100	1.83	22.2	1.83	22.2	--	--	--	--
Total Temporary		**Variable**	**4.0**	**Variable**	**4.0**	--	--	--	--
Total Permanent		**3.29**	**39.8**	**3.29**	**39.8**	**--**	**--**	**--**	**--**
Alternative 2 (Segment T6)									
Temporary ROW [A]	Variable		7.5	Variable	7.5	--	--	--	--
Permanent ROW	100	6.16	74.7	6.16	74.7	--	--	--	--
On-lease [B] – temporary [A]	Variable		0.5	Variable	0.5	--	--	--	--
On-lease [B] – permanent	100	0.41	5.0	0.41	5.0	--	--	--	--
Total Temporary		**Variable**	**8.0**	**Variable**	**8.0**	--	--	--	--
Total Permanent		**6.57**	**79.7**	**6.57**	**79.7**	**--**	**--**	--	--

Notes: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding. Total lengths only include permanent ROWs.
A: The exact location and extent of the temporary ROW associated with the 69-kV Power and Communication Line has not been determined. It has been estimated as 10 percent of the permanent ROW.
B: No ROW required. Length, width, and area provided as a basis for the analysis of effects.

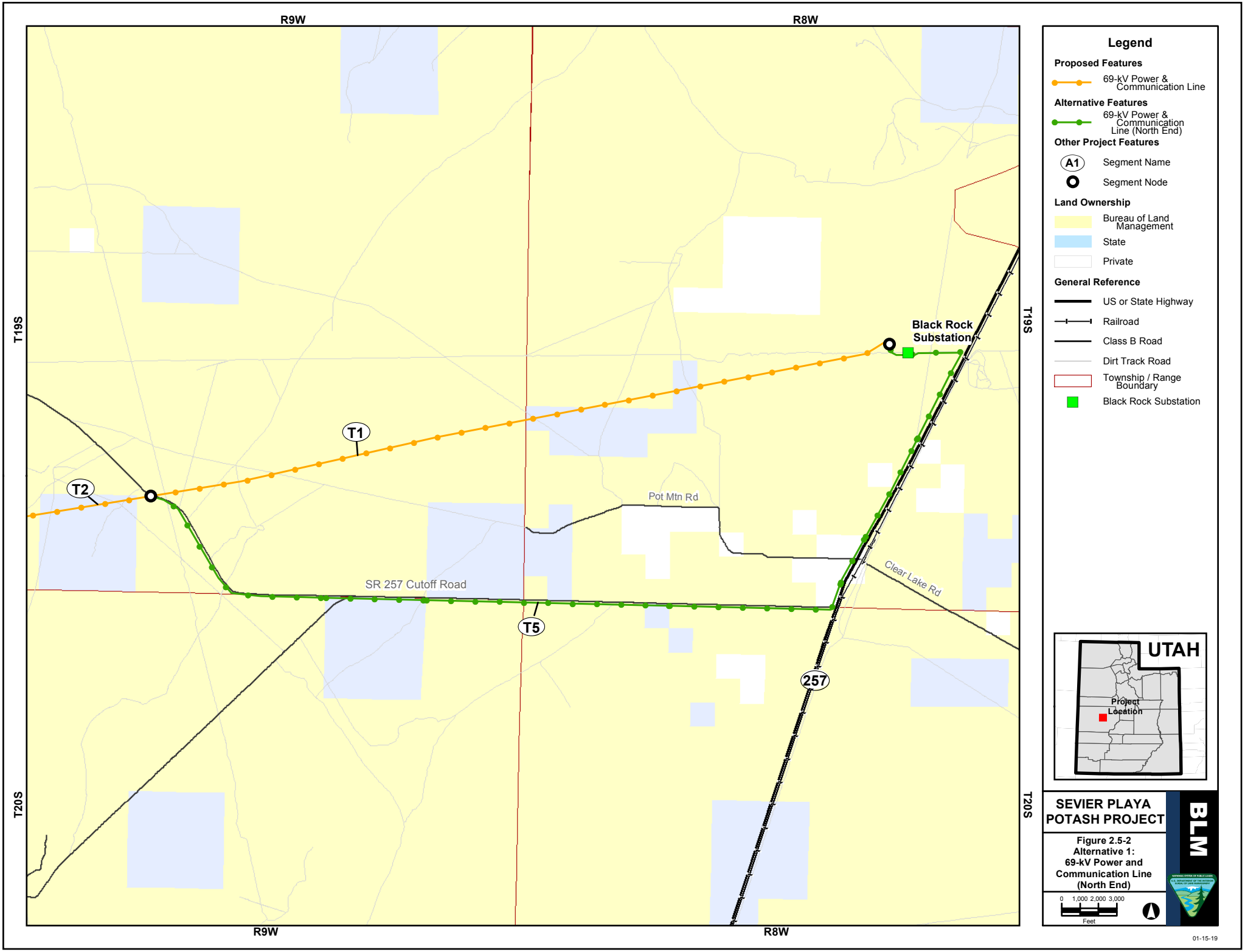
2.5.3 Alternative 3 – Natural Gas Pipeline (Black Rock)

Alternative 3 would be an alternative route (Segment G7) that would replace the portion of the proposed action (Segment G2) for the Natural Gas Pipeline generally between SR 257 on the east and the Rail Loadout Facility on the west (**Figure 2.5-4**). Alternative 3 would be located entirely outside the lease area, in a ROW that would be granted to CPM by the BLM. The purpose of this alternative would be to provide a route for the Natural Gas Pipeline that is entirely on BLM-administered land and avoids crossing private lands. **Table 2.5-5** compares the length, width, and area of the ROWs for Alternative 3 (Segment G7) and the section of the proposed action (Segment G2) that Alternative 3 would replace if it were selected.

Table 2.5-5 Comparison of the Proposed Action and Alternative 3

Alternative, ROW Type	ROW Width (feet)	Total Length (miles)	Total Area (acres)	BLM		State		Private	
				Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)
Proposed Action (Segment G2)									
Temporary ROW	20	2.36	5.7	1.29	3.1	-	-	1.07	2.6
Permanent ROW	30	2.36	8.6	1.29	4.7	-	-	1.07	3.9
Alternative 3 (Segment G7)									
Temporary ROW	20	2.36	5.7	2.36	5.7	-	-	-	-
Permanent ROW	30	2.36	8.6	2.36	8.6	-	-	-	-

Note: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.


R9W
R8W
T19S
T20S
Black Rock Substation
T1
T2
T5
Pot Mtn Rd
SR 257 Cutoff Road
Clear Lake Rd
257
Legend
Proposed Features
69-kV Power & Communication Line
Alternative Features
69-kV Power & Communication Line (North End)
Other Project Features
A1
Segment Name
Segment Node
Land Ownership
Bureau of Land Management
State
Private
General Reference
US or State Highway
Railroad
Class B Road
Dirt Track Road
Township / Range Boundary
Black Rock Substation
UTAH
Project Location
SEVIER PLAYA POTASH PROJECT
Figure 2.5-2
Alternative 1:
69-kV Power and
Communication Line
(North End)
BLM
0 1,000 2,000 3,000
Feet
01-15-19

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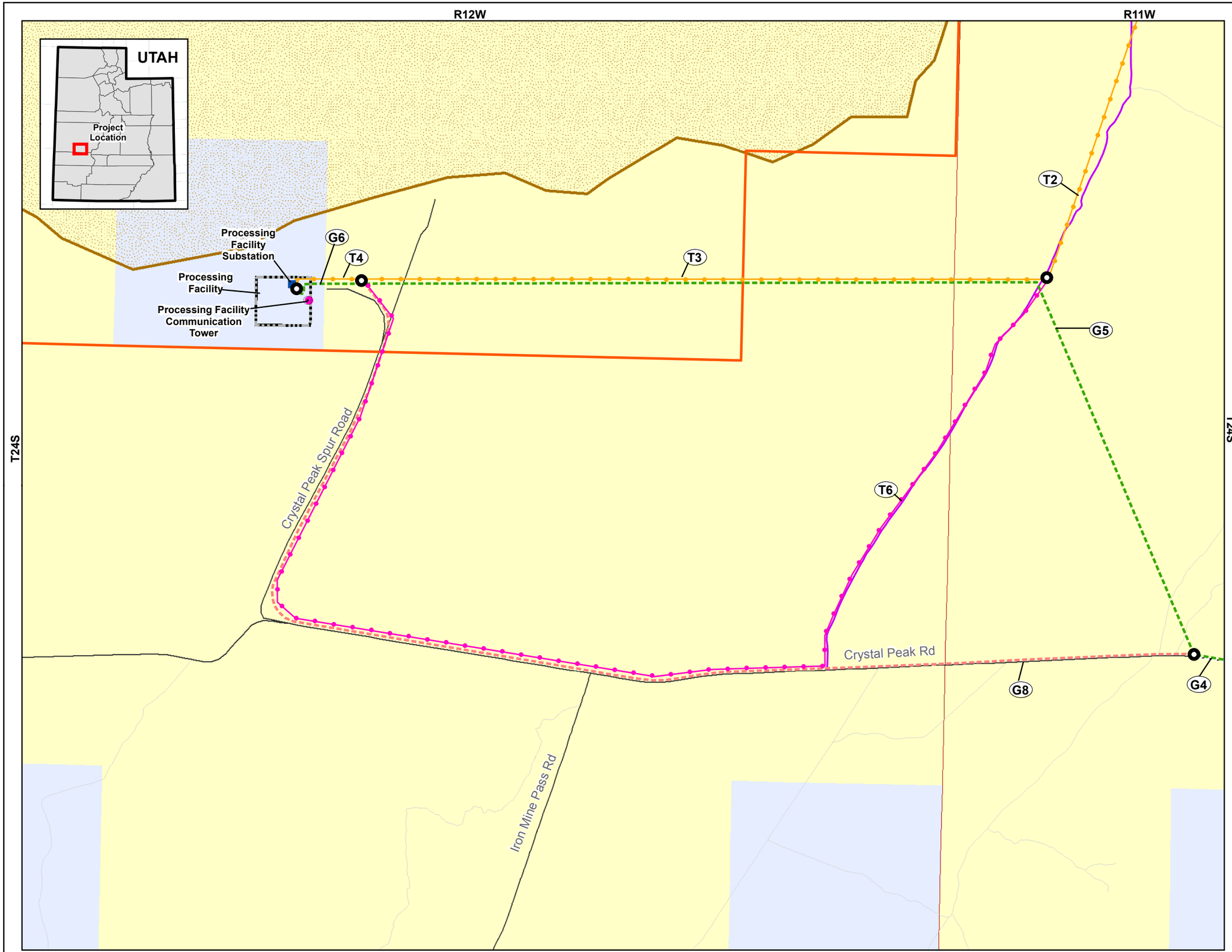

Legend

Proposed Features

- Substation
- Communication Tower
- Natural Gas Pipeline
- 69-kV Power & Communication Line
- Access Road
- Processing Facility Perimeter Fence

Alternative Features

- Natural Gas Pipeline (West End)
- 69-kV Power & Communication Line (South End)

Other Project Features

- A1 Segment Name
- Segment Node

Land Ownership

- Bureau of Land Management
- State
- Private

General Reference

- Class B Road
- Dirt Track Road
- Lease Boundary
- Sevier Playa
- Township / Range Boundary

SEVIER PLAYA POTASH PROJECT

Figure 2.5-3
Alternatives 2 and 4:
69-kV Power and Communication Line (South End);
Natural Gas Pipeline (West End)

0 1,000 2,000
Feet

BLM

01-15-19

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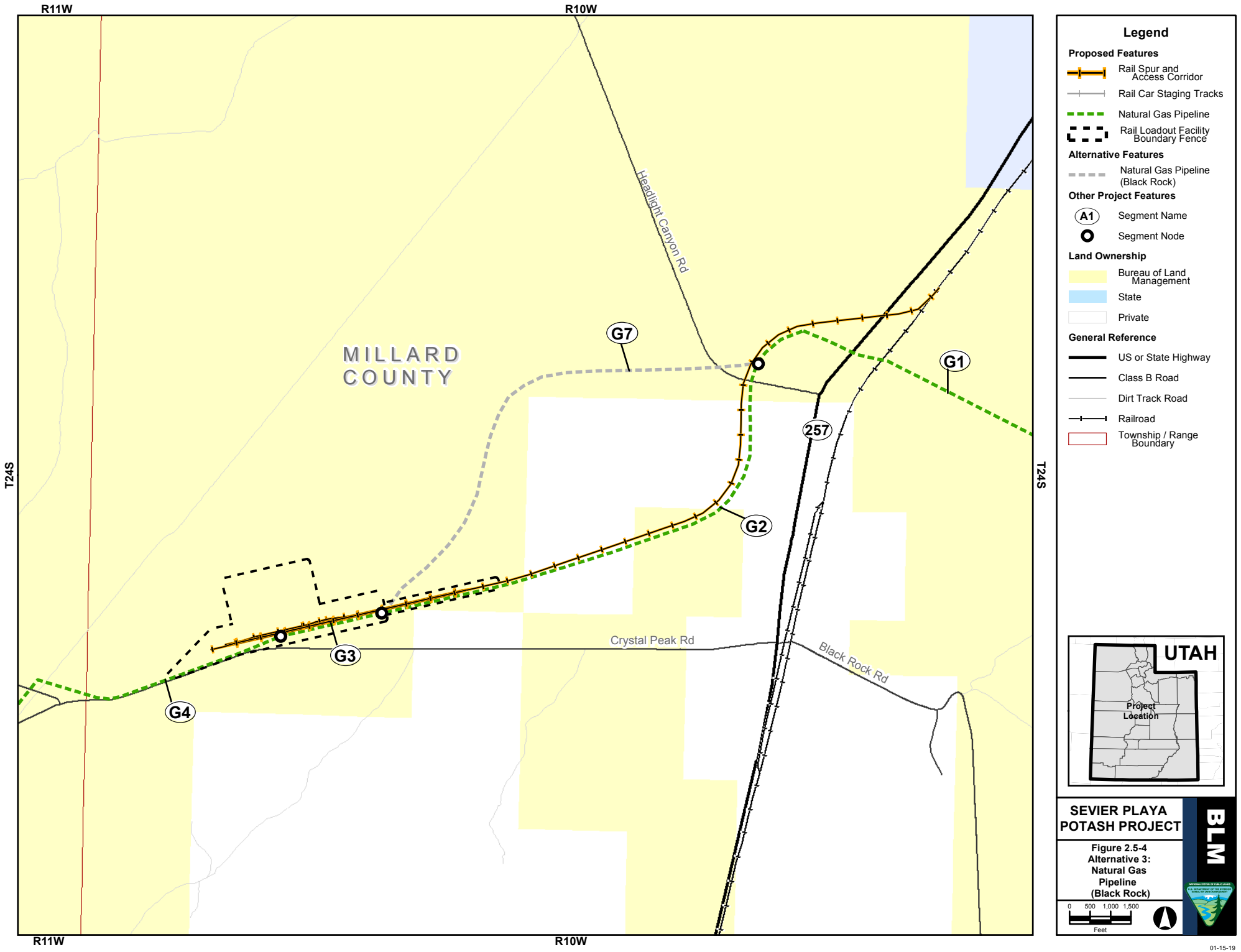
R11W
R10W
T24S
T24S
R11W
R10W
MILLARD
COUNTY
Headlight Canyon Rd
Crystal Peak Rd
Black Rock Rd
G1
G2
G3
G4
G7
257
Legend
Proposed Features
Rail Spur and Access Corridor
Rail Car Staging Tracks
Natural Gas Pipeline
Rail Loadout Facility Boundary Fence
Alternative Features
Natural Gas Pipeline (Black Rock)
Other Project Features
A1
Segment Name
Segment Node
Land Ownership
Bureau of Land Management
State
Private
General Reference
US or State Highway
Class B Road
Dirt Track Road
Railroad
Township / Range Boundary
UTAH
Project Location
SEVIER PLAYA POTASH PROJECT
Figure 2.5-4
Alternative 3:
Natural Gas
Pipeline
(Black Rock)
BLM
0 500 1,000 1,500
Feet
01-15-19

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2.5.4 Alternative 4 – Natural Gas Pipeline (West End)

Alternative 4 would be an alternative route (Segment G8) that would replace the western portion of the proposed action (Segment G5) for the Natural Gas Pipeline from the point where the pipeline leaves Crystal Peak Road and heads northwest, then west toward the Processing Facility (**Figure 2.5-3**). This alternative route would continue to run west along the north side of Crystal Peak Road and then turn north and run along the east side of the Crystal Peak Spur Road to a point near the Processing Facility, where it intersects the proposed action. Alternative 4 would be located partially in the lease area and partially outside the lease area in a ROW that would be granted to CPM by the BLM.

The purpose of this alternative would be to minimize new disturbance in previously undisturbed areas and minimize habitat fragmentation by following existing disturbance corridors (Crystal Peak Road and the Crystal Peak Spur Road). **Table 2.5-6** compares the length, width, and area of the ROWs for Alternative 4 (Segment G8) and the section of the proposed action (Segment G5) that Alternative 4 would replace if it were selected.

Table 2.5-6 Comparison of the Proposed Action and Alternative 4

Alternative, ROW Type	ROW Width (feet)	Total Length (miles)	Total Area (acres)	BLM		State		Private	
				Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)
Proposed Action (Segment G5)									
Temporary ROW	20	3.33	8.1	3.33	8.1	--	--	--	--
Permanent ROW	30	3.33	12.1	3.33	12.1	--	--	--	--
On-lease [A] – temporary	20	1.63	3.9	1.63	3.9	--	--	--	--
On-lease [A] – permanent	30	1.63	5.9	1.63	5.9	--	--	--	--
Total Temporary		**4.95**	**12.0**	**4.95**	**12.0**	--	--	--	--
Total Permanent		**4.95**	**18.0**	**4.95**	**18.0**	--	--	--	--
Alternative 4 (Segment G8)									
Temporary ROW	20	5.77	14.0	5.77	14.0	--	--	--	--
Permanent ROW	30	5.77	21.0	5.77	21.0	--	--	--	--
On-lease [A] – temporary	20	0.37	0.9	0.37	0.9	--	--	--	--
On-lease [A] – permanent	30	0.37	1.3	0.37	1.3	--	--	--	--
Total Temporary		**6.13**	**14.9**	**6.13**	**14.9**	--	--	--	--
Total Permanent		**6.13**	**22.3**	**6.13**	**22.3**	--	--	--	--

Notes: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.
A: No ROW required. Length, width, and area provided as a basis for the analysis of effects.

2.5.5 Alternative 5 – Sevier River Diversion

Alternative 5 would be an alternative method of diverting flows from the Sevier River into the recharge system (**Figure 2.5-5**). The purpose of this alternative would be to place the diversion within the boundary of the playa, minimizing effects to riparian vegetation, wildlife habitat, and known cultural resources at the location of the diversion in the proposed action. Alternative 5 would be entirely within the lease area. For this alternative, an existing shallow channel on the playa would be modified into the Diversion Channel to confine and direct the Sevier River into the recharge system without constructing a diversion structure across the river channel.

In the upper half of the channel, the existing banks are sufficient to confine the anticipated flows (**Figure 2.5-6**, cross-section A-A'). The center of the channel would be excavated slightly (between zero and about two feet), to contain low flows. No berms would be constructed in this area and spoils from excavation would be placed on the channel banks above the anticipated flow zone. The channel would be

about 20 feet wide at the bottom and its side slopes would be 3:1 (horizontal: vertical). The depth and top width of the channel would be approximately three feet and 300 feet (at high flows), respectively.

In the lower half of the channel, the confining banks of the existing channel diminish and spread out laterally. A deeper channel (about two to five feet deep) would be excavated and the spoils would be used to construct berms on either side of the channel to confine the anticipated flows (**Figure 2.5-6**, cross-section B-B'). These berms would be two to three feet in height, with side slopes of 3:1 (horizontal: vertical), and a four-foot top width. The maximum depth and top width of the channel would be approximately five feet and 60 feet (at high flows), respectively.

The Diversion Channel would empty into an alternative Diversion Sump (**Figure 2.5-5**) that would be located about 500 feet west of the proposed Diversion Sump. The West Recharge Canal would follow the same alignment as the proposed action, but would be about 500 feet shorter because of the change in the location of the proposed Diversion Sump. About 1,200 feet of the northern end of the East Recharge Canal would be shifted west to align with the location of the alternative Diversion Sump. This would also lengthen the alternative East Recharge Canal by about 200 feet compared with the proposed action. The Perimeter Road would be re-aligned on the east side of the Diversion Channel to follow the alternative alignment of the East Recharge Canal (**Figure 2.5-5**). This would shorten the Perimeter Road by about 300 feet compared with the proposed action. A concrete box culvert would be constructed across the Diversion Channel where it is crossed by the Perimeter Road, slightly upstream of the alternative Diversion Sump. Perimeter Road Spur 1 would be re-aligned to run on the west side of the Diversion Channel, avoiding the need to construct a second concrete box culvert across the channel. This would increase the length of Perimeter Road Spur 1 by about 600 feet. **Table 2.5-7** compares the width, length, and area of the components of Alternative 5 with the components of the proposed action that Alternative 5 would replace if it were selected.

Table 2.5-7 Comparison of the Proposed Action and Alternative 5

Alternative, Disturbance Type	Disturbance Width (feet) [A]	Length (miles)	Area (acres)
Proposed Action			
Diversion Berm – permanent	Irregular [B]	Irregular [B]	0.4[B]
Diversion Canal - permanent	125[C]	0.28	4.3
Perimeter Road Segment P2 - temporary	20	0.35	0.9
Perimeter Road Segment P2 - permanent	60	0.35	2.6
Perimeter Road Spur 1 Segment S2 - temporary	20	0.28	0.7
Perimeter Road Spur 1 Segment S2 - permanent	60	0.28	2.0
Recharge Canal Segment R2 - temporary	20	0.33	0.8
Recharge Canal Segment R2 - permanent	120	0.33	4.8
Total Temporary	**--**	**0.96**	**2.3**
Total Permanent	**--**	**1.24**	**14.02**
Alternative 5			
Diversion Channel - permanent	Irregular [B]	Irregular [B]	13.3[B]
Perimeter Road Segment P3 - temporary	20	0.29	0.7
Perimeter Road Segment P3 - permanent	60	0.29	2.1
Perimeter Road Spur 1 Segment S3 - temporary	20	0.39	0.9
Perimeter Road Spur 1 Segment S3 - permanent	60	0.39	2.8
Recharge Canal Segment R3 - temporary	20	0.27	0.6
Recharge Canal Segment R3 - permanent	120	0.27	3.9
Total Temporary	**--**	**0.94**	**2.3**

Table 2.5-7 Comparison of the Proposed Action and Alternative 5			
Alternative, Disturbance Type	**Disturbance Width (feet) [A]**	**Length (miles)**	**Area (acres)**
Total Permanent	**--**	**0.94**	**22.10**

Notes: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.
A: All Project components associated with Alternative 5 would be located in the lease area; therefore, no ROW would be required. Disturbance widths are estimated based on the ROW widths of equivalent components that would be located in off-lease ROWs.
B: The Diversion Berm (Proposed Action) and Diversion Channel (Alternative 5) are irregular polygons for which length and width are variable. The areas (acres) of these features were estimated from the GIS data for the polygons, which is based on preliminary engineering.
C: Maximum width based on preliminary engineering.

2.6 No Action Alternative

Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14) require analysis of a no-action alternative. The no-action alternative provides a means of comparing the potential effects of the action alternatives (including the proposed action) against the baseline conditions in the analysis area in the absence of the proposed action (in this case, the Project). The potassium leases controlled by CPM provide it the exclusive right to extract potassium and associated minerals on lands leased from the BLM and SITLA on and around the Sevier Playa, subject to the terms and conditions in the leases. It also gives CPM the right to use the surface of the leased land as needed for the development of the potassium resource. A potassium lease is not cancellable except by due process in cases where the lessee does not meet the terms and conditions of the lease. Thus, the no-action alternative does not imply that the leases controlled by CPM would never be developed, only that BLM would not approve them for development as proposed in the Mining Plan (CPM and Stantec 2019a), the POD (CPM 2019b), the Gravel Pit Mining Plan (CPM and Stantec 2019b), or the action alternatives evaluated in detail in this EIS.

The no-action alternative would prevent CPM from exercising its existing, valid lease rights to extract the potassium resource at this time. However, selection of the no-action alternative would not preclude mining of the potassium resource in the future, which would require submittal of a new Mining Plan, POD, and Gravel Pit Mining Plan, as well as completion of a new NEPA process. Public lands in the lease area and along the proposed ROWs would continue to be managed in accordance with the WSRA RMP (BLM 1987). Ongoing exploration activities by CPM, as approved by the Exploration EA (BLM 2011b), may continue. Existing land uses such as livestock grazing, recreation, ROW administration, and wildlife habitat would continue.

2.7 Preferred Alternative

The BLM's preferred alternative is the proposed action summarized in **Section 2.4** and described in more detail in **Appendix L** based on the Mining Plan (CPM and Stantec 2019a), POD (CPM 2019b), and Gravel Pit Mining Plan (CPM and Stantec 2019b). The preferred alternative includes the applicant committed design features (**Appendix K**), supplemental plans (listed in **Section 2.3**), and additional mitigation measures listed in **Section 4.4**.

2.8 Comparison of Alternatives

Table ES-1 (in the Executive Summary) summarizes and compares the potential effects of the proposed action and action alternatives for each resource topic analyzed. As a summary, **Table ES-1** provides a general comparison, but does not capture some subtle differences between the alternatives. **Chapter 4** contains a detailed analysis of potential effects.

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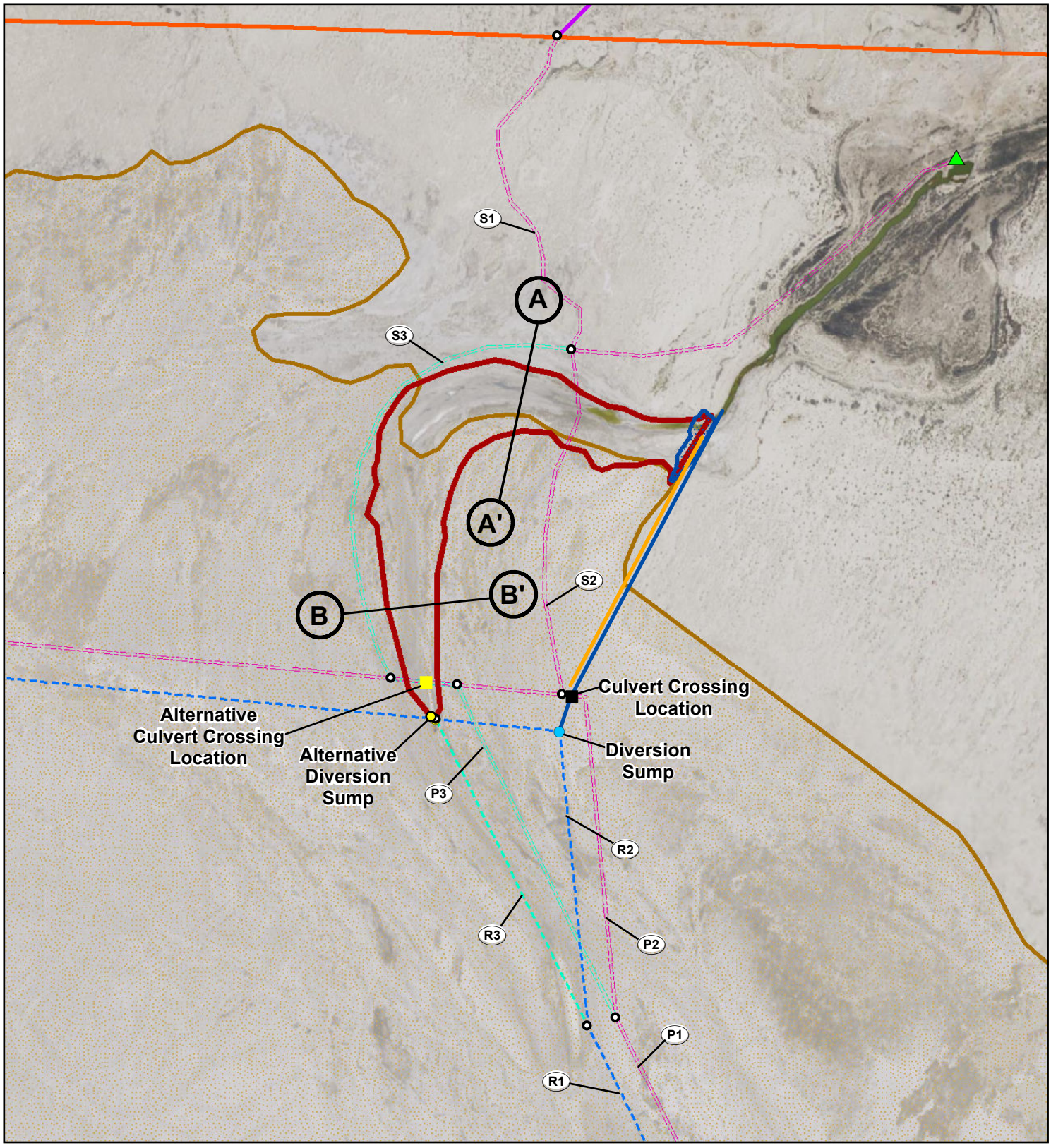

Legend

Proposed Features
- Access Road
- Perimeter Road and Spurs
- Diversion Canal
- Diversion Canal Spoils Pile
- Recharge Canal
- Sevier River Diversion Berm
- Concrete Culvert Box Structure

- Diversion Sump
- Drop Structure

Alternative Features
- Perimeter Road and Spurs
- Recharge Canal
- Sevier River Diversion Channel
- Diversion Culvert
- Diversion Sump

General Reference
- Lease Boundary
- Sevier Playa

SEVIER PLAYA POTASH PROJECT

Figure 2.5-5
Alternative 5:
Sevier River
Diversion Overview

0 100 200 300
Feet

BLM

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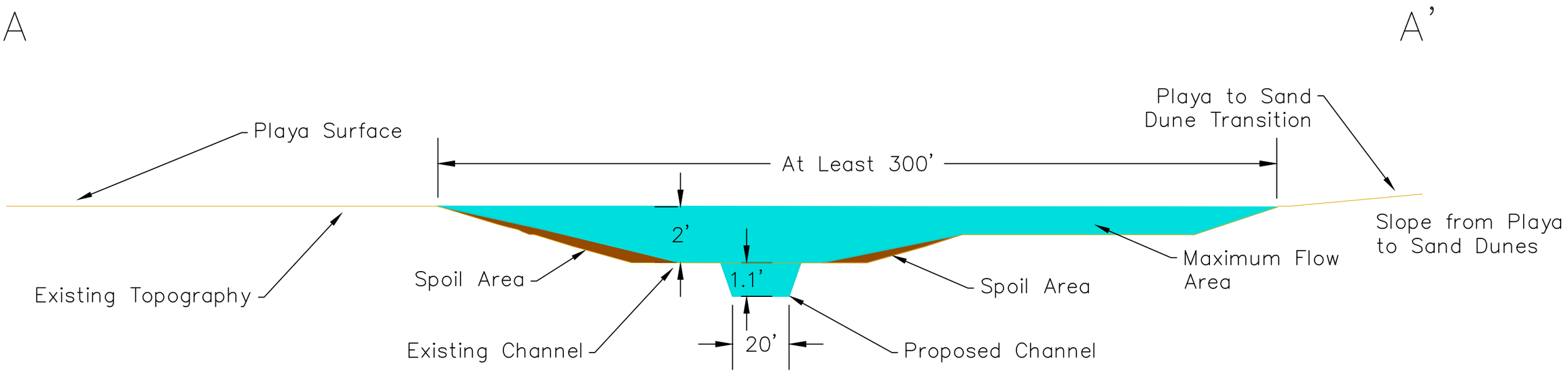

Source: Stantec 2018
Modified: MS, 20190501

SEVIER PLAYA POTASH PROJECT

Figure 2.5-6 Alternative 5: Sevier River Diversion, Cross Sections

BLM

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3.0 Affected Environment

In accordance with Secretarial Order 3355 (2018) and EO 13807 (2018), this FEIS was prepared in a streamlined format that summarizes extensive background information and analysis into a limited number of pages. A series of resource reports was prepared that contains detailed discussions of the analysis area, regulatory framework, methods, affected environment, and environmental consequences for each resource analyzed in detail. These resource reports are incorporated by reference in the FEIS and are, therefore, part of the FEIS. The resource reports were available for public review with the DEIS. The resource reports were revised as needed for the FEIS, based on public comments on the DEIS, as well as in response to new information from CPM and other sources.

Extensive Project-specific studies, as well as existing data, were used to identify the current conditions for each resource and their relevant characteristics that may be affected by the Project. Baseline information on the affected environment for each resource can be found in the resource reports, which are referenced in the following outline. This outline also lists the main topics in the resource reports. This information provides the baseline for the analysis and comparison of potential effects described in **Chapter 4**.

- Air Quality and Climate (McVehil-Monnett Associates [MMA] and ENValue 2019)
    - Regional Climate
    - Regional Air Quality
    - Local Topography of the Analysis Area
    - Local Air Quality and Meteorology
    - Climate Change
- Biological Resources (ENValue 2019a)
    - Vegetation Excluding Special Status Species
    - Wetlands and Riparian Areas
    - Invasive Species and Noxious Weeds
    - Wildlife and Fish excluding Special Status Species
        - Amphibians and Reptiles
        - Fish
        - Bats
        - Big Game
    - Migratory Birds
        - Waterfowl and Shorebirds
        - Raptors
        - Passerines
        - Greater Sage Grouse
    - Special Status Wildlife Species
        - BLM Sensitive Animals
    - Federally Listed Wildlife Species
- Cultural Resources (ENValue 2019b)
    - Regional Cultural Context
    - Existing Information
        - Class I Inventory, Leasing Area
        - Class I Inventory, ROWs
        - Resource Summary
- Geology and Minerals (ENValue 2019c)
    - Regional Geology
        - Sevier Lake Basin Stratigraphy
        - Sevier Playa Stratigraphy
        - Metallic and Non-Metallic Resources
        - Energy Resources
    - Geologic Hazards

        - Earthquakes and Seismicity
        - Mass Wasting
        - Sand Dune Migration
- Lands and Access (ENValue 2019d)
    - Land Use
    - Land Management
    - Realty Management
    - Transportation
        - General Access Road Network
        - Project Road Network
        - Rail Network
        - Project-Generated Traffic
- Native American Religious Concerns (ENValue 2019e)
    - Current Status
- Paleontology (ENValue 2019f)
    - Potential Fossil Yield Classification
    - Geological Units Potentially Affected
- Range Management (ENValue 2019g)
    - Grazing Allotments
    - Range Improvements
    - Stock-Watering Water Rights
- Recreation (ENValue 2019h)
    - Recreational Opportunities
- Socioeconomics (ENValue 2019i)
    - Population
    - Economy and Employment
    - Housing
    - Community Services
- Soils (ENValue 2019j)
    - Soil Types
- Visual Resources (ENValue 2019k)
    - Project Setting
    - Viewshed Analysis
    - Key Observation Points and Visual Simulations
- Water Resources (Whetstone and ENValue 2019)
    - Climate
    - Surface Water
        - Surface Water Inventory
        - Surface Water Quality
    - Groundwater
        - Hydrologic Setting and Previous Studies
        - Conceptual Model of Groundwater Flow
        - Groundwater Data Collection and Monitoring
        - Groundwater Levels and Direction of Flow
        - Hydrologic Testing Data
        - Groundwater Quality
    - Water Rights
        - Surface Water
        - Groundwater
    - Floodplains

4.0 Environmental Consequences

This chapter describes the potential effects, or consequences, that could be caused by the construction, operation, maintenance, and decommissioning of the Project. It describes, compares, and contrasts the effects to the existing environment (outlined in **Chapter 3** and described in detail in the resource reports) that could be caused by implementation of the proposed action or action alternatives (summarized in **Chapter 2**). It also describes, compares, and contrasts the potential effects of the no-action alternative. Throughout this chapter, the analysis of the no-action alternative does not imply that CPM's leases would never be developed, only that BLM would not approve them for development as proposed in the Mining Plan, POD, and Gravel Pit Mining Plan. The leases could be developed in the future, which would require submittal of a new Mining Plan, POD, and Gravel Pit Mining Plan, as well as completion of a new NEPA process. Other topics addressed in this chapter include conformance with applicable land use plans, policies, and controls; additional mitigation measures; unavoidable adverse effects; the relationship between short-term use and long-term productivity; and irreversible and irretrievable commitments of resources.

The analysis area for each resource depends on the potential effects that may be caused by the Project. The specific analysis area for each individual resource or sub-resource is described in its respective section in this chapter. The analysis addresses only those issues that were specifically identified during scoping (by federal, state, or local agencies; Native American tribes; interested or affected parties; the public; or the BLM IDT) or where an analysis is required by law, regulation, or agency direction (**Table 1.6-1**). Potential effects of the proposed action and alternatives are described in this chapter as direct, indirect, or cumulative, which are defined as follows:

- Direct effects are caused by an action and occur at the same time and place.
- Indirect effects are caused by an action, but occur later in time or farther removed in distance. Indirect effects are reasonably foreseeable.
- Cumulative effects are the incremental effects of an action added to the effects of other past, present, and reasonably foreseeable future actions regardless of what agency or entity undertakes such actions.

Potential effects are also described in terms of context (site-specific, local, or regional), intensity (on a spectrum from minimal to substantial), duration (short-term or long-term), and whether they would be beneficial or detrimental. Duration of effects for this Project is defined as follows:

- Short-term effects would primarily be caused by activities during construction of the Project; however, these effects would occur at different times because some facilities would be constructed in phases. The effects of the temporary ROW grants would be considered short-term. The completion of construction of each facility, including interim reclamation, would represent the end of most short-term effects. Some operation and maintenance activities would also have short-term effects, which may occur at any time over the life of the Project. Short-term effects of decommissioning would end once final reclamation is complete.
- Long-term effects are effects that would remain through the life of the Project (during construction, operation, and maintenance) and may continue following decommissioning. The effects of the permanent ROW grants would be considered long-term. Although these ROW grants are termed "permanent", they would be issued for 30 years with an option to extend as long as the potash leases and associated facilities are in use. Once the Project is decommissioned and reclaimed, CPM would relinquish these ROW grants.

The specific methods used to identify effects to each resource are described in each resource section in this chapter. Within each resource section, the analysis begins by first describing the effects of the proposed action. As described in **Section 2.5**, the alternatives carried forward for detailed analysis are variations of specific Project components rather than re-iterations of the entire Project in which only certain components are changed. If one or more of these alternatives were to be selected in the ROD, the

components of the selected alternative(s) would replace the corresponding component(s) in the proposed action, while the remainder of the proposed action would be implemented as described in **Section 2.4**. For this reason, the effects of each alternative are described in relation to their equivalent components in the proposed action. This allows a clear comparison and identification of differences between the proposed action and alternatives.

As described in **Section 2.2**, the applicant committed design features in **Appendix K** and the supplemental plans summarized in **Section 2.3** are integral to all of the action alternatives including the proposed action. For reference, the entire set of design features that are applicable to a particular resource are listed at the beginning of Section 7 of each resource report, but are not repeated in each resource section in this chapter. CPM would implement these design features regardless of which action alternative, or combination of alternatives, may be selected. The analysis in this chapter assumes that all of these design features would be implemented and would be effective; thus, the effects described in the remainder of this chapter are those residual effects that would occur despite integration of these design features into the Project.

4.1 Direct and Indirect Effects

4.1.1 Air Quality and Climate

The analysis area, methods, and direct and indirect effects described in this section are summarized from the Resource Report for Air Quality and Climate (MMA and ENValue 2019) (Air Report). Specific pollutants discussed is this section include:

CFC	Chlorofluorocarbon	O_3	Ozone
CH_4	Methane	PM_{10}	Particulate Matter with a Diameter Less Than or Equal to10 Microns
CO	Carbon monoxide	$PM_{2.5}$	Particulate Matter with a Diameter Less Than or Equal to 2.5 Microns
CO_2	Carbon dioxide	SF_6	Sulfur hexafluoride
N_2O	Nitrous oxide	SO_2	Sulfur dioxide
NO_2	Nitrogen dioxide	SO4	Sulfate
NO_x	Nitrogen oxides	VOC	Volatile organic compound

4.1.1.1 *Analysis Area*

The analysis area for direct, indirect, and cumulative effects includes a zone extending approximately 30 kilometers (km) (19 miles) in all directions from the Project's ambient air boundary (Figure 1 in the Air Report). The area falls under a near-field analysis classification, as defined by the EPA in 40 CFR Part 51 Appendix W, also known as the Guideline on Air Quality Models (GAQM) (EPA 2017a). The analysis of effects also included seven National Parks and one National Forest identified as Class I and Class II areas of interest (see Section 4.2 in the Air Report for general discussion of Class I and Class II areas of interest) located in southwestern Utah, western Nevada, and northern Arizona. These areas are listed in Table 3 in the Air Report. The closest Class I area is Zion National Park at about 135 km (84 miles) south of the center of the Sevier Playa, while the closest Class II area of interest is the Fishlake National Forest, approximately 57 km (35 miles) east.

4.1.1.2 *Methods*

This section describes, compares, and contrasts the effects that could be caused by implementation of the proposed action, action alternatives, or no-action alternative. The issues addressed in this section include fugitive dust emissions; other emissions (including construction and operation equipment); compliance with NAAQS; PSD increments; effects to Class I and Class II areas of interest; GHG emissions; and effects of GHG emission on climate change.

Both the construction and operation phases of the Project would affect air quality in the analysis area. CPM contracted Ramboll, Inc. (Ramboll) to perform an air quality analyses for the Project. Ramboll

employed standard procedures that involve two basic tasks. The first task involved generating an emissions inventory that estimated emissions over the life of the Project for each criteria pollutant. To provide assurance that the modelled emissions from equipment would not exceed those predicted, a mitigation measure (**Section 4.4.1**) has been added requiring that CPM use equipment that at a minimum meets the pollution controls for equivalent equipment detailed in the emission inventory. The second task involved incorporating these emissions into a computer-based air dispersion model that simulated the atmosphere and how and where the pollutants would travel. The model output consists of pollutant concentrations over various averaging periods at specific locations. These concentrations were then compared to the applicable standards. The results of these two tasks are presented in the Final Air Dispersion Modeling Protocol for NEPA Analysis (Modeling Protocol) (Ramboll 2018) and the Final Air Dispersion Modeling Report for NEPA Analysis (Modeling Report) (Ramboll 2019a). The Air Report provides an extensive description of the methods employed for these two tasks.

Several modifications were made to the Project between the Draft and Final EIS. The changes involved refinements to the Mining Plan and the equipment that would be required to accomplish various tasks and processes. In addition, some source characterizations were altered due to modifications of the source itself or how controls would be applied. The Project modifications required updates to the emissions inventory and a revised air modeling analysis. Specifically, the changes include:

- Revisions to the construction schedule and equipment list.
- Updates to the engine tier level commitments.
- Removal of the bus commute scenario for worker travel. All worker commute trips are now assumed to be made in passenger vehicles.
- Additional areas of windblown dust emissions.
- Removal of the unpaved road emission factor reduction for precipitation since watering control is already accounted for in the emission estimates.
- Revision of the unpaved surface silt content from 8.4 percent for all unpaved surfaces to 8.4 percent for roadways built with natural soil and 6.4 percent for roadways covered with gravel.
- Updated material handling details, including control efficiencies, for operations at the Processing Facility and Rail Loadout Facility. Baghouse emissions were revised based on grain loading limits rather than uncontrolled emissions plus 95 percent control efficiency.
- Addition of emissions from gravel pit construction and operation.

4.1.1.3 *Proposed Action*

4.1.1.3.1 Fugitive Dust Emissions

If the Project were implemented, fugitive dust emissions would increase in the analysis area over what currently exists on both a daily and annual basis. Fugitive dust increases would occur in all three phases of the Project from 2019 through 2053.

Fugitive dust would be emitted from heavy equipment moving and working on the playa, BMUs, canals, trenches, and berms; light-duty and heavy-duty vehicle movement on paved and unpaved roads; material transfer to piles, pile management, and road maintenance; and wind-blown dust from exposed areas on the playa and from storage piles. Fugitive dust would consist of the criteria air pollutants PM_{10} and $PM_{2.5}$. The maximum annual increase would be 528 tons of PM_{10} and 67 tons of $PM_{2.5}$ (**Table 4.1.1-1**), while the maximum daily increase would be 3,754 pounds of PM_{10} and 582 pounds of $PM_{2.5}$ (**Table 4.1.1-2**). The majority of the fugitive dust would be generated from vehicle movement on roads. Emission estimates for fugitive dust include controls such as watering, chemical suppressants, or brine application, controlling the majority of the fugitive dust sources at the 70 to 80 percent level. One exception would be paved roads that are public and are out of the control of CPM.

Table 4.1.1-1 Project Maximum Annual Emissions Summary

Source Category	Maximum Annual Tons					
	PM_{10} CYr 2025 PYr 7	$PM_{2.5}$ CYr 2025 PYr 7	NO_X CYr 2020 PYr 2	CO CYr 2020 PYr 2	VOC CYr 2020 PYr 2	SO_2 CYr 2020 PYr 2
Stationary Source Total	56.9	38.1	5.4	34.0	2.0	<0.1
Fugitive Dust Total	528.3	67.2	0.0	0.0	0.0	0.0
Tailpipe Total	2.4	2.0	151.6	315.0	16.8	0.3
Project Total	**587.6**	**107.2**	**157.0**	**349.0**	**18.7**	**0.4**

[1] Totals may not appear exact because of rounding.

Fugitive dust would be transported by the wind away from Project sources into the analysis area. In general, the highest increases in concentration of PM_{10} and $PM_{2.5}$ would be at or near the ambient air boundary, as well as along the Crystal Peak Road or Crystal Peak Spur Road. PM_{10} and $PM_{2.5}$ concentrations would decrease relatively rapidly as the plume disperses and settles downwind and away from the ambient air boundary and dust-generating sources. The plume concentrations would dissipate to near background levels within about 3 km (2 miles) of the ambient air boundary, Crystal Peak Road, or Crystal Peak Spur Road. **Section 4.1.1.3.3** contains discussions related to NAAQS for PM.

Table 4.1.1-2 Project Maximum Daily Emissions Summary

Source Category	Maximum Daily Pounds					
	PM_{10} CYr 2025 PYr 7	$PM_{2.5}$ CYr 2025 PYr 7	NO_X CYr 2020 PYr 2	CO CYr 2020 PYr 2	VOC CYr 2020 PYr 2	SO_2 CYr 2020 PYr 2
Stationary Source Total	893.2	297.0	41.0	275.0	15.3	0.4
Fugitive Dust Total	3,754.0	582.3	0.0	0.0	0.0	0.0
Tailpipe Total	15.1	12.6	955.9	1,961.5	104.1	2.1
Project Total	**4,662.3**	**891.9**	**996.9**	**2,236.5**	**119.5**	**2.5**

[1] Totals may not appear exact because of rounding.

CPM would implement a FDCP (CPM 2019f) that specifies applicant committed design features that would minimize dust generation. The FDCP would cover every phase of the Project and the dust generating activities that occur in each phase. CPM would employ a Dust Control Supervisor who would be responsible for monitoring visible dust and ensuring that controls are being implemented. If high wind conditions occur, alert measures would be implemented that involve the inspection of all controls. High wind conditions are defined in the FDCP as any one of the following:

- The hourly wind speed measured at the Sevier Playa meteorological station has exceeded 35 mph in the last 12 hours;
- The hourly instantaneous gust measured at the Sevier Playa meteorological station has exceeded 45 mph in the last 12 hours; or
- A high wind warning or high wind advisory is issued by the NWS for Southwest Utah.

In addition, all fugitive dust generating activities would cease until notified by the Dust Control Supervisor if the hourly average wind as measured by the Sevier Playa meteorological station:

- Exceeds 35 mph for three consecutive hours; or
- Exceeds 40 mph for one hour.

The design features in the FDCP would help to minimize fugitive dust emissions from the Project. The specified controls for the sources and the FDCP itself would be part of the Approval Order air permit from UDAQ and would be enforceable through that permit.

4.1.1.3.2 Other Emissions

If the Project were implemented, the analysis area would experience an increase in pollutants including NO_X, CO, VOCs, SO_2, as well as process and tailpipe emissions of PM_{10} and $PM_{2.5}$. Air pollution increases would occur in all three phases of the Project from 2019 through 2053.

These six air pollutants would be emitted from dryers and other stationary equipment as well as mobile light-duty and heavy-duty vehicles. For NO_X, the maximum annual increase would be 157 tons while the maximum daily increase would be 997 pounds. For CO, the maximum annual increase would be 349 tons while the maximum daily increase would be 2,237 pounds. For VOCs, the maximum annual increase would be 19 tons while the maximum daily increase would be 120 pounds. For SO_2, the maximum annual increase would be 0.4 tons while the maximum daily increase would be 3 pounds. For PM_{10} that is not fugitive dust, the maximum annual increase would be 59 tons and the maximum daily would be 908 pounds. For $PM_{2.5}$ that is not fugitive dust, the maximum annual increase would be 40 tons and the maximum daily would be 310 pounds (**Table 4.1.1-1** and **Table 4.1.1-2**).

As with fugitive dust, the air pollutant plumes would be transported away from Project sources into the analysis area. In general, the highest concentrations of pollutants would be at or near the ambient air boundary, as well as along the Crystal Peak Road or Crystal Peak Spur Road. The pollutant concentrations in the plume would decrease relatively rapidly as plumes flow downwind and away from the ambient air boundary and Project sources. The plume concentrations would dissipate to near background levels within about 3 km (2 miles) of the ambient air boundary, Crystal Peak Road, or Crystal Peak Spur Road.

4.1.1.3.3 National Ambient Air Quality Standards

If the Project were implemented, the pollutants emitted would affect the analysis area to differing degrees, as presented in the Modeling Report. To assess the level of these effects, the modeled concentrations were compared against the applicable NAAQS for each pollutant and averaging period (**Table 4.1.1-3**). The Project-only concentration represents the maximum modeled effect over all of the receptors for the respective rank. The background concentration represents the existing air quality for the analysis area (Section 5.5 in the Air Report). The total concentration is the sum of the modeled Project-only concentrations and the existing background concentration. This sum is the value that is compared against the NAAQS to determine if the Project would comply with the applicable standard.

Table 4.1.1-3 Comparison of Maximum Project Concentrations to the NAAQS

Pollutant	Averaging Period	Model Rank [1]	Project- Only Conc. [2] (µg/m³)	Background Conc. [3] (µg/m³)	Total Conc. [4] (µg/m³)	NAAQS (µg/m³)	% of NAAQS	Exceeds NAAQS?
CO	1-hour	2nd	3,431	3,434.8	6,866	40,000	17.2	No
	8-hour	2nd	482	2,747.9	3,230	10,000	32.3	No
NO_2	1-hour	8th	323.4	23.9[5]	347.3	188	184.7	Yes
	Annual	1st	23.8	3.8	27.6	100	27.6	No
NO_2[6]	1-hour	8th	293.3	23.1[5]	316.4	188	168.3	Yes
PM_{10}[7]	24-hour	2nd	51.2	97.4	148.6	150	99.1	No
PM_{10}[8]	24-hour	2nd	96.9	16.4	113.3	150	75.5	No
PM_{10}[9]	24-hour	2nd	96.9	97.4	194.3	150	129.4	Yes
$PM_{2.5}$[10]	24-hour	8th	15.3	11.8	27.1	35	77.4	No
	Annual	1st	6.9	4.1	11.0	12	91.7	No

Table 4.1.1-3 Comparison of Maximum Project Concentrations to the NAAQS

Pollutant	Averaging Period	Model Rank (1)	Project- Only Conc. (2) (µg/m³)	Background Conc. (3) (µg/m³)	Total Conc. (4) (µg/m³)	NAAQS (µg/m³)	% of NAAQS	Exceeds NAAQS?
SO_2	1-hour	4th	3.4	18	21.4	196	10.9	No
	3-hour	2nd	1.4	12.8	14.2	1,300	1.1	No
	24-hour (11)	2nd	0.3	5.8	6.1	365	0.1	No
	Annual (11)	1st	0.04	1.5	1.5	80	1.9	No

(1) Rank of the modeled concentration used when modeling for the NAAQS.
(2) Maximum modeled Project-only concentration over all receptors for the respective model rank
(3) Background concentration represents the existing air quality for the analysis area. See **Section 5.5**.
(4) Total concentration is the Project-only concentration plus background concentration, and is compared to the NAAQS.
(5) This concentration is the calculated NO_2 seasonal-hour background concentration for the same season and hour for which the listed modeled concentration occurred. See **Table 28** and **Section 5.5.4** for the development of the seasonal hour concentrations.
(6) Project-only model results without the gravel pit sources.
(7) Highest second-high total concentration model results when considering the modeled Project-only 24-hour concentration plus the respective 24-hour seasonal background concentration (spring) (see **Table 27**). See **Section 7.2.1.3.3** for further details.
(8) Project-only highest second-high 24-hour concentration for the model year, which occurred in the winter season. The background concentration shown is the winter background concentration. See **Section 7.2.1.3.3** for further details.
(9) Project-only highest second-high 24-hour concentration for the model year summed with the second highest 24-hour background concentration for the monitor year. See **Section 7.2.1.3.3** for further details.
(10) Project-only concentration for $PM_{2.5}$ includes both modeled primary concentration plus secondary $PM_{2.5}$ concentration. See **Section 7.2.1.3.4**.
(11) The primary 24-hour and annual SO_2 NAAQS were revoked in 2010. Comparisons are listed here for informational purposes.

4.1.1.3.3.1 Carbon Monoxide

The modeled Project-only concentrations for both 1-hour and 8-hour averaging periods for CO represent the highest of the second-high concentrations for all receptors. The modeled concentrations would be near or below the existing background air quality and the total concentration would be well below the NAAQS (**Table 4.1.1-3**). If the Project is implemented, the effects of Project CO emissions on the analysis area would be relatively minimal.

4.1.1.3.3.2 Nitrogen Dioxide

The modeled Project-only concentration of 323.4 µg/m³ for the 1-hour NO_2 averaging period represents the highest of the 8th high concentrations for all receptors. This concentration is much greater than the background air quality and is above the NAAQS by itself. The background concentration shown in **Table 4.1.1-3** is the representative concentration for the season and hour during which the highest 8th-high concentration occurred (see Section 5.5.4 and Table 28 in the Air Report). The total concentration is 347.3 µg/m³ and is above the NAAQS. For the maximum season and hour, one of the primary contributors to the Project-only concentration would be the gravel pit sources. Excluding the gravel pit sources, the 1-hour NO_2 highest 8th high concentration is 293.3 µg/m³ for total concentration of 316.4 µg/m³ when the corresponding seasonal hour background concentration is included. Again, both the modeled Project-only and total concentrations are above the NAAQS.

Figure 6 in the Air Report depicts the areal coverage of the total 1-hour NO_2 effects and how the concentrations would be distributed across the analysis area. The maximum total concentration of 347.3 µg/m³ would be located along the southern ambient air boundary by the gravel pits and Processing Facility. The maximum modeled concentration of 316.4 µg/m³ (not shown in Figure 6 in the Air Report)

that did not include gravel pits would also be located on the southern end of the ambient air boundary. The sources contributing to the maximum concentrations would be the tailpipe emissions from the heavy-duty equipment working in the gravel pits and constructing the Processing Facility. Other maximum concentrations exceeding the NAAQS are shown by the Rail Loadout Facility and by the Black Rock Communication Tower. These would also be caused by tailpipe emissions from heavy-duty equipment involved in the construction of these facilities. For all of these maximum areas, the concentration drops below the NAAQS within about 500 meters (1,640 feet). The concentrations decrease to levels that are indistinguishable from background within about 3 km (2 miles) from the boundary.

Modeled exceedances do not necessarily translate to actual monitored exceedances because of the conservative nature of the model and the modeling analysis. As discussed in Section 5.3.8 in the Air Report, air dispersion models are designed to be conservative to be protective of human health and the environment. AERMOD can predict concentrations 2 to 10 times higher than monitored concentrations, if not greater (EPA 2017b). In addition, the analysis for 1-hour NO_2 employed the Project's highest daily emissions of 997 lbs. These emissions were apportioned to the gravel pits and the Processing Facility construction areas, all in close proximity to each other. The chances that these activities would occur at the modeled density at the same time as a poor dispersion hour are relatively low. Thus, while the total 1-hour NO_2 modeled concentrations are above the NAAQS, this is a conservative estimate of the maximum potential effects. In addition, as the worst-case emissions day was modeled, days with lower emissions would generally have lower concentrations. If the Project were implemented, the effects from 1-hour NO_2 emissions would be relatively localized to the activities, and decrease to levels that are indistinguishable from background within about 3 km (2 miles) of the ambient air boundary. The applicant committed design features listed in **Appendix K** and the FDCP would be used as applicable to minimize emissions from Project sources.

The modeled Project-only concentration for annual NO_2 represents the maximum concentration over all receptors. This concentration is higher than the background air quality. The total concentration is below the NAAQS (**Table 4.1.1-3**). If implemented, the effects of the Project's annual NO_2 emissions on the analysis area would be relatively minimal.

4.1.1.3.3.3 PM_{10}

The modeled Project-only PM_{10} concentrations for the 24-hour averaging period were assessed with three different methodologies. These methods involve various ways of combining modeled concentrations with background concentrations to obtain total concentrations. The first method summed the modeled 24-hour PM_{10} concentrations with the respective seasonal background concentration (Table 27 in the Air Report) and then from this sum the second highest total 24-hour concentration was selected (**Table 4.1.1-3**). Using this method, the modeled Project-only concentration is 51.2 $\mu g/m^3$ which occurs in the spring, the spring seasonal background concentration is 97.4 $\mu g/m^3$ (Table 27 in the Air Report), and the total concentration is 148.6 $\mu g/m^3$ (**Table 4.1.1-3**). This total concentration is slightly below the NAAQS.

The second method sums the Project-only modeled highest second-high 24-hour concentration for the model year with the respective seasonal background value. For this method, the modeled Project-only highest second-high concentration is 96.9 $\mu g/m^3$ which occurs in the winter, the winter seasonal background concentration is 16.4 $\mu g/m^3$ (Table 27 in the Air Report), and the total concentration is 113.3 $\mu g/m^3$ (**Table 4.1.1-3**). This total concentration is below the NAAQS.

The third method sums the Project-only modeled highest second-high 24-hour concentration for the model year with the second highest background concentration for the entire monitoring year (Table 9 in the Air Report). Using this method, the modeled Project-only highest second-high concentration is 96.9 $\mu g/m^3$, the second highest background concentration is 97.4 $\mu g/m^3$, and the total concentration is 194.3 $\mu g/m^3$ (**Table 4.1.1-3**). This total concentration is above the NAAQS.

The first and second methods consider the relatively large fluctuations of PM_{10} background concentrations that occur with the seasons, similar to the 1-hour NO_2 analysis, only adding the respective

seasonal background to the modeled concentrations. The third method employs the highest second-high modeled concentration, ignoring the season during which the modeled impact occurs, and adds it to the second highest monitored background concentration to obtain the total concentration.

In all three methods, the Project maximum daily emissions and source placement are the same. The first two methods provide a more realistic, yet still conservative, prediction of the total concentrations (Project plus background) of PM_{10}. The third method provides a worst-case analysis at both the modeling and background levels. The chances that an unusually high background concentration would occur the same day as the daily maximum emissions and modeled source emissions density with poor dispersion conditions are relatively low.

Figure 7 in the Air Report depicts the areal extent of the total 24-hour PM_{10} concentrations using the first method. The maximum concentration is located at the Rail Loadout Facility east of the Sevier Playa. Relatively higher concentrations are seen along the southern ambient air boundaries, as well as along Crystal Peak Road and Crystal Peak Spur Road leading to the Rail Loadout Facility. The concentrations decrease rapidly to levels that are indistinguishable from background within about 3 km (2 miles) from the southern ambient air boundary, Crystal Peak Road, and Crystal Peak Spur Road. If the Project were implemented, the effects on the analysis area would be restricted to within about 3 km (2 miles) of the ambient boundary, and decrease to minimal levels further out. To further illustrate the anticipated effects, Figure 8 in the Air Report displays a ring that is 30 km from the Project boundary (approximating the analysis area). The 24-hour highest second-high Project-only concentrations for receptors along that ring are less than 0.45 $\mu g/m^3$ (0.31% of the 24-hour PM_{10} NAAQS). This figure shows that during either a typical day, or even on a relatively windy day, the effects of the Project emissions would stay within 30 km of the Project.

4.1.1.3.3.4 $PM_{2.5}$

The Project-only concentrations for $PM_{2.5}$ (**Table 4.1.1-3**) include both the direct emissions that were entered into AERMOD and an estimate of secondary $PM_{2.5}$ concentrations calculated separately from the model. Secondary $PM_{2.5}$ can form from NO_X and SO_2 emissions, which are called "precursors" in this context. AERMOD does not contain chemistry algorithms required to model this process and, as a result, the secondary $PM_{2.5}$ emissions have to be estimated outside of the model.

Ramboll (2019a) estimated the amount of secondary $PM_{2.5}$ that would be generated from the Project NO_X and SO_2 emissions following EPA's memorandum Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ Under the PSD Permitting Program (MERP Guidance) (EPA 2016a). The MERP Guidance provides numerous generic modeling studies performed by EPA for the entire nation. The most representative of these modeling studies was selected. The ratio of the Project precursor emissions to the selected MERP study precursor emissions was calculated. This ratio was then multiplied by the $PM_{2.5}$ SIL concentration to obtain an estimate of the Project secondary $PM_{2.5}$ concentration.

This produced the following results for the Project:

- Secondary 24-hour $PM_{2.5}$ concentration = 0.18 $\mu g/m^3$
- Secondary annual $PM_{2.5}$ concentration = 0.010 $\mu g/m^3$

These two values were added to the respective direct $PM_{2.5}$ concentrations from AERMOD for the final modeled Project-only concentration in **Table 4.1.1-3**. The modeled Project-only concentration of 15.3 $\mu g/m^3$ for 24-hour $PM_{2.5}$ is slightly higher than the background air quality. The total concentration of 27.1 $\mu g/m^3$ is below the NAAQS (**Table 4.1.1-3**). The modeled Project-only concentration for annual $PM_{2.5}$ represents the maximum concentration over all receptors. This concentration of 6.9 $\mu g/m^3$ is slightly higher than the background air quality. The total concentration of 11.0 $\mu g/m^3$ is close to, but below, the NAAQS (**Table 4.1.1-3**).

Figure 9 in the Air Report depicts the areal extent of the total 24-hour $PM_{2.5}$ concentrations and how concentrations are distributed across the analysis area. Similar to PM_{10}, the maximum concentration is

located at the Rail Loadout Facility east of the Sevier Playa. Relatively higher concentrations are seen along the southern ambient air boundary, as well as along Crystal Peak Road and Crystal Peak Spur Road leading to the Rail Loadout Facility. The concentrations decrease rapidly to levels that are indistinguishable from background within about 3 km (2 miles) of the southern ambient air boundary, Crystal Peak Road, and Crystal Peak Spur Road. The annual $PM_{2.5}$ concentration areal distribution (not shown in Figure 9 in the Air Report) has a similar pattern, with the maximum occurring at the Rail Loadout Facility and the relatively higher concentrations along the southern boundary and along the road leading to the Rail Loadout Facility.

If the Project were implemented, the effects on the analysis area for both 24-hour and annual $PM_{2.5}$ would be restricted to within about 3 km (2 miles) of the southern ambient boundary, and decrease to minimal levels further out.

4.1.1.3.3.5 Sulfur Dioxide

The modeled Project-only concentration for 1-hour SO_2 represents the highest of the 4th high concentrations for all receptors. The modeled Project-only concentration for the 3-hour and 24-hour averaging periods represents the highest of the second-high concentrations for all receptors. The modeled Project-only concentration for the annual averaging period represents the maximum concentration over all receptors. All of these concentrations are well below the background concentrations and all total concentrations are well below the NAAQS (**Table 4.1.1-3**). Note that the 24-hour and annual NAAQS for SO_2 were revoked in 2010 (EPA 2010a) and are listed here for informational purposes. If the Project were implemented, the effects of the SO_2 emissions on the analysis area would be minimal.

4.1.1.3.3.6 Ozone

Ozone cannot be modeled with AERMOD, as the model does not contain the necessary algorithms. Using the screening methods from the MERP Guidance, it was determined that the total Project NO_X and VOC emissions would be below the amount necessary to create O_3 concentrations above 1 ppb over an 8-hour period. Thus, if the Project were implemented, the effects of O_3 created from the VOCs and NO_X emissions would be below 1 ppb for an 8-hour average and would have minimal effects on the analysis area.

4.1.1.3.4 PSD Increments

Ramboll (2019a) compared Project-only modeled concentrations against the PSD Class II increments for all applicable pollutants and averaging times. Ramboll also calculated how far from the ambient air boundary the Project concentrations would drop below increment levels (**Table 4.1.1-4**). Note that the comparison to increments was done only for informational purposes at the request of the EPA and does not represent a formal PSD increment analysis. Formal increment analyses are only performed for a PSD source and would involve the modeling of both increment consuming and expanding sources. As proposed, the Project would be a minor source and formal increment analyses are not required (see Utah Division of Air Quality Emission Impact Assessment Guidelines (UDAQ 2013). Overall, the tracking of increment consumption and expansion from minor sources is the responsibility of the state agency (UDAQ in this case), not the BLM.

Table 4.1.1-4 Comparison of Project Concentrations with PSD Increments

Pollutant	Averaging Period	Model Rank (1)	Project-Only Modeled Concentration (2) (µg/m³)	Location of Maximum	PSD Class II Increment (µg/m³)	Maximum Distance to Increment (m)
NO_2	Annual	1st	23.8	600 m southeast of Processing Facility near one of the gravel pits	25	---
PM_{10}	24-hour	2nd	96.9		30	50
	Annual	1st	30.6		17	50

Table 4.1.1-4 Comparison of Project Concentrations with PSD Increments

Pollutant	Averaging Period	Model Rank (1)	Project-Only Modeled Concentration (2) (µg/m³)	Location of Maximum	PSD Class II Increment (µg/m³)	Maximum Distance to Increment (m)
$PM_{2.5}$ (3)	24-hour	2nd	17.5	All PM maxima were located near the Rail Loadout Facility.	9	50
	Annual	1st	6.9		4	50
SO_2	3-hour	2nd	1.4	300 m southwest of the Processing Facility near one of the gravel pits.	512	---
	24-hour	2nd	0.3		91	---
	Annual	1st	0.04	600 m southwest of the Processing Facility near one of the gravel pits.	20	---

(1) Rank of the modeled concentration used when modeling for the increment.
(2) Maximum modeled Project-only concentration over all receptors for the respective model rank
(3) Project-only concentration for $PM_{2.5}$ includes both modeled primary concentration plus secondary $PM_{2.5}$ concentration. See **Section 7.2.1.3.4**.

The Project-only effects for 24-hour PM_{10}, 24-hour $PM_{2.5}$, 3-hour SO_2, and 24-hour SO_2 represent the highest of the second-high concentrations over all of the receptors. The Project-only concentrations for the annual averaging periods for NO_2, $PM_{10,}$ and SO_2 reflect the maximum concentration over all of the receptors. If the Project were implemented, the only pollutants that would exceed the increment in the analysis area would be PM_{10} and $PM_{2.5}$ for the 24-hour and annual averaging periods. The concentrations would drop below the increment level within about 50 m (164 feet) from the maximum locations.

Ramboll (2019a) compared Project-only emissions against the PSD Class I and Class II increments for all applicable pollutants and averaging times at receptors located on the western edge of the Fishlake National Forest (**Table 4.1.1-5**). The modeled concentrations at the Fishlake National Forest would be well below both Class I and Class II increments for all pollutants and averaging times. If the Project were implemented, effects to the Fishlake National Forest would be minimal.

Table 4.1.1-5 Comparison of Project Concentrations to PSD Increments, Fishlake National Forest

Pollutant	Averaging Period	Model Rank	Project-Only Modeled Concentration (µg/m³)	Class II Increment (µg/m³)	Class I Increment (µg/m³)	Exceeds Class I or II Increment?
NO_2	Annual	1st	0.79	25	2.5	No
PM_{10}	24-hour	2nd	0.15	30	8	No
	Annual	1st	0.02	17	4	No
$PM_{2.5}$	24-hour	2nd	0.12	9	2	No
	Annual	1st	0.01	4	1	No
SO_2	3-hour	2nd	0.03	512	25	No
	24-hour	2nd	0.003	91	5	No
	Annual	1st	0.0001	20	2	No

4.1.1.3.5 Effects to Air Quality Related Values in Class I and Sensitive Class II Areas

Ramboll (2019a) performed a screening level analysis to address effects to air quality related values (AQRVs) in the six Class I areas and two Class II areas of interest in the general region (Table 3 in the Air Report). The screening level methodology is prescribed in the Federal Land Managers' Air Quality Related Values Work Group (FLAG) – Phase I Report (U.S. Forest Service et al. 2010). The screening technique relates the total emissions of PM_{10}, NO_X, and SO_2 with the distance to the Class I or Class II

area of interest in question. The relevant emissions total is the sum of the maximum 24-hour (daily) emissions for PM_{10}, NO_X, and SO_2 converted to annual emissions in tons as if the maximum daily occurred for all 365 days. It is important to note that the maximum daily emission level for each pollutant was selected, even though these did not occur in the same year. This emissions total (Q) is divided by the distance (D) to the Class I or Class II area of interest in km. If the Q/D value is less than or equal to 10, then the effect from the source's emissions on that area is assumed to be negligible and no quantitative analysis for AQRVs is required. The results from the screening for the Project are presented in **Table 4.1.1-6**. All Q/D values for Class I areas are below 10. If the Project were implemented, the effects to AQRVs in the Class I areas would be negligible. All Q/D values for Class II areas of interest were above 10, and thus an additional analysis was performed to further assess the visibility effects on these two areas.

Table 4.1.1-6 AQRV Screening Analysis

Area Name	Approximate Distance from Playa Center, D (km) / (miles)	Annual Emissions, Q (tpy)	Q/D	AQRV Analysis Required? (Y/N)
Class I Area				
Zion National Park	135 / 84	1,033	8	N
Bryce Canyon National Park	144 / 89		7	N
Capitol Reef National Park	149 / 93		7	N
Grand Canyon National Park	248 / 154		4	N
Canyonlands National Park	248 / 154		4	N
Arches National Park	285 / 177		4	N
Class II Area of Interest				
Fishlake National Forest	56.7 / 35	1,033	18	Y
Great Basin National Park	85.7 / 53		12	Y

4.1.1.3.5.1 Visibility Screening for the Class II Areas of Interest

Ramboll (2019a) performed a visibility screening level analysis to address effects to visibility in the two Class II areas of interest. The analysis was conducted in accordance with the Workbook for Plume Visual Impact Screening and Analysis (Visibility Workbook, EPA 1992). The plume visual impact screening model VISCREEN (Version 13190) was used to assess visibility impacts, per FLAG (U. S. Forest Service et al. 2010). VISCREEN assesses whether a plume from a source is visible to the typical person against the sky or a terrain feature, such as a scenic vista. The criteria for a visible plume are based on two screening threshold values of ΔE at 2.0 and contrast at 0.05. If the model output values are above these screening values, then the plume would be visible. To make this assessment, annualized maximum 24-hour emissions of PM_{10}, NO_X, soot, and sulfate (SO_4), as applicable, are entered into the model. The distance from the source to the area being analyzed is also entered. VISCREEN is then run with specific meteorological conditions of atmospheric stability and wind speed, depending on the screening level, known as Level 1 or 2.

The Level 1 meteorology assumes a very stable atmospheric condition, known as stability class F, with a very low wind speed of 1 m/s. This is very conservative and sets the atmosphere to be least dispersive. Atmospheric stability can be defined by Classes A to F, with Class A being the most dispersive (very unstable) to Class F being the least dispersive (very stable). Atmospheric stability Classes A, B and C are unstable, Class D is neutral, and Classes E and F are stable. Level 2 screening uses actual meteorology and sets the stability class and wind speed to values that represent the worst conditions at the one percent level by wind direction sector (for example, north, north-northwest, northwest, etc.). Other parameters, such as particle size, are set as default or adjusted, depending on the screening level.

Ramboll (2019a) first performed a Level 1 screening analysis with VISCREEN on the two Class II areas of interest. The emissions entered into VISCREEN were annualized maximum daily emissions of PM_{10}

and NO_X for the year 2025. This equates to 851 tpy of PM_{10} and 121 tpy of NO_X. The Project would not emit soot or SO_4. The distances to the near side and far side receptors of both Class II areas of interest were also entered. Figure 10a in the Air Report presents the receptor locations of the Class II areas of interest in relation to the Project. The results of the Level 1 screening analysis exceeded the screening criteria at both the Great Basin National Park and the Fishlake National Forest.

As the Level 1 screening showed a Q/D in excess of 10 for the two Class II areas of interest, Ramboll (2019a) performed Level 2 screening with VISCREEN, per the Visibility Workbook. Specific receptors along the boundary of both Class II areas of interest were placed based on wind direction (Figure 10b in the Air Report). Following the guidance in the Visibility Workbook, the worst case meteorological conditions for stability class and wind speed were calculated at the one percent level for each direction that affected the selected locations using the on-site meteorological data employed in the AERMOD modeling analysis. The worst one percent level stability class values were further adjusted to one class less stable if elevated terrain, defined as greater than 500 m (1,640 feet) above the elevation of the Project, exists between the Project and the Class II area of interest location. The stability class is also adjusted if the Class II area of interest receptor elevation is more than 500 m (1640 feet) above the Project. **Table 4.1.1-7** lists the Level 2 meteorological screening analysis parameters for each location. Note that all locations except FL1 and FL2 meet the terrain adjustment criteria. The particle size for the Level 2 runs was adjusted from the default size of 2 microns in diameter to 5 microns in diameter, given that the majority of the particulate matter is from mechanically-generated fugitive dust. This type of dust is primarily comprised of large-sized particles, i.e., greater than 2.5 microns. All other default parameters were used, and the same PM_{10} and NO_X emissions from the Level 1 analysis were used.

Table 4.1.1-7 Summary of VISCREEN Level 2 Meteorological Parameters

Observer Point	Distance (km) / (mi)	Wind Direction	1% Worst Case Dispersion Level	Complex Terrain Adjustment?	Adjusted 1% Worst-Case Dispersion Level
GB1	86 / 53	East	Stability Class E Wind Speed 3 m/s	Y	Stability Class D Wind Speed 3 m/s
FL1	89 / 55	Southwest	Stability Class F Wind Speed 3 m/s	N	Stability Class F Wind Speed 3 m/s
FL2	78 / 48	West-southwest	Stability Class E Wind Speed 4 m/s	N	Stability Class E Wind Speed 4 m/s
FL3	71 / 44	West	Stability Class D Wind Speed 8 m/s	Y	Stability Class C Wind Speed 8 m/s
FL4	57 / 35	West-northwest	Stability Class D Wind Speed 4 m/s	Y	Stability Class C Wind Speed 4 m/s
FL5	60 / 37	Northwest	Stability Class D Wind Speed 7 m/s	Y	Stability Class C Wind Speed 7 m/s
FL6	87 / 54	North-northwest	Stability Class D Wind Speed 8 m/s	Y	Stability Class C Wind Speed 8 m/s

Table 4.1.1-8 presents the Level 2 visibility screening results for the seven locations. VISCREEN models the potential effects of a Project to an observer inside an area in question, in this case, the Great Basin National Park and Fishlake National Forest. All locations passed the visibility screening criteria inside Great Basin National Park and Fishlake National Forest. This means that emissions from the Project would not affect visibility for an observer inside either of these areas. VISCREEN also models effects to visibility for an observer standing 1 km from the ambient air boundary, looking toward an area in question (EPA 1992). All locations passed the visibility screening criteria outside Fishlake National Forest except for FL2 and FL4. In addition, the visibility outside Great Basin National Park also did not pass the screening criteria. This means that emissions from the Project would reduce visibility for an observer standing 1 km from the ambient air boundary, looking toward the Great Basin National Park or locations FL2 and FL4 on the Fishlake National Forest. Note that VISCREEN does not account for

intervening topography, which in the case of the Project would screen both the Great Basin National Park and Fishlake National Forest from view by the observer, regardless of any effects to visibility caused by Project emissions.

VISCREEN is a conservative screening model for visibility. The emissions entered are the annualized maximum daily values (that is, the maximum daily amount running for 365 days). For the Project, this is 851 tpy of PM_{10} and 121 tpy of NO_X. This level of emissions is not realistic, and the actual annual emissions would be much lower. For the maximum year 2025, PM_{10} emissions would be 588 tpy and NO_2 emissions would be 106 tpy. Emissions from other years would be even lower (Table 15 in the Air Report). If the Project were implemented, the PM_{10} and NO_X emissions would not affect the visibility inside Great Basin National Park and Fishlake National Forest. As viewed from a point 1 km outside the ambient air boundary, PM_{10} and NO_X emissions would have minimal effects on visibility because the actual annual emissions would be lower than the modeled emissions and the VISCREEN model disregards the screening effect of intervening topography.

Table 4.1.1-8 VISCREEN Level 2 Results for Year 2025 Daily Maximum Emissions

Class II Area	Observer Location	Background / Sun Angle[1]	Inside Park[2]		Outside Park[3]	
			ΔE (Criteria=2.0)	Contrast (Criteria = 0.05)	ΔE (Criteria=2.0)	Contrast (Criteria = 0.05)
Fishlake National Forest	FL1	Sky 10	1.2	0.02	1.8	0.02
		Sky 140	0.3	-0.01	0.5	-0.01
		Terrain 10	1.3	0.01	1.6	0.02
		Terrain 140	0.1	0.00	0.4	0.01
	FL2	Sky 10	0.5	0.01	4.1	0.05
		Sky 140	0.1	0.00	1.1	-0.03
		Terrain 10	0.6	0.01	4.0	0.04
		Terrain 140	0.0	0.00	1.3	0.03
	FL3	Sky 10	0.0	0.00	0.9	0.01
		Sky 140	0.0	0.00	0.2	-0.01
		Terrain 10	0.0	0.00	1.0	0.01
		Terrain 140	0.0	0.00	0.3	0.01
	FL4	Sky 10	0.0	0.00	2.3	0.03
		Sky 140	0.0	0.00	0.6	-0.02
		Terrain 10	0.1	0.00	2.8	0.03
		Terrain 140	0.0	0.00	0.6	0.02
	FL5	Sky 10	0.0	0.00	1.3	0.02
		Sky 140	0.0	0.00	0.3	-0.01
		Terrain 10	0.0	0.00	1.5	0.02
		Terrain 140	0.0	0.00	0.4	0.01
	FL6	Sky 10	0.0	0.00	0.7	0.01
		Sky 140	0.0	0.00	0.2	-0.01
		Terrain 10	0.0	0.00	0.7	0.01
		Terrain 140	0.0	0.00	0.2	0.01
Great Basin National Park	GB1	Sky 10	0.2	0.00	3.3	0.04
		Sky 140	0.1	0.00	0.9	-0.02
		Terrain 10	0.3	0.00	3.1	0.03
		Terrain 140	0.0	0.00	1.0	0.02

Table 4.1.1-8 VISCREEN Level 2 Results for Year 2025 Daily Maximum Emissions

Class II Area	Observer Location	Background / Sun Angle[1]	Inside Park[2]		Outside Park[3]	
			ΔE (Criteria=2.0)	Contrast (Criteria = 0.05)	ΔE (Criteria=2.0)	Contrast (Criteria = 0.05)

[1] A sun angle of 10 means the sun is in front of the observer while a sun angle of 140 means the sun is behind the observer.
[2] These results would be experienced by a viewer inside the Great Basin National Park or Fishlake National Forest. Modelled values lower than the criteria values indicate visibility would not be affected.
[3] These results would be experienced by a viewer standing 1 km from the Project's ambient air boundary, looking toward either the Great Basin National Park or Fishlake National Forest. Modelled values lower than the criteria values indicate visibility would not be affected. Modelled values higher than the criteria values indicate visibility of these areas would be reduced for the viewer.

4.1.1.3.6 Greenhouse Gas Emissions

Ramboll (2019b) estimated GHG emissions for each year from all fuel combustion activities for the Project based on activity level and readily accepted emission factors. The Project would have no other sources of GHGs. The fuel combustion activities consist of both stationary and mobile sources, as summarized in Table 7 in the Air Report. The stationary sources would include generators and dryers. The mobile sources would include heavy-duty equipment, light-duty vehicles, truck transport of product, and railroad emissions for idling, short haul, and a 100-km long-haul round trip. Emission factors were obtained from MOVES2014a, MOVES-NONROAD, EPA publications (EPA 2010b, 2015), as well as other published factors, employing the same methodology used for the criteria pollutants.

The three GHGs emitted from all Project sources would be CO_2, CH_4, and N_2O, with the vast majority (greater than 99 percent) being CO_2. All of the GHGs can be classified in terms of their global warming potential (GWP) relative to CO_2 over a 100-year period, which is termed CO_2 equivalent (CO_2e). Ramboll (2019b) calculated the CO_2e based on the emissions of the three GHGs and their respective AR4 GWP (Table 34 in the Air Report), which are the same GWPs listed in 40 CFR Part 98, Subpart A (EPA 2017c) for GHG reporting. Using these GWPs allows for direct comparison between the Project CO_2e emissions and the national inventories developed by EPA.

The maximum GHG emissions from the Project would occur during Calendar Year (CYr) 2022 (Project Year [PYr] 4) as summarized in **Table 4.1.1-9**. The annual railroad emissions from CYr 2024 to 2053 are also presented because the railroad would not operate in CYr 2022. In the years the railroad is operating, GHG emissions from the Project would be lower than the maximum year. The maximum annual CO_2e emissions over the 35-year life of the Project would be 26,893 metric tons (0.03 mmt) (29,644 tons). This represents about 0.0005 percent of the 2016 U.S. CO_2e emissions of 6,511.3 mmt (Table 35 in the Air Report) (7.2 billion tons), 0.05 percent of 2015 Utah's CO_2e emissions of 63.2 mmt (69.7 million tons), and 0.31 percent of 2016 Milliard County CO_2e emissions of 8.7 mmt (9.6 million tons) (EPA 2018b). The Project would be a negligible contributor to GHG emissions at the county, state, and national levels.

Table 4.1.1-9 Maximum Annual GHG Emissions

Emissions Source Category	CO_2		CH_4		N_2O		CO_2e	
	MT	tons	MT	tons	MT	tons	MT	tons
CYr 2022 / PYr 4								
Construction On-Road Travel(1)	--	--	--	--	--	--	4,532	4,996
Construction Off-Road Equipment	5,134	5,659	0.039	0.042	0.238	0.263	5,206	5,738
Construction Stationary Sources	4,249	4,683	0.026	0.029	0.197	0.217	4,308	4,749

Table 4.1.1-9 Maximum Annual GHG Emissions								
Emissions Source Category	CO_2		CH_4		N_2O		CO_2e	
	MT	tons	MT	tons	MT	tons	MT	tons
Operational On-Road Travel[(1)]	--	--	--	--	--	--	52	57
Operational Off-Road Equipment	3,094	3,411	0.019	0.021	0.144	0.158	3,138	3,458
Operational Stationary Source	9,616	10,600	0.448	0.494	0.101	0.111	9,658	10,645
Rail Loadout[(2)]	NA	NA	NA	NA	NA	NA	NA	NA
Total	--	--	--	--	--	--	26,893	29,644
Rail Operations CYr 2024 to 2053 (PYr 6 to 35)								
Locomotive short line haul	20.0	22.1	0.002	0.002	0.001	0.001	20.2	22.3
Locomotive long line haul	311.3	343.2	0.024	0.027	0.008	0.009	314.3	346.5
Locomotive - switching	27.6	30.5	0.002	0.002	0.001	0.001	27.9	30.8

[1] A breakdown of the specific GHG emissions of CO_2, CH_4, and N_2O was not available from the emissions model used, only CO2e.
[2] The railroad would not operate in CYr 2022 / PYr 4.

4.1.1.3.7 Climate Change

The Intergovernmental Panel on Climate Change (IPCC) in 2014 released its Synthesis Report (IPCC 2014), the final part of the Fifth Assessment Report. The Synthesis Report summarizes the results of the AR5 assessment carried out by the three working groups of the IPCC. The National Academy of Sciences agreed with previous findings of the IPCC and briefly summarized its analysis in a booklet, Climate Change Evidence and Cause (National Academy of Sciences 2008). Overall, while it is apparent that global warming has occurred over the last 150 years, the climate change models cannot be used to predict future climate changes at regional and small scales. According to IPCC's Fifth Assessment Report, The Physical Science Basis (IPCC 2013), there is considerable confidence that climate models provide credible quantitative estimates of future climate change, particularly at continental scales and above, but the confidence of the changes projected by global models decreases at smaller scales. Global climate models are at this time imperfect and due to their uncertainties should not be used as the only basis for public policy decisions. As stated in **Section 4.1.1.3.6**, if the Project were implemented, the amount of CO_2e emissions would increase by a small fraction, as compared to national, state, and county totals. Climate change is a complex process with many unknowns. Climate change represents the cumulative effects of all worldwide GHG emissions, land use management practices, sinks, and other factors, known and unknown. The Project's effect on climate change would be negligible and not discernible from the climate change that is occurring.

4.1.1.4 *Action Alternatives*

If selected, Alternatives 1, 2, 3, 4, or 5 would be implemented during the initial construction portion of the Project. The disturbed areas for these alternatives would be similar to or slightly larger than the equivalent segments of the proposed action; however, with implementation of the applicant committed design features, including the measures in the FDCP (CPM 2019f), no measureable difference in PM or other emissions is expected for any of the alternatives.

Alternatives 1 through 5 would not affect the operation phase of the Project, and the production level would remain the same as in the proposed action. All sources in the operation / concurrent construction phase (2024-2053) would be the same as in the proposed action because the Mining Plan would remain the same. As a result, the maximum emission years for the Project would not be affected, nor would the

placement of the sources be altered. The predicted effects for all pollutants and averaging periods under Alternatives 1, 2, 3, 4, and 5 would be identical to the proposed action.

4.1.1.5 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as described in the proposed action. There would be no new emissions or effects to air quality or climate. Air quality in the analysis area would not change from current background levels. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process, including a new analysis of potential effects to air quality and climate.

4.1.2 Biological Resources

The analysis area, methods, and direct and indirect effects described in this section are summarized from the Resource Report for Biological Resources (ENValue 2019a) (Biology Report).

4.1.2.1 *Analysis Area*

Different analysis areas have been defined for different sub-resources within biological resources. The analysis areas for direct and indirect effects are described in this section. The analysis areas for cumulative effects are described in **Section 4.2.3**. Each of these analysis areas is based on the extent of expected effects from the Project to the applicable resource.

The analysis area for direct and indirect effects to vegetation (excluding special status species) and invasive species and noxious weeds includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes a 0.25-mile buffer around the off-lease lands (Figure 1 in the Biology Report).

The analysis area for direct and indirect effects to wetlands and riparian areas includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes both a 0.25-mile buffer around the off-lease lands and the floodplain of the Sevier River from Conks Dam downstream to the Sevier Playa (Figure 3 in the Biology Report).

The analysis area for direct and indirect effects to wildlife and migratory birds (excluding amphibians, bats, fish, and special status species) includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes a 0.5-mile buffer around both the on-lease and off-lease lands (Figure 2 in the Biology Report).

The analysis area for direct and indirect effects to amphibians, bats, and fish includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes both a 0.5-mile buffer around the off-lease lands and the floodplain of the Sevier River from Conks Dam downstream to the Sevier Playa (Figure 2 in the Biology Report).

The analysis area for direct and indirect effects to special status wildlife species includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes a 1.0-mile buffer around both the on-lease and off-lease lands (Figure 2 in the Biology Report).

4.1.2.2 *Methods*

This section describes, compares, and contrasts the effects that could be caused by implementation of the proposed action, action alternatives, or no-action alternative. The issues addressed in this section include vegetation excluding special status species (loss or degradation of native/desirable vegetation and loss or degradation of habitat for wildlife and forage for livestock); wetlands and riparian areas (loss or

degradation of wetlands/Waters of U. S., loss or degradation of riparian area near the inlet of the Sevier River [diversion structure and associated facilities], and loss or degradation of riparian areas and/or vegetation caused by changes in hydrology); invasive species and noxious weeds (introduction of noxious weeds and spread of existing and new weed infestations); wildlife and fish excluding special status species (loss or degradation of habitats, including loss of habitat suitability and influence of noise, traffic, vehicle collisions, and human activity on movement, foraging, nesting, and breeding of wildlife); migratory birds (influence of noise, traffic, vehicle collisions, and human activity on foraging, nesting, roosting, and breeding, attraction of birds to evaporation ponds or other Project facilities, with subsequent injury/mortality, and importance of habitats to migrating waterfowl and shorebirds); effects to special status wildlife species (Utah / BLM sensitive species [kit fox, burrowing owl], bats, raptors [golden eagle, ferruginous hawk], birds of conservation concern, and priority species for conservation action), federally-listed wildlife species (loss of potential [unoccupied] habitat for the Utah prairie dog and wildlife / livestock collisions with Project vehicles and subsequent risk of vehicle collisions with California condors that may scavenge road-kill.).

4.1.2.2.1 Vegetation Excluding Special Status Species

The Southwest Regional Gap Analysis Project (SWReGAP) data (U. S. Geological Survey [USGS] 2004) forms the basis for the mapping of vegetation cover types. The vegetation cover types used by SWReGAP are based on the terrestrial ecological systems classification framework (Comer et al. 2003). In addition to the SWReGAP data, vegetation cover types were field verified in some parts of the analysis area in 2013 (CH2M HILL 2014). The field-verified vegetation cover types were integrated into the SWReGAP data where substantial differences were noted, primarily along the Natural Gas Pipeline corridor, which was extensively burned during the 2007 Milford Flat Fire.

Additional vegetation field verifications were conducted by CPM within the Rail Loadout Facility and the Processing Facility in 2018 to help inform future reclamation procedures in response to UDOGM requirements (SWCA 2018a). Twenty-three sampling transects were established within the expected disturbance footprints of these facilities in order to quantify vegetation cover. Field verification of other proposed off-playa features was not required because of the minimal and short duration of disturbance.

4.1.2.2.2 Wetlands and Riparian Areas

SWCA (2016) conducted a comprehensive wetland and riparian baseline inventory of a portion of the analysis area. The goal of the baseline inventory was to identify and document the distribution and extent of wetlands and riparian areas that may be affected by the Project. The SWCA inventory represents the most comprehensive, current, and accurate data on wetlands and riparian areas in the analysis area. The term “wetland” is used in a general sense throughout the DEIS and is not meant to imply that these areas meet the definition of wetlands used by the USACE.

4.1.2.2.3 Invasive Species and Noxious Weeds

Vegetation surveys in 2013 documented the presence of several noxious and invasive species in the analysis area (CH2M HILL 2014). Invasive and noxious weed surveys were not conducted in all portions of the analysis area because of changes in Project components and alternatives since the 2013 surveys. Invasive and non-native species were identified during the 2018 vegetation surveys of the Rail Loadout Facility and the Processing Facility (SWCA 2018a). Pre-disturbance weed surveys would be implemented as described in the Noxious and Invasive Weed Management Plan (CPM 2019g) to ensure noxious or invasive weeds are documented and appropriately treated before construction begins.

4.1.2.2.4 Wildlife and Fish Excluding Special Status Species

CH2M HILL conducted multiple surveys between 2011 and 2015 to assess wildlife presence within the analysis area. Wildlife habitat, migratory bird, big game, Utah prairie dog, raptor, and burrowing owl surveys were conducted between 2011 and 2014 (CH2M HILL 2014). Bat acoustic surveys were conducted in 2015 (CH2M HILL 2015a). Kit fox camera surveys were conducted in 2015 (CH2M HILL 2015b). Water bird use and habitat surveys were conducted in 2017 and 2018 (SWCA 2018b).

4.1.2.2.5 Migratory Birds

A list of bird species to be analyzed (Table 6 in the Biology Report) was compiled from the Birds of Conservation Concern (BCC) list (USFWS 2008) and the Utah Partners in Flight (PIF) list (Parrish et al. 2002). In addition, the following literature and other resources were reviewed for information about bird occurrence and habitats in the analysis area:

- Utah Natural Heritage Program (UNHP) database (UDWR 2017a)
- EA for the Milford Wind Corridor Project (BLM 2008a)
- EA for the Sevier Lake Competitive Potash Leasing Proposal (BLM 2011a)
- EA for the Sevier Dry Lake Exploratory Testing (BLM 2011b)
- Important Bird Areas (National Audubon Society 2013)
- Birds of Great Salt Lake (Friends of Great Salt Lake 2013)

Several resource inventories were conducted by CH2M HILL from 2011 to 2014 within two general survey areas: the Standard Survey Area and the Enhanced Survey Area. These surveys included multiple survey points and routes. The point count locations and routes for these two surveys are shown in Figure 2 in the Biology Report. Ground-based raptor nest surveys were conducted within a 0.5-mile buffer of preliminary Project components. The area encompassed by these surveys is illustrated in Figure 2 in CH2M HILL (2014). These surveys covered some, but not all of the "Wildlife Resources Analysis Area (half-mile)" shown in Figure 2 in the Biology Report because some Project components were moved or added to the Project after the surveys were completed. Although small parts of the analysis area were not covered, the surveys were considered adequate to characterize the environmental baseline. Pre-construction surveys would be conducted in all disturbance areas in accordance with the measures in **Appendix K**. Intensive aerial surveys for raptor nests were conducted in 2013 in the Cricket Mountains east of the proposed 69-kV Power and Communication Line. In 2014, the aerial raptor surveys were extended into the mountains south of Crystal Peak Road, as well as west of the playa into the Black Hills portion of the House Range. Both of these aerial raptor survey areas are shown in Figure 2 in the Biology Report.

SWCA (2018b) conducted a water bird use and habitat evaluation study in 2017 and 2018. The water bird study included both an avian survey component and a water bird habitat evaluation component. Avian surveys were conducted at approximately 10-day intervals during migration periods (April to May and August to September) and monthly during the breeding season (June to July). Each avian survey included both a point count survey and an aerial survey.

4.1.2.2.6 Special Status Wildlife Species

A list of sensitive and other special-status wildlife species that are known to occur or potentially occur in the analysis area was compiled from the USFWS species list for Millard County (USFWS 2018a), the UDWR Utah Sensitive Species list (UDWR 2017b), the BLM Sensitive Species list (BLM 2019b), and observations made during various surveys for the Project (CH2M HILL 2014, 2015a, 2015b). The following literature and other resources were reviewed for additional information about special status species occurrence and habitats in the analysis area:

- UNHP database (UDWR 2017a)
- EA for the Milford Wind Corridor Project (BLM 2008a)
- EA for the Sevier Lake Competitive Potash Leasing Proposal (BLM 2011a)
- EA for the Sevier Dry Lake Exploratory Testing (BLM 2011b)

4.1.2.2.7 Federally Listed Wildlife Species

The Information, Planning, and Conservation System (IPaC) (USFWS 2018a) lists three federally-listed species of wildlife with the potential to occur in the analysis area: yellow-billed cuckoo (*Coccyzus americanus occidentalis*) (threatened), California condor (*Gymnogyps californianus*) (endangered), and Utah prairie dog (*Cynomys parvidens*) (threatened). The IPaC list and the results of several wildlife surveys (CH2M HILL 2014, 2015a, 2015b; SWCA 2018b), were used to evaluate the potential presence

of federally-listed wildlife species within the analysis area. The Guidelines for the Identification of Suitable Habitat for Western Yellow-billed Cuckoos in Utah (USFWS 2015) were used to assess the potential for suitable habitat for the yellow-billed cuckoo to occur within and near the analysis area. Wildlife surveys and consultation with UDWR and USFWS assisted in determining the probability of California condor presence within the analysis area (BLM 2011a, BLM, 2011b, CH2M HILL 2014). A Utah prairie dog survey was conducted in potential habitat with a 350-foot buffer around original Project features (CH2M HILL 2014).

4.1.2.3 *Vegetation Excluding Special Status Species*

4.1.2.3.1 Proposed Action

The large majority (99 percent) of the Mining Project would be constructed within the playa cover type, which is located on BLM and SITLA lands and is relatively void of vegetation (**Table 4.1.2-1**). Construction of mine components such as BMUs, preconcentration and production ponds, extraction wells, and the Perimeter Road would cause permanent disturbance through excavation, grading, and drilling within the playa. Within the lease area, but outside the playa, semi-desert shrub steppe, mixed salt desert scrub, and greasewood flat vegetation would be graded or otherwise permanently disturbed during construction of Project components including the Processing Facility, off-playa portions of the Perimeter Road, and along linear facilities (**Table 4.1.2-1**). In addition to the permanent disturbance, vegetation along on-lease linear components, such as the Power and Communication Lines, Water Supply Pipeline, and Natural Gas Pipeline, would be temporarily disturbed during construction. The vegetation types affected by the proposed action in the lease area are summarized in **Table 4.1.2-1.**

Table 4.1.2-1 Effects by Vegetation Cover Type, Proposed Action, Mining Project

	Temporary Acres				Permanent Acres			
Vegetation Cover Type	**BLM**	**State**	**Private**	**Total**	**BLM**	**State**	**Private**	**Total**
Semi-Desert Shrub Steppe	5.6	4.6	--	10.2	24.2	63.2	--	**87.4**
Mixed Salt Desert Scrub	13.6	4.7	--	18.3	56.2	39.6	--	**95.8**
Invasive Grasses and Forbs	0.1	--	--	0.1	0.4	--	--	**0.4**
Greasewood Flat	18.3	2.4	--	20.7	210.1	37.2	--	**247.3**
Playa	513.1	53.2	--	566.3	107,618.4	3,829.3	--	**111,447.4**
Sagebrush Shrubland	--	--	--	--	6.7	--	--	**6.7**
Open Water	0.2	--	--	0.2	67.3	--	--	**67.3**
Total	**550.1**	**64.9**	**--**	**615.1**	**107,983.3**	**3,969.3**	**--**	**111,952.3**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding. Vegetation cover types not listed in this table would not be affected by the proposed action for the Mining Project.

Direct disturbance to vegetation along the ROWs would be caused by clearing, grading, and other activities associated with facility construction. Permanent disturbance would be limited to the minimum area required for construction and operation; thus, in most areas, clearing or grading within the ROWs is expected to be less than the maximum area within the ROWs. Disturbance of soil and vegetation would be minimized to the extent possible, in part through implementation of design features (**Appendix K**), which would mitigate both temporary and permanent effects to vegetation. A Reclamation Plan (CPM 2019h) has been developed to guide interim and final reclamation. The Reclamation Plan includes measures for revegetation and seeding, as well as monitoring and reporting procedures to ensure revegetation is successful and meets the goals of the plan.

Temporary disturbance to vegetation would occur along all ROWs from construction vehicles where temporary access is needed during construction, and within temporary use areas (TUAs) (for example, for staging equipment or pulling sites for power and communication lines). In some relatively flat areas that would not be occupied by permanent structures, clearing may only involve "scalping," which would involve cutting shrubs near the base and leaving the root structure in the ground to minimize soil

disturbance. Some areas would be accessed by a "drive-and-crush" method and no grading would be required. The lowest-impact method would be used in each area, as feasible, to achieve construction objectives. Interim reclamation would replace vegetation disturbed during construction in the temporary ROWs. During grading, topsoil would be stockpiled and then spread on affected areas to be reseeded after construction is complete. Reseeding may also be required, as determined by the BLM, in some areas that were not graded, but where vegetation is trampled or otherwise damaged. The vegetation types and extent of temporary and permanent effects along all ROWs affected by the proposed action are summarized in **Table 4.1.2-2**.

Table 4.1.2-2 Effects by Vegetation Cover Type, Proposed Action, ROWs

	Temporary Acres				Permanent Acres			
Vegetation Cover Type	BLM	State	Private	Total	BLM	State	Private	Total
Semi-Desert Shrub Steppe	16.8	2.7	2.9	22.4	30.5	4.0	9.5	**44.0**
Mixed Salt Desert Scrub	31.1	6.6	0.2	37.9	285.3	22.0	1.6	**308.9**
Invasive Grasses and Forbs	43.0	3.2	1.7	47.9	132.2	5.1	3.5	**140.8**
Greasewood Flat	28.1	2.5	3.7	34.3	168.9	27.0	5.9	**201.8**
Semi-desert Grassland	16.8	2.6	--	19.4	29.7	4.0	0.3	**34.0**
Playa	73.1	5.4	--	78.5	2,596.5	24.2	--	**2,620.7**
Sagebrush Shrubland	3.2	--	--	3.2	21.7	2.2	6.2	**30.1**
Pinyon-Juniper Woodland	5.0	--	--	5.0	9.7	0.2	--	**9.9**
Wetlands/Riparian Areas	--	--	--	--	<0.1	--	--	**--**
Cliff and Canyon	--	--	--	--	<0.1	--	--	**--**
Total	**217.1**	**23.0**	**8.5**	**248.6**	**3,274.5**	**88.7**	**27.0**	**3,390.2**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding. Vegetation cover types not listed in this table would not be affected by the proposed action for the ROWs.

Gravel pits would be developed during construction and would be reclaimed when no longer needed. Effects to vegetation from the development and use of the gravel pits would include clearing and permanent removal of vegetation during the construction and operation periods. This disturbance would be limited to small areas of semi-desert shrub steppe, mixed salt desert scrub, greasewood flat, and invasive grasses and forbs. Per the Reclamation Plan (CPM 2019h), topsoil stored from the initial development of each gravel pit would be reapplied and roughened along the contours and seeded with an approved seed mix. The vegetation types and disturbance areas associated with gravel pit development are summarized in **Table 4.1.2-3.**

Table 4.1.2-3 Effects by Vegetation Cover Type, Proposed Action, Gravel Pits

	Temporary Acres				Permanent Acres			
Vegetation Cover Type	BLM	State	Private	Total	BLM	State	Private	Total
Semi-Desert Shrub Steppe	--	--	--	--	--	0.6	--	**0.6**
Mixed Salt Desert Scrub	--	--	--	--	2.8	1.4	--	**4.2**
Invasive Grasses and Forbs	--	--	--	--	7.5	--	--	**7.5**
Greasewood Flat	--	--	--	--	1.7	4.1	--	**5.8**
Playa	--	--	--	--	4.5	--	--	**4.5**
Total	**--**	**--**	**--**	**--**	**13.7**	**4.1**	**--**	**17.8**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding. Vegetation cover types not listed in this table would not be affected by the proposed action for the gravel pits.

4.1.2.3.2 Alternative 1 - 69-kV Power and Communication Line, North End

Alternative 1 (Segment T5) (**Section 2.5.1**) would be 3.56 miles longer than the proposed action (Segment T1) and would cause 51.2 acres of additional direct disturbance from construction and placement of additional structures. The majority of the additional disturbance from Alternative 1 would be in the mixed salt desert scrub cover type. Disturbance would include the removal (grading and clearing) of vegetation from structure locations, and crushing or "scalping" of vegetation along access routes in the ROW. The vegetation types affected by Alternative 1 (Segment T5) and Segment T1 of the proposed action are summarized in **Table 4.1.2-4.**

Table 4.1.2-4 Effects by Vegetation Cover Type, Alternative 1

	Temporary Acres				Permanent Acres			
Vegetation Cover Type	**BLM**	**State**	**Private**	**Total**	**BLM**	**State**	**Private**	**Total**
Proposed Action – Segment T1								
Semi-Desert Shrub Steppe	--	--	--	--	--	--	--	**--**
Mixed Salt Desert Scrub	--	--	--	--	0.6	0.2	--	**0.8**
Invasive Grasses and Forbs	--	--	--	--	1.0	--	--	**1.0**
Greasewood Flat	--	--	--	--	68.0	11.5	--	**79.5**
Playa	--	--	--	--	4.8	--	--	**4.8**
Total	**--**	**--**	**--**	**--**	**74.4**	**11.7**	**--**	**86.1**
Alternative 1 – Segment T5								
Semi-Desert Shrub Steppe	--	--	--	--	0.5	--	--	**0.5**
Mixed Salt Desert Scrub	--	--	--	--	31.3	7.9	<0.1	**39.3**
Invasive Grasses and Forbs	--	--	--	--	--	--	--	**--**
Greasewood Flat	--	--	--	--	77.8	7.3	9.7	**94.8**
Playa	--	--	--	--	2.3	0.4	--	**2.7**
Total	**--**	**--**	**--**	**--**	**111.9**	**15.6**	**9.7**	**137.3**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding. Vegetation cover types not listed in this table would not be affected by either the proposed action or alternative.

4.1.2.3.3 Alternative 2 - 69-kV Power and Communication Line, South End

Alternative 2 (Segment T6) (**Section 2.5.2**) would be 3.28 miles longer than the proposed action (Segment T3) and would cause 39.7 acres of additional direct disturbance from construction and placement of additional structures. The majority of the additional disturbance from Alternative 2 would be in the semi-desert shrub steppe and playa cover types. Disturbance would include the removal (grading and clearing) of vegetation from structure locations, and crushing or "scalping" of vegetation along access routes in the ROW. The vegetation types affected by Alternative 2 (Segment T6) and Segment T3 of the proposed action are summarized in **Table 4.1.2-5.**

Table 4.1.2-5 Effects by Vegetation Cover Type, Alternative 2

	Temporary Acres				Permanent Acres			
Vegetation Cover Type	**BLM**	**State**	**Private**	**Total**	**BLM**	**State**	**Private**	**Total**
Proposed Action – Segment T3								
Semi-Desert Shrub Steppe	--	--	--	--	1.1	--	--	**1.1**
Mixed Salt Desert Scrub	--	--	--	--	27.1	--	--	**27.1**
Invasive Grasses and Forbs	--	--	--	--	0.1	--	--	**0.1**
Greasewood Flat	--	--	--	--	11.0	--	--	**11.0**
Playa	--	--	--	--	--	--	--	--
Total	**--**	**--**	**--**	**--**	**39.3**	**--**	**--**	**39.3**

Table 4.1.2-5 Effects by Vegetation Cover Type, Alternative 2

Vegetation Cover Type	Temporary Acres				Permanent Acres			
	BLM	State	Private	Total	BLM	State	Private	Total
Alternative 2 – Segment T6								
Semi-Desert Shrub Steppe	--	--	--	--	57.5	--	--	**57.5**
Mixed Salt Desert Scrub	--	--	--	--	9.3	--	--	**9.3**
Invasive Grasses and Forbs	--	--	--	--	9.6	--	--	**9.6**
Greasewood Flat	--	--	--	--	0.3	--	--	**0.3**
Playa	--	--	--	--	2.1	--	--	**2.1**
Total	**--**	**--**	**--**	**--**	**79.0**	**--**	**--**	**79.0**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding. Vegetation cover types not listed in this table would not be affected by either the proposed action or alternative.

4.1.2.3.4 Alternative 3 - Natural Gas Pipeline, Black Rock

Alternative 3 (Segment G7) (**Section 2.5.3**) is approximately the same length as the proposed action (Segment G2) and would have a similar disturbance area, affecting 0.1 acre more of temporary ROW and 0.1 acre less permanent ROW. The proposed action would affect a greater area of native vegetation, because more of Alternative 3 would be located in the invasive grasses and forbs cover type. The proposed action would affect 3.1 additional acres (combined temporary and permanent ROW) of native vegetation compared to Alternative 3. The vegetation types affected by Alternative 3 (Segment G7) and Segment G2 of the proposed action are summarized in **Table 4.1.2-6.**

Table 4.1.2-6 Effects by Vegetation Cover Type, Alternative 3

Vegetation Cover Type	Temporary Acres				Permanent Acres			
	BLM	State	Private	Total	BLM	State	Private	Total
Proposed Action – Segment G2								
Semi-Desert Shrub Steppe	2.1	--	0.9	3.0	3.2	--	1.3	**4.5**
Mixed Salt Desert Scrub	<0.1	--	0.2	0.3	<0.1	--	0.3	**0.4**
Invasive Grasses and Forbs	--	--	0.5	0.5	--	--	0.8	**0.8**
Greasewood Flat	0.9	--	1.0	1.9	1.4	--	1.5	**2.9**
Semi-desert Grassland	--	--	--	--	--	--	--	--
Total	**3.1**	**--**	**2.6**	**5.7**	**4.7**	**--**	**3.9**	**8.6**
Alternative 3 – Segment G7								
Semi-Desert Shrub Steppe	1.9	--	--	1.9	2.8	--	--	**2.8**
Mixed Salt Desert Scrub	0.5	--	--	0.5	0.8	--	--	**0.8**
Invasive Grasses and Forbs	1.8	--	--	1.8	2.6	--	--	**2.6**
Greasewood Flat	1.4	--	--	1.4	2.0	--	--	**2.0**
Semi-desert Grassland	0.2	--	--	0.2	0.3	--	--	**0.3**
Total	**5.8**	**--**	**--**	**5.8**	**8.5**	**--**	**--**	**8.5**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding. Vegetation cover types not listed in this table would not be affected by either the proposed action or alternative.

4.1.2.3.5 Alternative 4 - Natural Gas Pipeline, West End

Alternative 4 (Segment G8) (**Section 2.5.4**) would be 1.18 miles longer than the proposed action (Segment G5). The additional length would cause 2.4 more acres of temporary disturbance and 3.7 more acres of permanent disturbance to vegetation for Segment G8 compared with Segment G5. The vegetation types affected by Alternative 4 (Segment G8) and Segment G5 of the proposed action are summarized in **Table 4.1.2-7.**

Table 4.1.2-7 Effects by Vegetation Cover Type, Alternative 4								
	Temporary Acres				Permanent Acres			
Vegetation Cover Type	BLM	State	Private	Total	BLM	State	Private	Total
Proposed Action – Segment G5								
Semi-Desert Shrub Steppe	3.6	--	--	3.6	5.4	--	--	**5.4**
Mixed Salt Desert Scrub	5.8	--	--	5.8	8.7	--	--	**8.7**
Invasive Grasses and Forbs	0.6	--	--	0.6	0.9	--	--	**0.9**
Greasewood Flat	2.0	--	--	2.0	3.2	--	--	**3.2**
Semi-desert Grassland	0.3	--	--	0.3	0.5	--	--	**0.5**
Playa	--	--	--	--	--	--	--	**--**
Total	**12.4**	**--**	**--**	**12.4**	**18.6**	**--**	**--**	**18.6**
Alternative 4 – Segment G8								
Semi-Desert Shrub Steppe	9.5	--	--	9.5	14.3	--	--	**14.3**
Mixed Salt Desert Scrub	0.1	--	--	0.1	0.1	--	--	**0.1**
Invasive Grasses and Forbs	4.7	--	--	4.7	7.1	--	--	**7.1**
Greasewood Flat	0.1	--	--	0.1	0.2	--	--	**0.2**
Semi-desert Grassland	--	--	--	--	--	--	--	**--**
Playa	0.4	--	--	0.4	0.6	--	--	**0.6**
Total	**14.8**	**--**	**--**	**14.8**	**22.3**	**--**	**--**	**22.3**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding. Vegetation cover types not listed in this table would not be affected by either the proposed action or alternative.

4.1.2.3.6 Alternative 5 - Sevier River Diversion

The proposed action and Alternative 5 (**Section 2.5.5**) would be located primarily in the playa cover type, which is relatively devoid of vegetation. The proposed action would affect 2.1 more acres then Alternative 5 because Perimeter Road Segment P3 and Recharge Canal Segment R3 are shorter than Segments P2 and R2 of the proposed action. The vegetation types affected by Alternative 5 and the proposed action are summarized in **Table 4.1.2-8.**

Table 4.1.2-8 Effects by Vegetation Cover Type, Alternative 5								
	Temporary Acres				Permanent Acres			
Vegetation Cover Type	BLM	State	Private	Total	BLM	State	Private	Total
Proposed Action – Segments P2, R2, S2								
Semi-Desert Shrub Steppe	<0.1	--	--	<0.1	0.1	--	--	**0.1**
Mixed Salt Desert Scrub	<0.1	--	--	<0.1	<0.1	--	--	**<0.1**
Greasewood Flat	0.1	--	--	0.1	0.5	--	--	**0.5**
Playa	2.3	--	--	2.3	9.4	--	--	**9.4**
Total	**2.5**	**--**	**--**	**2.5**	**10.1**	**--**	**--**	**10.1**
Alternative 5 – Segments P3, R3, S3								
Semi-Desert Shrub Steppe	0.3	--	--	0.3	1.7	--	--	**1.7**
Mixed Salt Desert Scrub	--	--	--	--	--	--	--	**--**
Greasewood Flat	--	--	--	--	--	--	--	**--**
Playa	2.3	--	--	2.3	6.9	--	--	**6.9**
Total	**2.6**	**--**	**--**	**2.6**	**8.6**	**--**	**--**	**8.6**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding. Vegetation cover types not listed in this table would not be affected by either the proposed action or alternative.

4.1.2.3.7 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. The No Action alternative would not cause any direct or indirect effects to vegetation. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.4 *Wetlands and Riparian Areas*

4.1.2.4.1 Proposed Action

The majority of the components of the Mining Project would be located within the playa and would not affect riparian or wetland habitats. The Sevier River diversion and Drop Structure are the only on-lease components that would be located near wetlands or riparian habitat. The Diversion Berm and part of the Diversion Canal would be located in an area mapped as wetland floodplain, while the Drop Structure would be located in an area mapped as riparian (SWCA 2016). Earlier analysis by BLM (2015a) found that riparian vegetation could be present near the diversion, depending on the amount of water flowing in the Sevier River from year to year.

Effects to the wetland floodplain and riparian areas would include excavation, grading, and compaction of soil, as well as removal of wetland and riparian vegetation during construction of the Perimeter Road and spurs, the Drop Structure, the recharge canals, and the other features associated with the diversion. No on-lease linear components (such as power lines, trenches, or canals) would be located within or adjacent to riparian or wetland habitats.

The acquisition of recharge water and increased consistency of water flows may improve existing wetlands and riparian areas and lead to expansion of these habitats upstream of the Sevier River diversion during Project operations. It is estimated that the maximum wetted area resulting from additional flows down the Sevier River would be approximately 1,419 acres (Tables 10 and 11 in the Water Report). The exact locations that would be inundated or saturated by additional water are unknown at this time. The size and location of wetland and riparian vegetation that would develop are also unknown, although it is expected that this expansion would occur adjacent to the river channel (Figure 8 in the Water Report). Once Project operations are terminated and decommissioning begins, acquired water would no longer be available. Any benefit to riparian and wetland habitats from acquired water would cease and these habitats would revert to their current condition.

A wetland located within an existing stock pond was mapped at the western end of the access road for the proposed Long Ridge Communication Tower. This existing road may need minor improvements such as widening; however, no direct or indirect effects to wetlands or riparian areas are expected.

The 12.47-kV Power Line Spur 1 and Water Supply Pipeline Spur 1 would be constructed along the west side of the existing Water Supply Well Access Road 1, potentially within 100 feet of a small wetland. Potential indirect effects to the wetland include sedimentation from soil runoff or fuel or chemical spills during construction. The risk of these potential effects would be minimized through application of the design features (**Appendix K**), specifically development and implementation of a SPCC (CPM 2019k) and SWPPP (CPM 2019l).

Riparian and wetland habitats were identified near Access Road Segments A, C1, and F. These existing roads would require maintenance and improvements such as widening. Potential indirect effects such as sedimentation from soil runoff, fuel spills, or chemical spills would be minimized with implementation of the design features (**Appendix K**), specifically development and implementation of a SPCC (CPM 2019k) and SWPPP (CPM 2019l).

4.1.2.4.2 Alternatives 1 through 4

There are no wetland or riparian habitats within or adjacent to temporary or permanent disturbance areas from Project components associated with Alternatives 1, 2, 3, or 4; therefore, these alternatives would not affect wetlands or riparian areas.

4.1.2.4.3 Alternative 5 - Sevier River Diversion

Alternative 5 would be located in a wetland floodplain as mapped by SWCA (2016) but not in riparian areas. Alternative 5 would affect the wetland floodplain through disturbance and alteration of local hydrology during construction, operation, and maintenance of the diversion features; however, this area supports poor quality habitat at present because of the intermittent nature of river flows and high salt loads. The Alternative 5 Diversion Channel would be located further downstream than the Diversion Berm that is part of the proposed action, which would reduce the potential effects to wetland vegetation. With the addition of recharge water during operation of the Project, the Sevier River channel upstream of the diversion may temporarily (during Project operation) support more extensive and higher quality wetland and riparian habitats than are currently present; however, once the Project is decommissioned, recharge water would no longer be available and wetland and riparian habitats would revert to their current condition. A larger area of improved habitat may develop during Project construction and operation because Alternative 5 would be located further downstream than the proposed action, providing a greater area for wetland vegetation to develop.

4.1.2.4.4 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action; therefore, there would be no direct or indirect effects to wetlands or riparian areas. Existing wetlands and riparian areas would remain in their current condition, subject to the variability of flows in the Sevier River. Recharge water would not be acquired and potential improvements and increases in area of wetlands and riparian areas during Project operations would not be realized. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.5 *Invasive Species / Noxious Weeds*

4.1.2.5.1 Proposed Action

The removal of native vegetation would increase the potential for expansion of non-native and invasive plants including noxious weeds. Non-native and invasive plants have the potential to colonize disturbed areas and once established, may reduce the diversity and productivity of native plant communities. Several design features (**Appendix K**) have been developed to minimize potential effects of invasive species and noxious weeds. Specifically, a Noxious and Invasive Weed Management Plan (CPM 2019g), which includes additional mitigation measures, has been developed and would be implemented during construction, operation, maintenance, and decommissioning, which would minimize the potential for establishment or increase of noxious and invasive weeds.

4.1.2.5.2 Alternative 1 - 69-kV Power and Communication Line, North End

As shown in **Table 4.1.2-4**, the total disturbance of vegetation would be higher in Alternative 1 (Segment T5) compared to the proposed action (Segment T1). The larger disturbance area of Alternative 1 may increase the probability of colonization by noxious and invasive weeds. Alternative 1 is located along multiple existing roads, including the SR 257 Cutoff Road and SR 257. The areas adjacent to these roads may contain existing occurrences of noxious and invasive weeds that could be spread by construction activities. Implementation of the Noxious and Invasive Weed Management Plan (CPM 2019g) would minimize the risk of introduction or spread of noxious and invasive weeds.

4.1.2.5.3 Alternative 2 - 69-kV Power and Communication Line, South End

As shown in **Table 4.1.2-5**, the total disturbance of vegetation would be higher in Alternative 2 (Segment T6) compared to the proposed action (Segment T3). Alternative 2 would parallel and be accessed from multiple existing roads including Crystal Peak Road, Crystal Peak Spur Road, and the Power Line Access Road, whereas the proposed action would be located in undisturbed habitat. Alternative 2 may be more susceptible to colonization of invasive and noxious weeds compared to the proposed action. There are 9.6 acres of existing invasive grasses and forbs along Alternative 2, which could spread along the ROW during construction activities. Additionally, Alternative 2 is located along multiple existing roads, where human presence could increase the introduction of noxious and invasive weeds to areas disturbed by

construction activities. Implementation of the Noxious and Invasive Weed Management Plan (CPM 2019g) would minimize the risk of introduction or spread of noxious and invasive weeds.

4.1.2.5.4 Alternative 3 - Natural Gas Pipeline, Black Rock

As shown in **Table 4.1.2-6**, the total disturbance of native vegetation is slightly lower for Alternative 3 (Segment G7) compared to the proposed action (Segment G2). At the same time, Alternative 3 would disturb 4.4 acres of existing invasive grasses and forbs, compared with only 1.3 acres along the proposed action. Alternative 3 would have a higher probability of spreading noxious and invasive species along the ROW during construction activities because there is a larger amount of invasive grasses and forbs currently present. The proposed action would parallel the proposed Rail Spur and Rail Spur Access Corridor. The additional disturbance from facilities along the proposed action could increase the potential for introduction of invasive and noxious weeds. Implementation of the Noxious and Invasive Weed Management Plan (CPM 2019g) would minimize the risk of introduction or spread of noxious and invasive weeds.

4.1.2.5.5 Alternative 4 - Natural Gas Pipeline, West End

As shown in **Table 4.1.2-7**, the total disturbance of vegetation is higher for Alternative 4 (Segment G8) compared to the proposed action (Segment G5). The larger disturbance area from Alternative 4 could increase the probability of colonization of invasive and noxious weeds compared to the proposed action. Alternative 4 would parallel multiple existing roads including Crystal Peak Road and Crystal Peak Spur Road. The proposed action would be constructed in undisturbed habitat. Additionally, the extent of existing invasive grasses and forbs is greater along Alternative 4, compared to the proposed action. The higher density of invasive species along Alternative 4 could spread further along the ROW during construction activities. Implementation of the Noxious and Invasive Weed Management Plan (CPM 2019g) would minimize the risk of introduction or spread of noxious and invasive weeds.

4.1.2.5.6 Alternative 5 - Sevier River Diversion

Total disturbance is slightly lower with Alternative 5 compared to the proposed action **(Table 4.1.2-8)**; however, both the proposed action and Alternative 5 would be constructed on and adjacent to the playa, which is unlikely to support noxious or invasive weeds because of the high salt content in the soils. Considering the similar locations and poor growing conditions, no difference in risk of introduction or spread of noxious or invasive weeds is predicted between the proposed action and Alternative 5. Additionally, implementation of the Noxious and Invasive Weed Management Plan (CPM 2019g) would minimize the risk of introduction or spread of noxious and invasive weeds.

4.1.2.5.7 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of this alternative would not increase the risk of introduction or spread of invasive or noxious weeds. Existing occurrences of noxious weeds would persist and may spread. New occurrences may be introduced along existing roads or at other locations. Treatment of these occurrences would depend on action by the BLM or other entities with an interest in controlling noxious weeds. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.6 *Wildlife and Fish Excluding Special Status Species*

4.1.2.6.1 Amphibians and Reptiles

Direct effects to reptiles and amphibians may include injury, mortality, or displacement from Project activities such as ground clearing, traffic on access roads, or overland travel across undisturbed habitats. Project construction could reduce the suitability of habitats used by these species. Increased human presence could cause temporary indirect effects to amphibian and reptile species from Project-related trash attracting predators and increasing predation of amphibians and reptiles. Operations and maintenance activities such as road and overland travel could cause direct or indirect effects, including

injury or mortality and degradation of habitat. An increase in raptor perches from structures such as transmission line poles and communication towers could increase predation of amphibians and reptiles.

4.1.2.6.1.1 Proposed Action

The large majority of Project disturbance would be on the playa (**Section 4.1.2.3**), which does not provide suitable habitat for amphibians or reptiles. Outside the playa, disturbance of wetlands and riparian habitats would generally be avoided, which would minimize the risk of effects to amphibians. The only area where wetlands and riparian areas would be affected is at the Drop Structure and around the Sevier River diversion. These areas currently provide poor quality habitat because of the intermittent availability of water, and high level of salts in the soil and water. Minimal effects to amphibians are predicted based on their low numbers and the limited amount of poor quality habitat that would be disturbed.

The proposed action includes the acquisition of an average of about 50,000 acre-feet of recharge water per year in dry years, which is likely to support more continuous flow of higher quality (cooler and lower salinity) water down the Sevier River. The increased availability of water is likely to lead to expansion of wetlands and riparian areas (**Section 4.1.2.4.1**). Water quality would likely improve, allowing aquatic species including amphibians to inhabit the Sevier River farther downstream than they do at present. Macroinvertebrate populations would likely become more abundant, providing a prey base for amphibians. These effects could benefit amphibians while the Project is in operation. However, once the Project is terminated and scheduled for decommissioning, acquired water would no longer be available and any benefit to amphibian habitats would cease.

Construction of Project facilities that are located off-playa (both on- and off-lease) has the potential to injure, kill, or displace reptiles and would degrade some suitable reptile habitat; however, large areas of suitable habitat would remain around the facilities. Implementation of the design features (**Appendix K**) would help limit loss and degradation of habitat and removal of individuals. Remaining habitats would continue to support reptiles, such that no population-level effects are expected.

4.1.2.6.1.2 Alternatives 1, 2, 3, and 4

Amphibian habitats are not present along Alternative 1 (Segment T5), Alternative 2 (Segment T6), Alternative 3 (Segment G7), Alternative 4 (Segment G8), or the equivalent parts of the proposed action (Segments T1, T5, G2, and G5, respectively); therefore, neither the alternative or proposed segments would have direct or indirect effects on amphibians.

The proposed action is located in undisturbed habitat that is likely higher quality habitat for reptiles than the equivalent segments of Alternatives 1, 2, and 4, which follow existing roads. However, each of the alternative segments are longer and would disturb a larger area of habitat. Alternatives 1 and 2 would also require more power line structures, increasing perching opportunities for predators, which could increase predation on reptiles. While the proposed action would affect a slightly smaller total area than Alternative 4, construction of Segment G8 would disturb higher quality habitat and may have a higher risk of injury or mortality to reptiles.

Alternative 3 and the proposed action are both located in undisturbed reptile habitat. Effects to reptiles from Alternative 3 would be similar to the proposed action because the extent of temporary and permanent disturbance and the quality of habitats are the same.

4.1.2.6.1.3 Alternative 5 - Sevier River Diversion

Alternative 5 would have a lower potential for direct and indirect effects to amphibians compared to the proposed action because it would move most of the disturbance associated with construction of the diversion out onto the playa, which is not suitable amphibian habitat, and away from the poor-quality habitat at the location of the proposed action. No difference in effects to reptiles from implementation of Alternative 5 or the proposed action is expected because both would be constructed primarily on the playa and playa margins, which provide unsuitable or poor quality habitat.

4.1.2.6.1.4 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the no action alternative would not cause any new direct or indirect effects to amphibians or reptiles. Current habitats for amphibians and reptiles would be maintained. Recharge water would not be acquired and sent down the Sevier River to the playa. Wetland and riparian habitats, which may support amphibians, would remain in their current condition and would not expand or be improved. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.6.2 Fish

Potential effects to fish include changes in the quality or quantity of water in aquatic habitats, which would affect the suitability of these areas.

4.1.2.6.2.1 Proposed Action

The potential direct and indirect effects of the Project on aquatic habitat are limited to the Sevier River upstream of the playa. With the exception of acquisition of recharge water, none of the Project facilities or activities would affect fish because of the lack of suitable habitat. The proposed action includes the acquisition of an average of about 50,000 acre-feet of recharge water per year in dry years, which is likely to support more continuous flow of higher quality water down the Sevier River. The increased availability of water is likely to lead to improvement and expansion of aquatic habitats during operation of the Project. Water quality would likely improve, allowing aquatic species including fish to inhabit the Sevier River farther downstream than they currently do. Macroinvertebrate populations would likely become more abundant, providing a prey base for fish. These effects could benefit fish within and upstream of the analysis area during Project operations; however, once the Project is decommissioned, any benefits to fish would quickly decline and eventually cease and habitat would return to the present state.

4.1.2.6.2.2 Alternatives 1, 2, 3, and 4

Aquatic habitats capable of supporting fish do not exist in or adjacent to the segments associated with Alternatives 1, 2, 3, or 4 or their equivalent segments from the proposed action; therefore, none of these segments would have direct or indirect effects on fish.

4.1.2.6.2.3 Alternative 5 - Sevier River Diversion

No difference in the effects to fish are expected between Alternative 5 and the proposed action for the Sevier River diversion because of the low quality of aquatic habitat in this area. The need for acquired recharge water would be the same for Alternative 5 and the proposed action; therefore, the potential benefits to aquatic habitat and fish would be the same.

4.1.2.6.2.4 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the no action alternative would not cause any new direct or indirect effects to aquatic habitat or fish. Current habitats for fish would be maintained. Recharge water would not be acquired and sent down the Sevier River to the playa. Aquatic habitats, which may support fish, would remain in their current condition and would not expand or be improved. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.6.3 Bats

Direct and indirect effects to bats could include mortality or injury from bat collisions with construction vehicles/equipment during early morning commutes, construction work taking place at night or operational activities (for example, hauling of products to the Rail Loadout Facility during night hours). If construction or operational activities take place at night, direct and indirect effects may also include displacement of bats from foraging areas (for example, from wetlands near the Sevier River inlet) caused

by increased activity, noise, and vibration. These effects are expected to be minor and are unlikely to affect bats at the population level because of the lack of large roosting sites in and near the analysis area.

4.1.2.6.3.1 Proposed Action

There are concerns that increased surface water (in the form of brine) from the proposed action could attract bats to the playa. Consumption of hypersaline brine from preconcentration ponds, purge brine ponds, production ponds, and associated canals and trenches could cause salt toxicity. However, based on current information, it is unknown to what extent bat populations would be affected. Salinity levels in the extraction system, preconcentration ponds, production ponds, and Waste Product Storage Area are expected to be generally above a level that would support aquatic insects. This hypersaline water is not expected to support forage for bats, and bats are not expected to be attracted to them. Potential effects would be mitigated by implementation of the AWMP (CPM 2019a), including the Brine Pond Stepped Monitoring and Mitigation Plan. This plan would require monitoring to document and track bat presence and use patterns associated with brine ponds, trenches, and canals, as well as require necropsy of bat carcasses found within the analysis area to determine the cause of death (for example, salt toxicity, drowning, etc.). The intent of this monitoring is to identify and address unforeseen effects and make operational adjustments, as appropriate.

The use of guy wires on the power and communication lines may increase the risk of bat collisions with the lines. About five percent (93 of 1,773 total structures) would have guy wires. Because of this potential increased risk, all guy wires would be marked and would include bird flight diverters as design features (**Figure L-15**), which would further reduce the risk of collision. In addition, bat's echolocation abilities further suggest a reduced risk of collision. Considering bat echolocation abilities, the low percentage of guy wire application, as well as the integration of design features on all guy wires, the risk of collision by bats with the guy wires would be minimal.

The proposed action may cause some adverse direct and indirect effects to bats (for example, mortality, injury from collisions, or displacement caused by noise) (CH2M HILL 2015c). These effects are expected to be minor and are unlikely to affect bats at the population-level because of the lack of large roosting sites within and near the analysis area. Implementation of design features listed in **Appendix K**, including monitoring and adaptive management, would reduce potential risks to bats.

The more continuous flow of water down the Sevier River (from acquired recharge water) while the Project is in operation would improve water quality, allowing aquatic species to inhabit the Sevier River farther downstream. Macroinvertebrate populations would likely be more abundant, providing a prey base for bats, and the more regular presence of fresh water could increase the extent of riparian habitats. These effects could positively influence bat populations within and upstream of the analysis area by providing additional foraging resources; however, it is uncertain if foraging or roosting sites currently limit bat populations. Once the Project is terminated and scheduled for decommissioning, acquired water would no longer be available and any benefit to bat habitats would cease.

4.1.2.6.3.2 Alternatives 1, 2, 3, and 4

No suitable foraging or roosting habitats exist in or adjacent to the segments associated with Alternatives 1, 2, 3, or 4 or their equivalent segments from the proposed action; therefore, the potential effects of these alternatives would be the same as for the proposed action.

4.1.2.6.3.3 Alternative 5 - Sevier River Diversion

Bats could potentially forage along the Sevier River. If night work takes place at this site, Alternative 5 and the proposed action both could cause temporary effects to bats including stress and displacement from construction-related noise or vehicle-related mortality. Permanent effects from implementation of Alternative 5 could include establishment of a larger area of riparian habitat along the Sevier River compared to the proposed action. The increased riparian habitat could lead to increased abundance of invertebrate species and the prey base for bats over time.

4.1.2.6.3.4 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the no action alternative would not cause any new direct or indirect effects to bats. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.6.4 Big Game

The analysis of effects for big game only addresses pronghorn antelope. Mule deer and elk are not addressed because their use of the analysis area is expected to be transient and because UDWR has not designated any crucial ranges for these species in the analysis area.

4.1.2.6.4.1 Proposed Action

The proposed action would directly disturb 662.7 acres of shrub-steppe vegetation, which would reduce or eliminate the suitability of these areas for pronghorn. Interim reclamation would return some of this area (133.0 acres) to suitable habitat for pronghorn. Following decommissioning of the Project and final reclamation, this entire area would again provide habitat for pronghorn. Direct effects to vegetation in designated crucial pronghorn range along proposed ROWs are not expected to be as high as shown in **Section 4.1.2.3** because of the following factors:

- New road construction would not be required for access along most proposed ROWs. Vegetation in these areas would be crushed, but not cleared or uprooted, which would allow for quicker regrowth following construction.
- Total direct disturbance from construction on linear ROWs was calculated using the entire length and width of the ROW; however, actual disturbance is likely to be less. Vegetation is anticipated to remain in undisturbed portions of the ROWs.

The direct and indirect effects of construction include potential mortality or injury from vehicle collisions during daily construction commutes, operation of equipment during construction and operational traffic (for example, product transportation from the Processing Facility to the Rail Loadout Facility, operation of the Rail Spur, daily operational traffic along access and Perimeter roads, and during commutes to the Project along general and Project access roads and highways). Additional direct and indirect effects would include displacement of pronghorn from habitat adjacent to active construction areas and operating Project facilities (for example, the Processing Facility and Rail Loadout Facility) caused by increased noise levels, increased human presence, and potential reduction of available surface water from the drawdown of groundwater aquifers.

Adverse permanent effects are not expected from displacement of pronghorn within the analysis area because of the large areas of adjacent, undisturbed suitable habitat. In addition, design features listed in **Appendix K** would minimize effects to pronghorn. Design feature 14 would require speed limits for Project traffic, minimizing collision risk. Design feature 107 would require that all fences meet BLM standards, which are designed to allow safe passage of pronghorn. The drawdown of groundwater would have minimal effects to surface water (Whetstone and ENValue 2019). In addition, CPM would be required to replace any water resources that are lost or adversely affected by the Project (special lease stipulation 8, **Appendix E**). A water monitoring plan (CPM 2019n) has been developed and implemented to ensure any effects to water resources are detected and addressed appropriately.

4.1.2.6.4.2 Alternative 1 - 69-kV Power and Communication Line, North End

Alternative 1 (Segment T5) would disturb 38.5 additional acres of mixed salt desert scrub habitat and 0.5 additional acres of semi-desert shrub-steppe habitat compared to the proposed action (Segment T1), which could be used by pronghorn for foraging. Fragmentation and displacement would be minimized from implementation of Alternative 1, because it would parallel existing roads.

4.1.2.6.4.3 Alternative 2 - 69-kV Power and Communication Line, South End

Alternative 2 would disturb 56.4 additional acres of foraging habitat (mixed salt desert scrub) compared to the proposed action. However, the proposed action would disturb 17.8 acres of additional mixed salt desert scrub foraging habitat compared to Alternative 2. Even though a higher amount of foraging habitat would be affected by Alternative 2, adverse effects including fragmentation and displacement would be minimized because Segment T6 would parallel existing roads.

4.1.2.6.4.4 Alternative 3 - Natural Gas Pipeline, Black Rock

Alternative 3 (Segment G7) and the proposed action (Segment G2) would affect similar acreages of foraging habitat; therefore, potential effects to pronghorn would be the same.

4.1.2.6.4.5 Alternative 4 - Natural Gas Pipeline, West End

Alternative 4 would disturb 8.9 additional acres of semi-desert shrub-steppe foraging habitat (compared to the proposed action. However, the proposed action (Segment G5) would disturb an additional 8.6 acres of mixed salt desert scrub foraging habitat compared to the alternative action. Even though a slightly higher amount of foraging habitat would be affected by Alternative 4, adverse effects including fragmentation and displacement would be minimized because Segment G8 would parallel existing roads.

4.1.2.6.4.6 Alternative 5 - Sevier River Diversion

Alternative 5 and the proposed action for the Sevier River diversion would be constructed primarily within the barren playa outside of pronghorn habitat; therefore, neither Alternative 5 nor the proposed action would affect pronghorn.

4.1.2.6.4.7 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the no action alternative would not cause any new direct or indirect effects to big game. Current habitats for big game would be maintained. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.7 *Migratory Birds*

Specific groups of migratory birds that are addressed include waterfowl and shorebirds, raptors, and passerines.

4.1.2.7.1 Waterfowl and Shorebirds

This section analyzes potential effects to non-listed waterfowl and shorebirds as well as BCC Region 9 waterfowl and shorebirds identified in Table 6 in the Biology Report (eared grebe, long-billed curlew, marbled godwit, and snowy plover). Avian surveys performed by CH2M HILL (2013, 2014) and SWCA (2018b) indicated relatively low use of the analysis area by waterfowl and shorebirds. The largest presence of waterfowl and shorebirds within and near the analysis area was at the mouth of the Sevier River and near freshwater sources such as lakes or wetlands.

4.1.2.7.1.1 Proposed Action

The proposed action could cause temporary displacement of waterfowl and shorebirds from construction activities (for example, construction noise, and human presence) in or adjacent to suitable habitat. The primary area where wetland or riparian habitat would be affected, and where waterfowl could be displaced, would be in the area where the Sevier River enters the playa and the diversion would be constructed. However, based on the results of surveys conducted by CH2M HILL (2014) and SWCA (2018b), the lack of high-quality habitat, low prey base, and implementation of the design features listed in **Appendix K**, direct and indirect effects including habitat loss and displacement to waterfowl and shorebirds are expected to be minimal, even in the area of the diversion. In addition, adaptive management measures identified within the AWMP (CPM 2019a) would further track and respond to waterfowl and shorebird management issues. As a result, population-level effects are not expected.

The use of guy wires on the power and communication lines may increase the risk of avian collisions with the lines. About five percent (93 of 1,773 total structures) would have guy wires. Because of the increased risk, all guy wires would be marked and would include bird flight diverters as design features (Figure L-15), which would further reduce the risk of collision. Considering the relatively low existing and anticipated use of the analysis area by waterfowl and shorebirds, the low percentage of guy wire application, as well as the integration of design features on all guy wires, the risk of collision by waterfowl and shorebirds with the guy wires would be minimal.

The acquisition of recharge water and increased consistency of water flows may improve existing wetlands and riparian areas along the Sevier River. The increase in open water within the playa from construction of preconcentration ponds, production ponds, the Purge Brine Storage Pond, and associated canals and trenches could attract migratory birds including waterfowl and shorebirds to the area. Brine shrimp may be able to survive and reproduce in the recharge system (Section 6.5.1 in the Biology Report). They may also be able to survive, but not reproduce, in the extraction system and first preconcentration pond. The presence of brine shrimp may provide another attractant to migratory birds.

A concern has been raised that hypersaline brine could cause adverse effects to waterfowl and shorebirds including salt encrustation, hypothermia, and drowning. It should be noted that the areas most likely to attract waterfowl and shorebirds would have fresher water and presence of forage or prey such as brine shrimp. Areas with hypersaline brine would not support brine shrimp or plant life; thus, although they may initially attract migratory birds, these areas would not contain any resources that would cause birds to stay in the area, which would reduce the risk of adverse effects.

The AWMP (CPM 2019a), including the Brine Pond Stepped Monitoring and Mitigation Plan, would require CPM to monitor for and adaptively manage potential adverse effects to waterfowl and shorebirds from hypersaline brine. Indicators of increased injury or mortality would be documented and additional mitigation (for example, use of avian deterrents) would be employed to reduce hazards to waterfowl and shorebirds as needed. Implementation of the AWMP, along with other design features listed in **Appendix K** would reduce potential indirect and direct adverse effects to waterfowl and shorebirds.

4.1.2.7.1.2 Alternatives 1, 2, 3, and 4

No aquatic features, such as open water, wetlands, or riparian habitats, are present within or adjacent to temporary or permanent disturbance areas from Project components associated with Alternatives 1, 2, 3, or 4, or the proposed action segments that these alternatives would replace; therefore, effects to waterfowl or shorebirds would be the same as those described for the proposed action.

4.1.2.7.1.3 Alternative 5 - Sevier River Diversion

The largest proportion of waterfowl and shorebirds observed in the analysis area was near freshwater sources such the inlet of the Sevier River, where water is lower in total dissolved solids (TDS). Potential temporary direct and indirect effects to waterfowl and shorebirds include disturbance and displacement from construction-related noise, vehicle-related mortality, and increased predation. These effects would be reduced by implementation of Alternative 5 because the Diversion Channel would be constructed further downstream from the location of the proposed Diversion Berm. This would place construction and operational disturbance a greater distance from higher quality foraging habitat that exists within the riparian habitat and areas of the Sevier River channel that may contain larger amounts of open water and a larger prey base.

4.1.2.7.1.4 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the No Action alternative would not cause any new direct or indirect effects to waterfowl and shorebirds. Current habitats would be maintained. New features containing brine would not be developed, eliminating the risk to waterfowl and shorebirds. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.7.2 Raptors

This section analyzes potential effects to non-listed raptor species and BCC Region 9 raptors identified in Table 6 in the Biology Report (bald eagle, ferruginous hawk, golden eagle, and peregrine falcon). Effects to other raptors that are not specifically mentioned (for example, red-tailed hawks or prairie falcons) would be same.

4.1.2.7.2.1 Golden Eagle and Peregrine Falcon

4.1.2.7.2.1.1 Proposed Action

Direct and indirect effects to these raptors include potential displacement from occupied nests; mortality or injury from collision with power lines, construction equipment, or Project facilities; and loss of foraging habitat caused by construction noise and human presence. Various raptor nests (including unoccupied golden eagle nests) have been documented in the analysis area (Section 6.5.2 in the Biology Report). The closest occupied golden eagle nest observed during the 2013 and/or 2014 raptor surveys (CH2M HILL 2014) was approximately 0.8 miles from the 69-kV Power and Communication Line. Construction of the proposed action could stress nesting birds or cause abandonment of nests; however, this potential effect would be minimized by implementation of species-specific nest avoidance buffers and timing limitations described in **Appendix K**.

The peregrine falcon may occasionally forage within all existing ROWs and on-lease lands (excluding the barren playa) and may pass through during migration; however, they are not expected to breed within the analysis area due to lack of nesting habitat; therefore, no adverse effects are expected to nesting activities during construction.

Adverse effects could also include injury or mortality from salt ingestion by foraging on carrion affected by salt toxicity. The extent of secondary salt toxicosis from feeding on salt-encrusted carrion would depend on the extent of primary salt toxicosis in waterfowl, shorebirds, or other wildlife. However, the potential for secondary salt toxicosis to golden eagles and peregrine falcons would be minimized through implementation of design features described in **Appendix K** and the AWMP (CPM 2019a), which requires the removal of all wildlife carcasses located during monitoring.

All power and communication lines (including related facilities such as substations) would be designed to minimize the potential for avian interactions with such facilities (**Appendix K**). Nevertheless, the increase in the extent of power lines would pose an increased risk of collision or electrocution to raptors including the golden eagle and peregrine falcon. All power lines would include angle and dead-end structures with supporting guy wires to stabilize the power lines. About five percent (93 of 1,773 total structures) would have guy wires. There is no published information to suggest that guyed power line structures pose a substantially higher collision risk for golden eagles or peregrine falcons compared with un-guyed structures. PacifiCorp has surveyed over 120,000 poles in six states and has not found collision victims at any of the guyed structures (APLIC 2012). However, design features (Figure L-15) have been included for structures with guy wires to reduce potential for collision to migratory birds and other wildlife. Considering the lack of evidence of the risk of guy wires to raptors, as well as the integration of design features, the risk of collision by golden eagles and peregrine falcons with the guy wires would be minimal.

Mortality or injury from collision with trucks performing operational activities such as product transportation from the Processing Facility to the Rail Loadout Facility would be minimized by implementation of Project-specific speed limits and other design features in **Appendix K**.

Temporary and permanent loss of foraging habitat from development of Project components and displacement from noise and human presence during construction and operations may discourage raptors from foraging near the analysis area. The playa is not considered foraging habitat because of the lack of vegetation and prey resources. The extent of short-term and long-term habitat loss is provided in **Tables 4.1.2-1, 4.1.2-2,** and **4.1.2-3**. In summary, the Project would cause the short-term loss of 198.6 acres and long-term loss of 1,329.1 acres of foraging habitat. This represents a total loss of 2.7 percent of the

available foraging habitats in the analysis area. Population level effects are not expected because of the large amount of remaining undisturbed foraging habitat within and adjacent to the analysis area. Effects to raptors are expected to be minor with no population level effects because of implementation of design features (**Appendix K**), including the AWMP (CPM 2019a).

4.1.2.7.2.1.2 Alternative 1 - 69-kV Power and Communication Line, North End

Alternative 1 (Segment T5) is 3.6 miles longer than the proposed action (Segment T1). This additional length would slightly increase the collision and electrocution risk relative to the proposed action. Potential refuse from construction of Alternative 1 could attract wildlife along existing roads and slightly increase the risk of vehicle-related wildlife mortalities, increasing foraging opportunities for carrion. This could potentially have a small increase of vehicle collision risks to raptors foraging for carrion. The risk of adverse effects to raptors would be slightly greater from implementation of Alternative 1 than the proposed action. CPM has committed to implementing design features (**Appendix K**), including speed limits and removal of carrion to avoid attracting raptors, which would minimize this risk. Pending detailed engineering, Segment T5 would have an estimated four additional structures with guy wires, compared to Segment T1.

4.1.2.7.2.1.3 Alternative 2 - 69-kV Power and Communication Line, South End

Alternative 2 (Segment T6) is 3.3 miles longer than the proposed action (Segment T3). This additional length would slightly increase the collision and electrocution risk relative to the proposed action. Potential refuse from construction of Alternative 2 could attract wildlife along existing roads and slightly increase the risk of vehicle-related wildlife mortalities, increasing foraging opportunities for carrion. This could potentially have a small increase of vehicle collision risks to raptors foraging for carrion. The risk of adverse effects to raptors would be slightly greater from implementation of Alternative 2 than the proposed action. CPM has committed to implementing design features (**Appendix K**), including speed limits and removal of carrion to avoid attracting raptors, which would minimize this risk. Pending detailed engineering, Segment T6 would have an estimated five additional structures with guy wires, compared to Segment T3.

4.1.2.7.2.1.4 Alternative 3 - Natural Gas Pipeline, Black Rock

There would be direct disturbance of 8.6 acres of raptor foraging habitat from Alternative 3 (Segment G7) and slightly smaller direct disturbance of 8.5 acres from the proposed action (Segment G2). The additional loss of raptor foraging habitat along Alternative 3 is not expected to cause measurably different effects compared to the proposed action. Alternative 3 (Segment G7) would be closer to existing transmission lines to the north and west. Though unlikely, noise from construction activities of Segment G7 could have a slightly higher effect on raptor nests or displacement of raptors from foraging sites along the existing transmission lines.

4.1.2.7.2.1.5 Alternative 4 - Natural Gas Pipeline, West End

There would be direct disturbance to 21.7 acres of raptor foraging habitat from Alternative 4 (Segment G8), which is slightly higher then direct disturbance (18.6 acres) from the proposed action (Segment G5). Potential refuse along Segment G8 from construction activities along Crystal Peak Road could attract wildlife to the area causing a slight increase in vehicle-related mortalities due to increased foraging opportunities on carrion. This could attract and encourage golden eagles to forage within road corridors, increasing the probability of vehicle collisions. CPM has committed to implementing design features (**Appendix K**), including speed limits and removal of carrion to avoid attracting raptors, which would minimize this risk.

4.1.2.7.2.1.6 Alternative 5 - Sevier River Diversion

Alternative 5 and the proposed action would be constructed primarily within the barren playa outside of preferred raptor habitat; therefore, implementation of Alternative 5 or the proposed action is not likely to cause different temporary effects to golden eagles or peregrine falcons. Alternative 5 may increase the area where riparian habitat could be established, compared to the proposed action. This additional habitat could promote increased foraging opportunities and prey abundance.

4.1.2.7.2.1.7 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the No Action alternative would not cause any new direct or indirect effects to raptors. Current habitats would be maintained. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.7.2.2 Bald Eagle and Ferruginous Hawk

Bald eagles are not expected to breed within the analysis area but could forage or roost along all Project components outside the playa. Ferruginous hawks could breed within limited nesting habitat (pinyon-juniper woodlands, utility structures, cliffs, and isolated trees).

4.1.2.7.2.2.1 Proposed Action

Potential direct and indirect effects to bald eagles include collision with power lines, construction and operational vehicles, or equipment while foraging for carrion and displacement from roosting sites caused by Project-related noise and human presence. Implementation of design features listed in **Appendix K** would reduce potential effects to bald eagles from collision. No population-level effects are expected.

Adverse effects could also include injury or mortality from salt ingestion by foraging on carrion affected by salt toxicity. The extent of secondary salt toxicosis from feeding on salt-encrusted carrion would depend on the extent of effects of primary salt toxicosis on waterfowl, shorebirds, or other wildlife. However, the potential for secondary salt toxicosis to bald eagles would be minimized through implementation of design features described in **Appendix K** and the AWMP (CPM 2019a), which requires the removal of all wildlife carcasses located during monitoring.

Potential direct and indirect effects to ferruginous hawks include risk of collision with power lines and construction vehicles while foraging, and stress and abandonment of nests from construction-related noise and increased human presence. Loss of potential nesting habitat would be minimal (9.9 acres of the 720 acres available in the analysis area, or 1.4 percent). Direct and indirect effects to ferruginous hawks are not expected with implementation of design features listed in **Appendix K**.

All power and communication lines (and related facilities such as substations) would be designed to minimize the potential for avian interactions (**Appendix K**). Nevertheless, the increase in the extent of power lines would pose an increased risk of collision or electrocution to raptors including the bald eagle and ferruginous hawk. All power lines would include angle and dead-end structures with supporting guy wires to stabilize the power lines. About five percent (93 of 1,773 total structures) would have guy wires. There is no published information to suggest that guyed power line structures pose a substantially higher collision risk for bald eagles and ferruginous hawks compared with un-guyed structures. PacifiCorp has surveyed over 120,000 poles in six states and has not found collision victims at any of the guyed structures (APLIC 2012). However, design features (**Figure L-15**) have been included for structures with guy wires to reduce potential for collision to migratory birds and other wildlife. Considering the lack of evidence of the risk of guy wires to raptors, as well as the integration of design features, the risk of collision by bald eagles and ferruginous hawks with the guy wires would be minimal.

Mortality or injury from collision with vehicles performing operational activities such as product transportation from the Processing Facility to the Rail Loadout Facility would be minimized through implementation of speed limits (**Appendix K**). Stress or abandonment of active raptor nests during construction are not expected based on implementation of species-specific nest avoidance buffers described in **Appendix K**.

4.1.2.7.2.2.2 Alternative 1 - 69-kV Power and Communication Line, North End

The additional length of the power line associated with Alternative 1 (Segment T5) could increase collision and electrocution risks compared with the proposed action (Segment T1). Additional power line structures would increase foraging and roost sites for both bald eagles and ferruginous hawks and increase nesting opportunities for ferruginous hawks. Increased refuse from construction of Alternative 1 could

increase vehicle related wildlife mortalities, increasing foraging opportunities on carrion. This could attract and encourage bald eagles to forage within road corridors and may increase the risk of vehicle collision for bald eagles foraging for carrion. CPM has committed to implementing design features (**Appendix K**), including speed limits and removal of carrion to avoid attracting raptors, which would minimize this risk.

4.1.2.7.2.2.3 Alternative 2 - 69-kV Power and Communication Line, South End

The additional length of the power line associated with Alternative 2 (Segment T6) could increase collision and electrocution risks compared with the proposed action (Segment T3). Additional structures would increase perch sites for foraging and roosting raptors, as well as potential nesting opportunities for ferruginous hawks. Alternative 2 would parallel existing roads and may increase the risk of vehicle collision for bald eagles foraging for carrion along these roads, compared to the proposed action. Increased refuse from construction of Alternative 2 along Crystal Peak Road and the Power Line Access Road could increase vehicle related wildlife mortalities, increasing foraging opportunities on carrion. This could attract and encourage bald eagles to forage within road corridors. CPM has committed to implementing design features (**Appendix K**), including speed limits and removal of carrion to avoid attracting raptors, which would minimize this risk.

4.1.2.7.2.2.4 Alternative 3 - Natural Gas Pipeline, Black Rock

There would be a similar loss of raptor foraging habitat (potentially used by ferruginous hawks) from Alternative 3 (Segment G7) or the proposed action (Segment G2). Alternative 3 is closer to an existing transmission line. Though unlikely, noise from construction of Segment G7 may have a slightly higher potential to affect bald eagle roosting sites and ferruginous hawk nesting opportunities along the existing transmission line to the north, compared to the proposed action.

4.1.2.7.2.2.5 Alternative 4 - Natural Gas Pipeline, West End

There would be a greater loss of raptor foraging habitat (potentially used by ferruginous hawks) with implementation of Alternative 4 (Segment G8) compared to the proposed action (Segment G5). There could be a higher potential of bald eagle and ferruginous hawk mortality or injury from vehicle collisions with implementation of Alternative 4. Increased refuse from Segment G8 construction activities along Crystal Peak Road could attract wildlife to the area and increase vehicle-related wildlife mortalities. This would potentially increase foraging opportunities on carrion, attracting and encouraging bald eagles to forage within road corridors. CPM has committed to implementing design features (**Appendix K**), including speed limits and removal of carrion to avoid attracting raptors, which would minimize this risk.

4.1.2.7.2.2.6 Alternative 5 - Sevier River Diversion

Alternative 5 and the proposed action for the Sevier River diversion would be constructed predominantly in the barren playa and would not affect current foraging or roosting opportunities for bald eagles and ferruginous hawks.

4.1.2.7.2.2.7 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the No Action alternative would not cause any new direct or indirect effects to the bald eagle or ferruginous hawk. Current habitats would be maintained. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.7.3 Passerines

This section analyzes potential effects to the five passerine species on the BCC or PIF lists (black swift, Brewer's sparrow, loggerhead shrike, sage sparrow, and sage thrasher) that were documented in the analysis area (Table 6 in the Biology Report). These species are analyzed together as they would be susceptible to similar direct and indirect effects; however, effects to their habitats are analyzed separately as they do not share the same habitat preferences.

4.1.2.7.3.1 Proposed Action

Direct and indirect effects to passerines may include mortality or injury from collision with construction vehicles, power and communication lines, or communication towers. Increased noise levels from construction or operational activities could also cause temporary stress, nest abandonment, or displacement of individuals into adjacent habitats, increasing competition for resources. Clearing of vegetation during construction could affect passerine nests. These potential adverse effects would be minimized by implementation of the design features in **Appendix K**.

Black swifts may rarely pass through the analysis area during migration, but are not expected to occur during the breeding season because of a lack of suitable nesting habitat; therefore, nests would not be affected.

The proposed action would cause 1,083.9 acres of permanent disturbance and 152.0 acres of temporary disturbance to Brewer's sparrow habitats, which includes semi-desert shrub steppe, mixed salt desert scrub, greasewood flat, sagebrush shrublands, and pinyon-juniper vegetation cover types. There are 50,265 combined acres of these habitats in the analysis area; therefore, the Project would disturb about 2.5 percent of the existing habitats for Brewer's sparrow. No population level effects to Brewer's sparrows are expected because of the small proportion of total existing habitats that would be temporarily or permanently disturbed.

The proposed action would cause 36.8 acres of permanent disturbance and 3.2 acres of temporary disturbance to preferred habitat (sagebrush shrubland) for the sage sparrow. The majority of direct disturbance of sagebrush shrubland would include potential widening and maintenance along access roads associated with the Natural Gas Pipeline. There are 3,793 acres of sagebrush shrubland in the analysis area; therefore, the Project would disturb about 1.1 percent of the existing habitats for the sage sparrow. No population level effects to the sage sparrow are expected because of the small proportion of total existing sagebrush shrubland that would be temporarily or permanently disturbed.

The proposed action would cause a total of 1,074.0 acres of permanent disturbance and 147.0 acres of temporary disturbance to preferred loggerhead shrike habitat (semi-desert shrub steppe, mixed salt desert scrub, greasewood flat, and sagebrush shrubland). There are 49,545 acres of these habitats in the analysis area; therefore, the Project would disturb about 2.5 percent of the existing habitats for the loggerhead shrike. No population level effects to the loggerhead shrike are expected because of the small proportion of its total existing habitats that would be temporarily or permanently disturbed.

The proposed action would cause direct permanent disturbance of 533.1 acres and temporary disturbance of 58.2 acres of greasewood and sagebrush shrubland, which are preferred habitats for sage thrashers. There are 18,805 acres of these habitats in the analysis area; therefore, the Project would disturb about 3.1 percent of the existing habitats for the sage thrasher. No population level effects to the sage thrasher are expected because of the small proportion of its total existing habitats that would be temporarily or permanently disturbed.

The use of guy wires on the power and communication lines may increase the risk of avian collisions with the lines. About five percent (93 of 1,773 total structures) would have guy wires. Because of the risk, all guy wires would be marked and would include bird flight diverters as design features (Figure L-15, Appendix L in the EIS), which would further reduce the risk of collision. Considering the low percentage of guy wire application and the integration of design features on all guy wires, the risk of collision by passerines with the guy wires would be minimal.

4.1.2.7.3.2 Alternative 1 - 69-kV Power and Communication Line, North End

A potential indirect effect from Alternative 1 (Segment T5) would be a slightly greater risk of collision with power lines because of its increased length and the estimated four additional guyed structures, compared to the proposed action (Segment T1). Alternative 1 would affect 15.8 additional acres of Brewer's sparrow habitat compared to the proposed action. Alternative 1 would disturb 54.3 additional acres of loggerhead shrike habitat compared to the proposed action. Alternative 1 would disturb 15.3

additional acres of sage thrasher habitat compared to the proposed action. Although Alternative 1 would disturb more habitat for these species, it is likely that habitat quality along Alternative 1 is lower compared to the proposed action because Segment T5 parallels existing roads. The proposed action, though shorter, may have a greater effect on high quality habitat than Alternative 1 because Segment T1 crosses habitats that are currently undisturbed.

4.1.2.7.3.3 Alternative 2 - 69-kV Power and Communication Line, South End

A potential indirect effect from Alternative 2 (Segment T6) would be a slightly greater risk of collision with power lines because of its increased length and the estimated five additional guyed structures, compared to the proposed action (Segment T3). Alternative 2 would disturb 37.2 additional acres of Brewer's sparrow habitat compared to the proposed action. Alternative 2 would affect 28.1 additional acres of loggerhead shrike habitat compared to the proposed action. The proposed action would disturb 10.5 additional acres of sage thrasher habitat compared to Alternative 2. In addition, habitat along Alternative 2 is likely of lower quality, especially where it parallels Crystal Peak Road.

4.1.2.7.3.4 Alternative 3 - Natural Gas Pipeline, Black Rock

Alternative 3 (Segment G7) would cause 2.5 fewer acres of disturbance to Brewer's sparrow habitat compared to the proposed action (Segment G2). Alternative 3 would cause 2.1 fewer acres of disturbance to loggerhead shrike habitat compared to the proposed action. The proposed action would cause direct disturbance to 0.9 additional acres of sage thrasher habitat compared to Alternative 3.

4.1.2.7.3.5 Alternative 4 - Natural Gas Pipeline, West End

Alternative 4 (Segment G8) would disturb an additional 5.9 acres of Brewer's sparrow habitat compared to the proposed action (Segment G5). Alternative 4 would disturb 3.2 fewer acres of loggerhead shrike habitat compared to the proposed action. The proposed action would cause disturb 3.0 more acres of sage thrasher habitat than Alternative 4.

4.1.2.7.3.6 Alternative 5 - Sevier River Diversion

Brewer's sparrows were identified near the Sevier River inlet during the 2018 point count surveys (SWCA 2018b). Alternative 5 would disturb an additional 1.6 acres of suitable habitat for Brewer's sparrow, compared with the proposed action. The proposed action would disturb less loggerhead shrike habitat than Alternative 5. No sagebrush shrubland habitat occurs along Alternative 5 or the proposed action for the Sevier River diversion; therefore, there would be no effects to sage sparrows, nor would there be any differences in potential effects between the proposed action and Alternative 5. The proposed action would affect an additional 0.5 acres of sage thrasher habitat compared to Alternative 5.

4.1.2.7.3.7 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the No Action alternative would not cause any new direct or indirect effects to passerines. Current habitats would be maintained. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.7.4 Greater Sage Grouse

Direct and indirect effects to greater sage grouse from the proposed action include potential loss of low quality habitat and potential injury or mortality during construction activities (for example, access road improvements or vegetation clearing).

4.1.2.7.4.1 Proposed Action

Suitable but low-quality greater sage grouse habitat in the analysis area is limited to the isolated patches of sagebrush along the ROW for the Natural Gas Pipeline and associated access roads east of SR 257. Adverse effects are not expected because of the limited amount of low quality habitat within the analysis area, the low probability of sage grouse occurring, and implementation of design features outlined in **Appendix K**.

4.1.2.7.4.2 Alternatives 1, 2, 3, 4, and 5

No sagebrush shrubland habitat occurs along Alternatives 1 through 5 or the equivalent segments of the proposed action; therefore, effects to greater-sage grouse would be the same as for the proposed action.

4.1.2.7.4.3 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the No Action alternative would not cause any new direct or indirect effects to the greater sage grouse. Current habitats would be maintained. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.8 *Special Status Species*

This section analyzes potential effects on BLM sensitive wildlife species with known or potential occurrence in the analysis area (Section 6.6.1 in the Biology Report), including the American white pelican, short-eared owl, burrowing owl, big free tailed bat, fringed myotis, Townsend's big-eared bat, western red bat, and kit fox.

4.1.2.8.1 American White Pelican

American white pelicans are not expected to breed or forage within the analysis area due to lack of food resources and breeding habitat but the playa could be used for staging for a short period during migration season. Any use of the playa would be temporary and of short duration; therefore, minimal direct or indirect effects from Project actions are anticipated.

4.1.2.8.1.1 Proposed Action

Direct and indirect effects would be limited to deterrence of staging behavior on the playa due to increased noise and human presence during construction and operational activities. However, adverse effects are not expected because of the low probability of species occurrence within the analysis area and implementation of design features (**Appendix K**) to minimize potential effects.

The use of guy wires on the power and communication lines may increase the risk of avian collisions with the lines. About five percent (93 of 1,773 total structures) would have guy wires. Because of the risk, all guy wires would be marked and would include bird flight diverters as design features (Figure L-15, Appendix L in the EIS), which would further reduce the risk of collision. Considering the relatively low use of the analysis area by pelicans, the low percentage of guy wire application, as well as the integration of design features on all guy wires, the risk of collision by American white pelicans with the guy wires would be minimal.

4.1.2.8.1.2 Alternatives 1, 2, 3, and 4

American white pelicans are not expected to breed, forage, or stage within or near Alternatives 1, 2, 3, or 4 or the equivalent segments of the proposed action because there is no suitable habitat in these areas.

4.1.2.8.1.3 Alternative 5 - Sevier River Diversion

Direct and indirect effects from Alternative 5 would be similar to the proposed action and are limited to disturbance from construction and operational-related noise. However, adverse effects are not expected because of the low probability of species occurrence within the analysis area and implementation of design features (**Appendix K**) to minimize potential effects.

4.1.2.8.1.4 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the No Action alternative would not cause any new direct or indirect effects to the American white pelican. Current habitats would be maintained. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.8.2 Short-eared Owl

Short-eared owls may forage along all ROWs but are not expected to nest within the analysis area. Direct and indirect adverse effects to the short-eared owl would be limited to collisions and loss of foraging habitat.

4.1.2.8.2.1 Proposed Action

Effects from collision are expected to be on an individual scale and minimal, based on implementation of design features (**Appendix K**) including speed limits for Project traffic. Temporary reduction or loss of the prey base along Project components is not expected to cause population level effects to short-eared owls because adjacent habitats would support sufficient foraging opportunities.

The use of guy wires on the power and communication lines may increase the risk of avian collisions with the lines. About five percent (93 of 1,773 total structures) would have guy wires. Because of the risk, all guy wires would be marked and would include bird flight diverters as design features (**Figure L-15**), which would further reduce the risk of collision. Considering the relatively low use of the analysis area by short-eared owls (foraging only), the low percentage of guy wire application, as well as the integration of design features on all guy wires, the risk of collision by short-eared owls with the guy wires would be minimal.

4.1.2.8.2.2 Alternatives 1 and 2

Short-eared owls may forage along Alternative 1 (Segment T5) and Alternative 2 (Segment T6), though this would be on a rare occasion as the existing roads may discourage owl presence and diminish foraging opportunities. Implementation of the proposed action (Segment T1 or T3) would affect a greater amount of high quality foraging habitat than Alternatives 1 or 2. The risk of collisions with construction vehicles could potentially be higher along the proposed action because of the higher quality of the habitat, which would increase the potential for owls to be present in this area.

4.1.2.8.2.3 Alternative 3 - Natural Gas Pipeline, Black Rock

Short-eared owls may forage along Alternative 3 (Segment G7) and the proposed action (Segment G2). Loss of foraging habitat would be similar for both Alternative 3 and the proposed action; therefore, potential effects to short-eared owls would be the same.

4.1.2.8.2.4 Alternative 4 - Natural Gas Pipeline, West End

Short-eared owls may forage along Alternative 4 (Segment G8), though this would be on a rare occasion as the existing road could discourage owl presence and diminish foraging opportunities. Even though the proposed action (Segment G5) would affect a smaller amount of vegetation, foraging habitat along the proposed action is likely of higher quality. The risk of collision with construction vehicles could potentially be higher along the proposed action (Segment G5) as owls could have a higher probability of being present because of the higher quality of the habitat.

4.1.2.8.2.5 Alternative 5 - Sevier River Diversion

Alternative 5 and the proposed action for the Sevier River diversion would be constructed primarily within the playa, which does not contain nesting or foraging habitat for short-eared owls; therefore, implementation of Alternative 5 or the proposed action would have similar, non-existent effects to short-eared owls.

4.1.2.8.2.6 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the No Action alternative would not cause any new direct or indirect effects to the short-eared owl. Current habitats would be maintained. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.8.3 Burrowing Owl

4.1.2.8.3.1 Proposed Action

Potential short-term effects (primarily during construction) to burrowing owls may include collision with construction vehicles, mortality or displacement from destruction of burrows, and stress and/or abandonment of nesting burrows from noise and increased human presence. Implementation of the design features listed in **Appendix K** and described in the AWMP (CPM 2019a), including pre-construction surveys and buffers, would minimize the potential for short-term effects, particularly displacement and loss of burrows. Once construction and interim reclamation are complete, the risk of displacement and burrow loss would be minimal because off-playa human activity would generally be limited to a few roads and the Processing and Rail Loadout Facilities.

The use of guy wires on the power and communication lines may increase the risk of avian collisions with the lines. About five percent (93 of 1,773 total structures) would have guy wires. Because of the risk, all guy wires would be marked and would include bird flight diverters as design features (**Figure L-15**), which would further reduce the risk of collision. Considering the low percentage of guy wire application as well integration of design features on all guy wires, the risk of collision by burrowing owls with the guy wires would be minimal.

Potential long-term effects from the proposed action may include collision from daily product transportation from the Processing Facility to the Rail Loadout Facility and operation of the Rail Spur. Direct and indirect effects to burrowing owls are not expected to cause population level effects due to implementation of design features listed in **Appendix K** and described in the AWMP (CPM 2019a).

4.1.2.8.3.2 Alternative 1 - 69-kV Power and Communication Line, North End

Alternative 1 (Segment T5) would disturb 39.3 acres of preferred habitat (mixed salt desert scrub), while the proposed action (Segment T1) would disturb 0.8 acres of mixed salt desert scrub. Even though burrowing owls could be discouraged from breeding along Alternative 1 due to disturbance along the existing roads, Alternative 1 would affect a greater amount of preferred habitat. Risks to burrowing owls from collisions with construction vehicles or burrow destruction would be higher along the proposed action due to higher potential for owl presence and increased overland travel through undisturbed suitable habitat.

4.1.2.8.3.3 Alternative 2 - 69-kV Power and Communication Line, South End

Alternative 2 (Segment T6) would disturb 9.3 acres of preferred habitat (mixed salt desert scrub) and the proposed action (Segment T3) would disturb 27.1 acres of mixed salt desert scrub. Burrowing owls are less likely to breed along Alternative 2 because of disturbance associated with the existing road. Risks to burrowing owls from collisions with construction vehicles or burrow destruction would be higher along the proposed action due to higher potential of owl presence and increased activity through undisturbed suitable habitat.

4.1.2.8.3.4 Alternative 3 - Natural Gas Pipeline, Black Rock

Alternative 3 (Segment G7) would disturb slightly more preferred habitat (0.8 acres of mixed salt desert scrub) compared to the proposed action (Segment G2) (0.4 acres mixed salt desert scrub). Alternative 3 would have a slightly higher probability of burrow destruction from overland travel due to the higher acreage of preferred habitat. Alternative 3 and the proposed action pose similar potential effects such as collision risk with construction vehicles.

4.1.2.8.3.5 Alternative 4 - Natural Gas Pipeline, West End

Alternative 4 (Segment G8) would disturb 0.1 acres of preferred habitat (mixed salt desert scrub) while the proposed action (Segment G5) would disturb more mixed salt desert scrub (8.7 acres). Burrowing owls are less likely to breed along Alternative 4 due to the minimal amount of preferred habitat and increased human presence and disturbance along the existing road that parallels the segment. Temporary risks to burrowing owl such as burrow destruction during construction would be higher along the proposed action due to higher potential of owl presence.

4.1.2.8.3.6 Alternative 5 - Sevier River Diversion

Alternative 5 and the proposed action for the Sevier River diversion would be constructed primarily within the barren playa, which does not contain preferred habitat for burrowing owls; therefore, implementation of Alternative 5 or the proposed action would have the same, minimal potential for effects.

4.1.2.8.3.7 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the No Action alternative would not cause any new direct or indirect effects to the burrowing owl. Current habitats would be maintained. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.8.4 Bats

This section analyzes the potential effects of the proposed action on the big free-tailed bat, fringed myotis, Townsend's big-eared bat, and western red bat. Direct and indirect effects to bats could include mortality or injury from collisions with construction vehicles/equipment during early morning commutes, construction work taking place at night or operational activities (for example, hauling of products to the Rail Loadout Facility during night hours). If construction or operational activities take place at night, direct and indirect effects may also include displacement of bats from foraging areas (for example, from wetlands near the Sevier River inlet) caused by increased activity, noise, and vibration. These effects are expected to be minor and are unlikely to affect bats at the population level because of the lack of large roosting sites in and near the analysis area.

4.1.2.8.4.1 Proposed Action

There are concerns that increased surface water (in the form of brine) from the proposed action could attract bats to the playa. Consumption of hypersaline brine from preconcentration ponds, purge brine ponds, production ponds, and associated canals and trenches could cause salt toxicity. However, based on current information, it is unknown to what extent bat populations would be affected. Salinity levels in the extraction system, preconcentration ponds, production ponds, and Waste Product Storage Area are expected to be generally above a level that would support aquatic insects. This hypersaline water is not expected to support forage for bats and bats are not expected to be attracted to them. Potential effects would be mitigated by implementation of the AWMP (CPM 2019a), including the Brine Pond Stepped Monitoring and Mitigation Plan. This plan would require monitoring to document and track bat presence and use patterns associated with brine ponds, trenches, and canals, as well as require necropsy of bat carcasses found within the analysis area to determine the cause of death (for example, salt toxicity, drowning, etc.). The intent of this monitoring is to identify and address unforeseen effects and make operational adjustments, as appropriate.

The proposed action may cause some adverse direct and indirect effects to bats (for example, mortality, injury from collisions, or displacement caused by noise) (CH2M HILL 2015c). These effects are expected to be minor and are unlikely to affect bats at the population-level because of the lack of large roosting sites within and near the analysis area. Implementation of design features listed in **Appendix K**, including monitoring and adaptive management, would reduce potential risks to bats.

The use of guy wires on the power and communication lines may increase the risk of bat collisions with the lines. About five percent (93 of 1,773 total structures) would have guy wires. Because of the risk, all guy wires would be marked and would include bird flight diverters as design features (**Figure L-15**), which would further reduce the risk of collision. In addition, bat's echolocation abilities suggest a reduced risk of collision. Considering bat echolocation abilities, the low percentage of guy wire application as well as the integration of design features on all guy wires, the risk of collision by bats with the guy wires would be minimal.

The more continuous flow of water down the Sevier River (from acquired recharge water) while the Project is in operation would improve water quality, allowing aquatic species to inhabit the Sevier River farther downstream. Macroinvertebrate populations would likely be more abundant, providing a prey base for bats, and the more regular presence of fresh water could increase the extent of riparian habitats. These effects could positively influence bat populations within and upstream of the analysis area by providing additional foraging resources; however, it is uncertain if foraging or roosting sites currently limit bat populations. Once the Project is terminated and scheduled for decommissioning, acquired water would no longer be available and any benefit to bat habitats would cease.

4.1.2.8.4.2 Alternatives 1, 2, 3, and 4

No suitable foraging or roosting habitats exist in or adjacent to the disturbance areas associated with Alternatives 1, 2, 3, or 4 or their equivalent segments from the proposed action; therefore, the potential effects of these alternatives would be the same as for the proposed action.

4.1.2.8.4.3 Alternative 5 - Sevier River Diversion

Bats may forage along the Sevier River. If night work is proposed, Alternative 5 and the proposed action both could cause temporary effects to bats including stress and displacement from construction-related noise or vehicle-related mortality. Effects during the operation of the Project from implementation of Alternative 5 could include establishment of a larger area of riparian habitat along the Sevier River compared to the proposed action. The increased riparian habitat could lead to increased abundance of invertebrate species and the prey base for bats over time.

4.1.2.8.4.4 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the No Action alternative would not cause any new direct or indirect effects to bats. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.8.5 Kit Fox

The proposed action could cause temporary adverse effects including collision with construction or other Project vehicles, destruction of dens from construction activity, and displacement into adjacent habitat from increased noise and human presence.

4.1.2.8.5.1 Proposed Action

Potential adverse effects to kit fox include collision with vehicles transporting SOP from the Processing Facility to the Rail Loadout Facility, other vehicle traffic, mortality or displacement from destruction of burrows, displacement caused by human activity, and habitat fragmentation. Some of these effects, particularly collision, burrow loss, and displacement, would be most likely in the short-term because of increased vehicle traffic and human activity associated with construction. However, collision with SOP transport vehicles would be a higher risk during operations. Increased trash from Project operation could cause long-term effects by influencing foraging behavior. The proposed action would cause 540.9 acres of permanent disturbance and 88.8 acres of temporary disturbance to preferred kit fox habitats (semi-desert shrub steppe and mixed salt desert scrub). There are 30,740 acres of these habitats in the analysis area; therefore, the Project would disturb about 2.0 percent of preferred kit fox habitats. Adverse effects to kit fox would be reduced and are anticipated to be minimal with the implementation of the design features listed in **Appendix K**.

4.1.2.8.5.2 Alternative 1 - 69-kV Power and Communication Line, North End

Alternative 1 (Segment T5) would disturb 0.5 acres of semi-desert shrub steppe and 39.3 acres of mixed salt desert scrub, while the proposed action (Segment T1) would disturb 0.8 acres of mixed salt desert scrub. Alternative 1 would have a higher potential of adverse effects (for example, den destruction or loss of foraging habitat) from construction due to the disturbance of a greater amount of suitable habitat compared to the proposed action.

4.1.2.8.5.3 Alternative 2 - 69-kV Power and Communication Line, South End

Alternative 2 (Segment T6) would disturb 57.5 acres of semi-desert shrub steppe and 9.3 acres of mixed salt desert scrub, while the proposed action would disturb 1.1 acres of semi-desert shrub steppe and 27.1 acres of mixed salt desert scrub. Alternative 2 would have a higher potential of adverse effects (for example, den destruction or loss of foraging habitat) from construction due to the disturbance of a greater amount of suitable habitat compared to the proposed action.

4.1.2.8.5.4 Alternative 3 - Natural Gas Pipeline, Black Rock

Alternative 3 (Segment G7) would disturb 2.8 acres of semi-desert shrub steppe and 0.8 acres of mixed salt desert scrub while the proposed action (Segment G2) would disturb 4.5 acres of semi-desert shrub steppe and 0.4 acres of mixed salt desert scrub. Potential adverse effects to kit fox could be slightly higher from implementation of the proposed action due to increased disturbance of preferred habitat.

4.1.2.8.5.5 Alternative 4 - Natural Gas Pipeline, West End

Alternative 4 (Segment G8) would disturb 14.3 acres of semi-desert shrub steppe and 0.1 acres of mixed salt desert scrub, while the proposed action (Segment G5) would disturb slightly less semi-desert shrub steppe (5.4 acres) and more mixed salt desert scrub (8.7 acres). The additional 0.2 acres of habitat from Alternative 4 is not expected to cause a substantial increase in direct and indirect effects to kit fox compared to the proposed action.

4.1.2.8.5.6 Alternative 5 - Sevier River Diversion

Alternative 5 and the proposed action would be constructed primarily within the barren playa outside of kit fox preferred habitat; therefore, implementation of Alternative 5 or the proposed action would have the same minimal effects on kit fox.

4.1.2.8.5.7 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the No Action alternative would not cause any new direct or indirect effects to kit fox. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.2.9 *Federally Listed Wildlife*

The yellow-billed cuckoo, California condor, and Utah prairie dog were considered for analysis (Section 6.7 in the Biology Report). The yellow-billed cuckoo and Utah prairie dog are not known to occur, nor are they expected to occur, in the analysis area and would not be affected by the Project. The analysis in this section is limited to the California condor because it is the only federally-listed species that has the potential to occur in the analysis area or to be affected by the Project.

4.1.2.9.1 California Condor

4.1.2.9.1.1 Proposed Action

A rare visitor, California condors are known to occasionally forage in Millard County; therefore, there is a slight risk of individuals being attracted to roadkill and colliding with Project vehicles while feeding on livestock or big game carrion. If this were to occur, condors could be at risk of injury or mortality, which would constitute "take" under the ESA. CPM has committed to implementing design features (**Appendix K**), including removing carrion from the analysis area to avoid attracting condors and avoid or minimize the risk of collision.

The use of guy wires on the power and communication lines may increase the risk of avian collisions with the lines. About five percent (93 of 1,773 total structures) would have guy wires. Because of the risk, all guy wires would be marked and would include bird flight diverters as design features (**Figure L-15**), which would further reduce the risk of collision. Considering the low use of the analysis area by condors, the low percentage of guy wire application, as well as the integration of design features on all guy wires, the risk of collision by California condors with the guy wires would be minimal.

To provide some assurance that proactive steps are being taken to further reduce the risk to California condors, the BLM completed Section 7 consultation with the USFWS. The BA (BLM and ENValue 2018) determined that the Project may affect, but would not be likely to adversely affect, the California condor. The USFWS (2018b) concurred with this determination. After completion of the DEIS and BA, CPM completed detailed engineering for several Project components that resulted in some changes to the Project description. BLM subsequently conducted informal discussions of these changes with the USFWS, with the conclusion that a revised BA did not need to be prepared and that the findings of the BA regarding the California condor remained valid, including USFWS's concurrence with those findings.

4.1.2.9.1.2 Alternative 1 - 69-kV Power and Communication Line, North End

Under this alternative, there could be a slightly higher potential of California condor mortality or injury from vehicle collisions with implementation of Alternative 1 (Segment T5) compared with the proposed action. There could be a slight increase of refuse from Alternative 1 construction activities along SR 257 Cutoff Road and SR 257, which could have a small influence on vehicle related wildlife mortalities and foraging opportunities for carrion. This could attract California condors to forage along the roads followed by Alternative 1, which would slightly increase the risk of collision. CPM has committed to implementing design features (**Appendix K**), including speed limits and removal of carrion to avoid attracting condors, which would minimize the risk of take.

4.1.2.9.1.3 Alternative 2 - 69-kV Power and Communication Line, South End

Under this alternative, there could be a slightly higher potential of California condor mortality or injury from vehicle collisions with implementation of Alternative 2 (Segment T6) compared with the proposed action. There could be a slight increase of refuse from Alternative 2 construction activities along Crystal Peak Road, Crystal Peak Spur Road, and the Power Line Access Road, which could have a small influence on vehicle related wildlife mortalities and foraging opportunities for carrion. This could attract California condors to forage along the roads followed by Alternative 2, which would slightly increase the risk of collision. CPM has committed to implementing design features (**Appendix K**), including speed limits and removal of carrion to avoid attracting condors, which would minimize the risk of take.

4.1.2.9.1.4 Alternative 3 - Natural Gas Pipeline, Black Rock

Implementation of Alternative 3 (Segment G7) or the proposed action (Segment G2) would not cause any measureable difference in potential for wildlife or livestock mortality, condor foraging on carrion, or risk of take of condors because neither would be constructed along road corridors.

4.1.2.9.1.5 Alternative 4 - Natural Gas Pipeline, West End

Under this alternative, there could be a slightly higher potential of California condor mortality or injury from vehicle collisions with implementation of Alternative 4 (Segment G8) compared with the proposed action. There could be a slight increase of refuse from Alternative 4 construction activities along Crystal Peak Road and Crystal Peak Spur Road, which could have a small influence on vehicle-related wildlife mortalities and foraging opportunities for carrion. This could attract California condors to forage along the existing roads that Alternative 4 would follow, which would slightly increase the risk of collision. CPM has committed to implementing design features (**Appendix K**), including speed limits and removal of carrion to avoid attracting condors, which would minimize the risk of take.

4.1.2.9.1.6 Alternative 5 - Sevier River Diversion

Alternative 5 and the proposed action would be constructed primarily within the barren playa. Foraging opportunities for carrion are expected to be low near Alternative 5 or the proposed action due to lack of wildlife. Implementation of Alternative 5 or the proposed action would not cause any measureable difference in potential for wildlife or livestock mortality, condor foraging on carrion, or risk of take of condors.

4.1.2.9.1.7 No Action Alternative

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Selection of the No Action alternative would not cause any new direct or indirect effects to the

California condor. At its discretion, CPM may retain control of it leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.3 Cultural Resources

The analysis area, methods, and potential direct and indirect effects described in this section are summarized from the Resource Report for Cultural Resources (ENValue 2019b) (Cultural Report).

4.1.3.1 *Analysis Area*

The analysis area for direct, indirect, and cumulative effects to cultural resources is the Area of Potential Effect (APE), as described in the PA (BLM et al. 2018) (Appendix A in the Cultural Report). The APE is divided into a two parts: 1) A direct effects APE, which includes all areas of potential ground disturbance from the Project and an appropriate buffer; and 2) an indirect effects APE, which is a more extensive area than the direct effects APE, to encompass potential changes to setting. The APE considers the potential direct and indirect effects of all Project features on all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands) and gravel pits, with appropriate buffers.

4.1.3.2 *Methods*

This section describes, compares, and contrasts the effects to cultural resources that could be caused by implementation of the proposed action, action alternatives, or no-action alternative. The issue addressed in this section is the potential for effects to eligible properties during construction, maintenance, operation, and decommissioning of the Project (**Table 1.6-1**). The BLM identified the need to develop a PA detailing how the BLM would meet the requirements of Section 106 of the NHPA (**Appendix F-6**). The PA has been developed and signed; implementation of its requirements forms the basis for the analysis of effects.

4.1.3.3 *Proposed Action*

A Class III intensive pedestrian survey (Class III survey) would be conducted prior to any ground-disturbing activities in all areas of the direct effects APE that have not been subject to a Class III survey in the previous ten years. A Class III survey would not be required for the Sevier Playa because archaeological investigations including Class III surveys and extensive archaeological monitoring during exploration activities indicated no potential for the presence of archaeological sites on the playa itself. Any cultural properties identified during the Class III surveys would be assessed for eligibility to the NRHP.

When feasible and prudent, CPM would seek to avoid adverse effects to eligible properties. This may be achieved through engineering redesign, alternate placement of facilities, or shifting of alignments to avoid potentially affected properties. In some cases, complete avoidance of cultural properties may not be possible and eligible properties would be adversely affected. Direct adverse effects could include damage or destruction of individual artifacts, portions of sites, or entire sites caused by ground disturbance during Project construction, operation, maintenance, or decommissioning. The extent of potential adverse effects would be unknown until after the Class III surveys are completed and any avoidance measures are developed in detail.

Cultural properties that are determined to be eligible for listing in the NRHP, and for which complete avoidance may not be possible, would be subject to either archaeological data recovery excavation or Level II historic documentation, as appropriate. The process for such treatments would be governed by the requirements of the PA. A HPTP would be developed and implemented by CPM's Cultural Resource Consultant (CRC) as approved by the BLM. Details of the HPTP cannot be determined in advance of identifying those sites that may be affected and the nature of any unavoidable effects. The HPTP would identify the nature of the effects to which each potentially eligible cultural property would be subjected and the proposed treatment to minimize or mitigate adverse effects. A Native American Graves Protection and Repatriation Act (NAGPRA) Plan of Action would be developed by the CRC and included as part of

the HPTP pursuant to 43 CFR § 10.3. Monitoring and inadvertent discoveries plans would be developed by the CRC and included as part of the HPTP. The HPTP would identify those areas that would be monitored and may include provisions for tribal monitoring of Project activities. The monitoring plan would also include a process for preconstruction training of all employees engaged in construction activities. Cultural resources discovered during Project activities would be treated in accordance with the PA and inadvertent discoveries plan in the HPTP.

In addition to direct effects, the Project may indirectly affect cultural resources within the indirect effects APE. These effects may include changes to the existing setting or views from cultural properties that are sensitive to such changes. The Project may cause a noticeable alteration of the setting for sensitive properties, potentially diminishing their integrity and causing adverse effects. Evaluation of potential indirect effects, including a visual effects assessment, would be included in the Class III survey reports.

Regionally, lake margins, river corridors, and wetlands appear to have been frequently occupied by Native Americans from the Paleoarchaic through Historic periods (Section 6.1 in the Cultural Report). Existing Class I inventories (summarized in Section 6.2 in the Cultural Report) identified a relatively large number of archaeological sites near the mouth of the Sevier River along the northeastern edge of the playa, including an Archaic period burial. Many of these sites are structurally complex long-term habitation or village sites used by farmer-foragers of the Fremont cultural tradition. These sites are partially buried amid sand dunes that may expose new cultural material when they shift. As such, the known distribution of sites may not fully represent the complete locations and extents of all existing sites, even in areas that have been subject to Class III survey (CPM and Stantec 2018). Considering the known resources and use patterns, it is likely that additional, currently undiscovered cultural properties exist along the lower Sevier River, including the mouth of the river where it meets the playa. Any ground-disturbing Project activities in this area would have high potential for adverse effects to eligible properties. The Sevier River Diversion, including the Diversion Berm and Diversion Canal, would bisect several known archaeological localities that are inferred to be large, village-like Fremont sites. Additional buried resources are likely present in this area. The potential for adverse effects to eligible properties from the Sevier River Diversion is high. As noted above, the requirements of the PA would be implemented where complete avoidance of eligible resources is not possible, including development and implementation of mitigation through the HPTP process and monitoring during ground-disturbing activities.

The Natural Gas Pipeline may be constructed aboveground in an area of surface rock outcrops from SR 257 east for approximately one mile (**Figure L-17** in **Appendix L**). Aboveground pipeline construction may decrease the potential for adverse effects to buried historic resources; however, it may increase indirect visual effects, including altered setting and loss of integrity, to rock art sites along the Beaver River. A landscape-level review and synthesis of known rock art localities along the Beaver River may be prepared as mitigation for adverse indirect or cumulative effects of the Project to these localities should the BLM determine that these effects are likely to occur. The need for this study would be based on the results of the Class III survey(s) for Project facilities that would be constructed in this area. If implemented, the final study would be prepared for publication in a local, regional, or national journal. The plans for this study would be detailed in the HPTP.

A paleoenvironmental study of the Sevier Playa during the Quaternary period would be prepared as mitigation for potential adverse indirect and cumulative effects of the Project. The Sevier Playa paleoenvironmental study would synthesize available paleoenvironmental data for the area and may include additional geoarchaeological or paleoenvironmental data collection as appropriate. The final study would be prepared in a manner suitable for publication in a local, regional, or national journal.

4.1.3.4 *Alternatives 1 through 4*

Alternatives 1 through 4, if selected, would likely have similar direct and indirect effects to cultural resources as the proposed action. There are no indications that there is substantially different potential for cultural resources to be found on the segments of these alternatives compared with the proposed

segments. Following Class III surveys, the BLM would first seek to avoid adverse effects to eligible properties. If adverse effects to eligible properties cannot be avoided, a HPTP would be developed and implemented to minimize or mitigate these adverse effects. Further details on this process are described in the PA. Following implementation of these measures, unresolved adverse effects to eligible properties are not anticipated.

4.1.3.5 *Alternative 5 - Sevier River Diversion*

Alternative 5 would shift the location of some facilities associated with the Sevier River Diversion within the boundary of the playa, which would avoid or minimize effects to known cultural properties that are present at the location of the diversion in the proposed action. The PA (BLM et al. 2018) notes: "Archaeological investigations including Class III survey and extensive archaeological monitoring on the playa during pre-Project feasibility studies indicate no potential for the presence of archaeological sites on the playa" and that no Class III surveys would be required on the playa (defined as all areas interior to the current active vegetation line that surrounds the playa).

Portions of Alternative 5 would be located off of the playa in an area that has not been subject to Class III surveys. At present, there are no known eligible sites in this area; however, the lack of surveys, the nearby presence of known sites, and past and current conditions in the area (lake margin, wetlands, and shifting sand dunes), suggest a very high likelihood that Alternative 5 may bisect large, complex archaeological sites with undocumented surface and sub-surface component, similar to the proposed action.

While it is likely that the proposed action would affect known eligible resources to a substantially greater degree than Alternative 5, it is unclear if this difference would persist once Class III surveys are completed. It is entirely possible, though currently unknown, that the proposed and alternative diversions of the Sevier River could have similar direct effects on cultural resources. As with the proposed action, the requirements of the PA would be implemented in any cases where Alternative 5 could not completely avoid adverse effects to eligible resources, including development and implementation of mitigation through the HPTP process and monitoring during ground-disturbing activities.

Indirect effects would be similar between Alternative 5 and the proposed action because they are located relatively close together, such that their visual intrusion into the existing setting or views from sensitive cultural properties would be essentially the same.

4.1.3.6 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Cultural resources would not be affected directly or indirectly. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and Plan of Development, as well as completion of a new NEPA process.

4.1.4 Geology and Minerals

The analysis area, methods, and direct and indirect effects described in this section are summarized from the Resource Report for Geology and Minerals (ENValue 2019c) (Geology Report).

4.1.4.1 *Analysis Area*

The analysis area for potential direct, indirect, and cumulative effects to geology and minerals is the area that may be directly affected by development of the Project. This includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands) **(**Figure 1 in the Geology Report). The analysis area was selected because this is the area within which the Project has the potential to affect geological or mineral resources.

4.1.4.2 *Methods*

This section describes, compares, and contrasts the effects to geology and minerals that could be caused by implementation of the proposed action, action alternatives, or no-action alternative. The issues

addressed in this section include removal of mineral resources, interactions with geologic hazards, and effects to active mining claims.

4.1.4.3 *Proposed Action*

4.1.4.3.1 Removal of Mineral Resources

The Project, by its purpose and design, would extract potassium-based mineral resources as detailed in the Feasibility Study (CPM 2018a) and Mining Plan (CPM and Stantec 2019a). These minerals are owned by the federal government and managed by the BLM, or owned by the state of Utah and managed by SITLA. CPM controls the necessary leases to extract those minerals. The outcome of the NEPA analysis, Mining Plan approval, and ROW grant issuance notwithstanding, there are no mineral-related legal or ownership conflicts that would preclude CPM from implementing the Project.

The mineral-rich sediments and brine of the playa are the result of many thousands of years of accumulation. Though the processes that produced these minerals continue, extraction of potassium and other minerals would be far faster than natural replenishment. Total SOP production over the life of the Project is an estimated 10.2 million tons, with 6.8 million tons from playa-sourced brine and 3.4 million tons produced through the muriate of potash reaction (CPM 2018a). At the end of the Project, the commercially viable potassium resource would be exhausted. Therefore, the removal of minerals is a permanent effect, one that cannot be recovered outside the scope and duration of geologic processes. This includes minerals and elements other than potassium, which would also be depleted by the Project. These secondary, other minerals and elements are included in the lease and in the case of locatable minerals, would not be available for location via future mining claims.

CPM would remove 250,000 yd^3 of aggregate (gravel and similar material) from three gravel pits, two in the lease area and one outside the lease area. Removal of gravel would be a permanent effect; however, the availability of gravel for other uses (such as surfacing of county roads) would not be substantially affected because of the abundance of these materials from other sources, including areas immediately adjacent to the proposed gravel pits.

4.1.4.3.2 Geologic Hazards

Though minor faults can be found throughout southwestern Utah, the closest along the Cricket Mountain, none are active, and no seismic activity has been recorded in nearly 50 years. There is a small probability the Project could be subjected to seismic activity, as with much of the western United States.

Small landslides are common in the basin and range topography, but no substantial slides are known that would affect, or be affected by, the Project. Unmapped slides may be present, and unstable slopes could be made active by construction in steeper, rockier areas.

At the north end of the playa, in the vicinity of the Sevier River Diversion, Perimeter Road, and other access roads (particularly Access Roads A and G and Perimeter Road Spurs 1 and 1A), loose, sandy soils or dunes may shift and affect those facilities. More frequent maintenance of the facilities in this area may be necessary to combat shifting dunes. Although additional maintenance may be needed, shifting dunes are not expected to substantially affect operation of the Project, as evidenced by existing roads in this area, which remain drivable despite long intervals between maintenance.

4.1.4.3.3 Active Mining Claims

There are no active mining claims in the area leased by CPM for potassium production that would be affected by the proposed action. Off-playa facilities and ROWs may affect the ability of future mining claims to be developed; however, as no conflict currently exists, there would be no effect on active mining claims from construction and operation of the various ROWs. No active mining claims exist where CPM is proposing gravel pits; therefore, there would be no effect.

4.1.4.4 *Alternatives 1 through 4*

The effects of Alternatives 1 through 4 on geology and minerals would be the same as those for the proposed action because the mineral resources, geologic hazards, and active mining claims that exist along the proposed and alternative segments are essentially the same.

4.1.4.5 *Alternative 5 - Sevier River Diversion*

The effects of Alternative 5 on mineral resources and active mining claims would be the same as those for the proposed action because these resources are the same at the locations of the proposed and alternative diversion features. Both the proposed and alternative diversions, including their access roads, would be located partially in areas that contain loose sandy soils. More frequent or intensive maintenance of the alternative Diversion Channel or Perimeter Road Spur Segment S3 may be required; however, the need for additional maintenance is not expected to be substantially different from the proposed action.

4.1.4.6 *No Action Alternative*

Under the No Action Alternative, the Project would not be implemented as described in the proposed action and no minerals would be extracted from the playa. The targeted potassium and other minerals would remain in place, available for future extraction. The proposed removal of gravel would not occur; the materials would remain in place and would be available for other uses. There would be no effect to any active mining claims or geologic hazards. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and Plan of Development, as well as completion of a new NEPA process.

4.1.5 Lands and Access

The analysis area, methods, and direct and indirect effects described in this section are summarized from the Resource Report for Lands and Access (ENValue 2019d) (Lands and Access Report).

4.1.5.1 *Analysis Area*

The analysis area for direct, indirect, and cumulative effects to land use includes all lands within the boundaries of the potash leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes a 0.25-mile buffer around the off-lease lands. The analysis area for land use is based on the area in which Project facilities and activities may affect other existing land uses.

The analysis area for direct, indirect, and cumulative effects to realty management includes all of the townships that encompass the lease area controlled by CPM, as well as the proposed and alternative ROWs. The analysis area for realty management is based on the area in which Project facilities and activities may affect other existing leases, ROWs, or permitted uses. The BLM (2019a) has prepared a more precise listing of the legal description of the Project; however, for the purpose of the NEPA analysis, whole townships were used. The analysis area includes:

- Township (T.) 18 South (S.), Range (R.) 11 and 12 West (W.)
- T. 19 S., R. 8, 9, 10, 11, and 12 W.
- T. 20 S., R. 8, 9, 10, 11, 12, and 13 W.
- T. 21 S., R. 10, 11, 12, and 13 W.
- T. 22 S., R. 11, 12, and 13 W.
- T. 23 S., R. 11, 12, and 13 W.
- T. 24 S., R. 8, 9, 10, 11, 12, and 13 W.
- T. 25 S., R. 8, 9, and 12 W.

The analysis area for direct, indirect, and cumulative effects to transportation includes an area generally bounded by I-15 to the east and south, the city of Nephi to the north and the Nevada / Utah state line to the west. The analysis area for transportation is based on the area that encompasses both the general access road network and the Project road network (Section 6.4 in the Lands and Access Report). These networks include all roads where Project traffic may have a measureable effect on existing traffic levels.

4.1.5.2 *Methods*

This section describes, compares, and contrasts the effects to the land use, realty management, and transportation that could be caused by implementation of the proposed action, action alternatives, or no-action alternative. The issues addressed in this section include conflicts with existing ROW holders, conflicts with other land users, effects on access to public lands, effects of Project-generated traffic, and effects of new at-grade railroad / highway / road crossings.

4.1.5.3 *Proposed Action*

4.1.5.3.1 Conflicts with Other Land Users

The analysis area is largely unpopulated, though ROWs exist for roads, power lines, pipelines and other uses. These are discussed in the following section. Grazing allotments and dispersed recreation opportunities surround the playa and other areas that would be occupied by Project facilities. **Section 4.1.9** and the Resource Report for Recreation (ENValue 2019h) addresses potential conflicts with recreation users. **Section 4.1.8** and the Resource Report for Range Management (ENValue 2019g) addresses potential conflicts with livestock grazing.

The Sevier B Military Operations Area (MOA) and a low-level military instrument training route (IR-293) are located above the analysis area. The Sevier B MOA is within the UTTR that is managed by Hill Air Force Base. This airspace is used for Department of Defense testing and training, including military aircraft flying low-level missions, and is the only location in the United States where some of these missions can be accomplished. The Sevier B MOA and IR-293 both encompass airspace down to 100 feet Above Ground Level. In general, the Project has been designed to minimize the potential for effects to UTTR's MOA and training route. For example, all Project facilities would be less than 100 feet in height to avoid interfering with low-altitude training missions. Several mitigation measures (**Section 4.4.2**) have been added requiring CPM to coordinate its use of radio frequencies, develop procedures for work stoppages, and develop a "Hold Harmless Agreement" to avoid conflicts with UTTR's mission. With implementation of these measures, no adverse effects to UTTR's mission are anticipated.

4.1.5.3.2 Conflicts with Existing ROW Holders

The analysis area for land use is located in Millard County's Range and Forest zoning district, where Project facilities would be considered conditional uses. CPM would work with Millard County to obtain any applicable Conditional Use Permits (CUPs) and avoid any conflicts with the existing zoning district.

The 24 existing ROWs near the Project (**Table 4.1.5-1**) may be directly affected because the ROWs would be crossed by, or are located near, one or more Project facilities. **Table 4.1.5-1** lists the existing ROWs and all of the Project facilities associated with the proposed action and alternatives that may affect them. Some alternative segments would affect different ROWs than the equivalent segments of the proposed action. These are indicated in **Table 4.1.5-1**.

Most potential conflicts arise with existing linear ROWs (for example, transmission lines and pipeline) and designated utility corridors where they cross Crystal Peak Road west of the proposed Rail Loadout Facility. Other potential conflicts exist where Project facilities would cross or, in the case of roads, intersect, various roads and highways. CPM would use several Millard County Class B roads for access and would coordinate maintenance of these roads with Millard County. CPM would work with all ROW holders to ensure that Project facilities are designed, constructed, and operated in a manner that would prevent conflicts with existing ROWs.

The University of Utah's TA Project, located north of the Project, has requested information on operational lighting, locations and frequencies of communication towers, and fugitive dust during operations. Representatives of the TA Project were provided a draft of the Mining Plan (CPM and Stantec 2019a) for review through the Cooperating Agency process. The Mining Plan (Section 6.12) states: "No lights would be on the playa during night hours, except at the pump stations, which would be turned on when necessary. These lights would be limited to the facilities and would include shades to focus light downward." Other facilities that would be lighted, such as the Processing Facility and Rail Loadout

Table 4.1.5-1 Rights-of-Way Affected by Project Facilities

Existing Rights-of-Way	Project Facilities					
	Proposed Action	Alternative				
		1	2	3	4	5
Communications						
Worldcom Network Services (UTU 059239)*	Natural Gas Pipeline – Segment G1, Rail Spur and Rail Spur Access Corridor	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
AT&T (UTU 078850)*	Access Road Segments F and G	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Electrical Transmission or Distribution						
PacifiCorp (UTU 014023)	Black Rock Substation access road, Black Rock Communication Tower, 69-kV Power and Communication Line – Segment T1	Black Rock Substation access road, Black Rock Communication Tower, 69-kV Power and Communication Line – Segment T5	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Intermountain Power Project (IPP) (UTU 042519)	69-kV Power and Communication Line – Segment T1, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	69-kV Power and Communication Line – Segment T5, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
City of Los Angeles (UTU 060642) [never constructed]	69-kV Power and Communication Line – Segment T1, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	69-kV Power and Communication Line – Segment T5, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Sierra Pacific Power (UTU 080667)*	Access Road Segments F and G	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Longroad Energy / Milford Wind Corridor (UTU 082973)	69-kV Power and Communication Line – Segment T1, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	69-kV Power and Communication Line – Segment T5, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
TransWest (TWE) Express (UTU 087238)*	69-kV Power and Communication Line – Segment T1, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	69-kV Power and Communication Line – Segment T5, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action

Table 4.1.5-1 Rights-of-Way Affected by Project Facilities

Existing Rights-of-Way	Project Facilities					
	Proposed Action	Alternative				
		1	2	3	4	5
Rocky Mountain Power (UTU 088512)	Black Rock Substation access road, Black Rock Communication Tower, 69-kV Power and Communication Line – Segment T1	Black Rock Substation access road, Black Rock Communication Tower, 69-kV Power and Communication Line – Segment T5	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Zephyr Power (UTU 089331 – pending)*	69-kV Power and Communication Line – segment T1, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	69-kV Power and Communication Line – Segment T5, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
PacifiCorp (UTU 0133566)*	Black Rock Substation access road, Black Rock Communication Tower, 69-kV Power and Communication Line – Segments T1 and T2, Power Line Access Road, Access Road Segments F and G	Black Rock Substation access road, Black Rock Communication Tower, 69-kV Power and Communication Line – Segment T5, Power Line Access Road, Access Road Segments F and G	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Pipelines						
Kern River Gas Transmission (UTU 068164)	Natural Gas Pipeline – Segment G1, Kern River Valve Station, Natural Gas Pipeline Access Road 8	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
UNEV Pipeline (UTU 079766)	69-kV Power and Communication Line – Segment T1, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	69-kV Power and Communication Line – Segment T5, Natural Gas Pipeline – Segment G4, 12.47-kV Power and Communication Line	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Telescope Array Project						
University of Utah (UTU 080712)	Access Road Segment A	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Transportation						
UPRR (UTU 000094RR)	Natural Gas Pipeline – Segment G1, Rail Spur and Access Corridor	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action

Table 4.1.5-1 Rights-of-Way Affected by Project Facilities

Existing Rights-of-Way	Project Facilities					
	Proposed Action	Alternative				
		1	2	3	4	5
Federal Highway Administration (Material Site) (UTU 042667)	Natural Gas Pipeline – Segment G1, Rail Spur and Access Corridor	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Millard County (UTU 058574) [Crystal Peak Road and Crystal Peak Spur Road]	Power Line Access Road, 12.47-kV Power and Communication Line, Natural Gas Pipeline – Segment G4, Rail Loadout Facility Access Roads 1 and 2, Water Supply Pipeline and spurs, Water Supply Well Access Roads, 12.47-kV Power Line Spurs	Same as Proposed Action	69-kV Power and Communication Line – Segment T6, Power Line Access Road, 12.47-kV Power and Communication Line, Natural Gas Pipeline – Segment G4, Rail Loadout Facility Access Roads 1 and 2, Water Supply Pipeline and spurs, Water Supply Well Access Roads, 12.47-kV Power Line Spurs	Same as Proposed Action	Power Line Access Road, 12.47-kV Power and Communication Line, Natural Gas Pipeline – Segment G8, Rail Loadout Facility Access Roads 1 and 2, Water Supply Pipeline and spurs, Water Supply Well Access Roads, 12.47-kV Power Line Spurs	Same as Proposed Action
UDOT (UTU 072901) [SR 257]	Natural Gas Pipeline – Segment G1, Rail Spur and Access Corridor	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Federal Highway Administration (UTU 0003842) [Hwy 6/50]	Access Road Segments F and G	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Wind Energy						
Orion Wind (UTU 090121)	Natural Gas Pipeline – Segment G1, Natural Gas Pipeline Access Roads	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action

* Detailed GIS data for these ROWs are not available. Project facilities that may affect these ROWs are estimated based on general geographic descriptions.

Facility, are remote from the TA Project. By implementing these design features, which have been integrated into CPM's proposed action, lighting is not expected to affect operation of the TA Project. The location of the communication towers was provided to representatives of the TA Project. Frequencies to be used are currently unknown, but would be provided to the TA Project when they are known. A mitigation measure (**Section 4.4.2**) has been added requiring CPM to coordinate radio frequencies with the TA Project. The potential effects of fugitive dust are addressed in **Section 4.1.1** and the Air Report.

The TA Project also requested information about year-round conveyance of acquired recharge water down the normally dry Sevier River channel. The TA Project uses an existing road along the IPP transmission line to access some locations on its project. IPP has a ROW grant for this road for access to its transmission line. The TA Project has a ROW grant and road maintenance agreement with IPP for a portion of this road. This road crosses the Sevier River channel. If water were to be in the river year-round, it would affect access to portions of the TA Project and IPP transmission line. CPM would coordinate with the BLM, IPP, and the TA Project to ensure that access is maintained. No permanent crossing structures are planned as part of CPM's proposed action. Depending on how access is provided, the TA Project and IPP may need to use longer or slower access routes to some parts of their facilities.

Several Project components would cross a transmission line ROW held by Los Angeles Department of Water and Power (LADWP) (**Table 4.1.5-1**). CPM has received comments from LADWP, which have been placed in the administrative record, regarding conditions required for the continued safe operation and maintenance of their ROW and transmission line. CPM would continue to work with LADWP to meet these conditions to ensure no disruption or disturbance to the existing ROW.

4.1.5.3.3 Construction Traffic

Construction traffic would use the existing general access road network to access the Project. It is possible that some road improvements would be needed to accommodate delivery and construction traffic along the public roads and highways. UDOT has indicated that there may be a need to add turning lanes on SR 257 and, possibly, on Hwy 6/50. The Rail Spur, which would cross Headlight Canyon Road and SR 257, may necessitate major road improvements. In addition, the two access roads from Crystal Peak Road to the Rail Loadout Facility may require some change to Crystal Peak Road (for example, turning or merging lanes).

With the exception of pickup and haul/delivery trucks, construction equipment generally would transit a road once to reach the Sevier Playa at the beginning of construction, and once to exit at the completion of construction. Based on the total number of pieces of construction equipment (Table 6-30 in the Mining Plan), there would be an estimated 342 one-way trips associated with equipment mobilization and de-mobilization. This traffic would take place over an extended periods, with no more than a few trips anticipated per day and many days with no trips, because of the extended period of on-playa construction.

Pickup trucks and haul trucks would travel the roads more often to deliver construction workers and equipment to workspaces associated with the various Project facilities. The peak vehicle trips generated by on-lease facility construction was estimated based on maximum expected employee and contractor numbers. Workers in personal vehicles are anticipated to generate approximately 275 round trips (550 one-way trips) per day. Of the full-time employees and contractors present during construction, it is anticipated that approximately 70 percent would commute from Delta and 30 percent would commute from Milford (**Table 4.1.5-2**). This estimate represents peak traffic during on-lease construction and would be reduced during operations and maintenance. It is unlikely that any single access road would be driven every day for a year; most roads would only be used for a short duration during specific types of construction. During construction, some roads could be used by multiple crews per day for several weeks or a couple of months, but then only occasionally thereafter.

Table 4.1.5-2 Estimated Traffic, Peak On-Lease Facility Construction

Location	One-Way Trips Per Day
Delta	386

Table 4.1.5-2 Estimated Traffic, Peak On-Lease Facility Construction	
Location	**One-Way Trips Per Day**
Milford	164
Total	550

The peak vehicle trips generated by off-lease facility construction was estimated by combining the typical number of pickup trucks and personnel transport with equipment transport vehicles and other large vehicles (water tankers, welding trailers, cranes, and fuel tankers) present at each feature (Table 6-30 in the Mining Plan). **Table 4.1.5-3** provides the estimated daily one-way vehicle trips for these vehicles to off-lease facilities during construction. These trips would not necessarily be concurrent because of the staggered construction schedules of the different facilities (Table 4-3 in the POD).

Table 4.1.5-3 Estimated Traffic, Peak Off-Lease Facility Construction				
	Number of Vehicles		**Estimated Trips Per Day**	
Facility	**Pickup Trucks and Personnel Transport**	**Equipment Transport and Other Large Vehicles***	**Pickup Trucks and Personnel Transport**	**Equipment Transport and Other Large Vehicles***
Power and communication lines; communication towers	12	10	18–36	15–30
Natural gas facilities	13	9	39–78	14–27
Rail facilities	11	6	17–33	9–18
Water supply facilities	2	0	3–6	0
Access roads	4	3	6–12	5–9
Total	42	28	83-165	43-84

Note: Equipment for construction of the off-lease portions of the preconcentration ponds, recharge system, and Brine Transfer Canal are included in the Mining Plan.
*Vehicles used during construction of off-lease Project facilities such as backhoes/excavators, dozers, drill rigs, graders, loaders, pipe layers, and rollers are not included in this category because they would be brought in by equipment transport vehicles.

If the maximum number of trips for both on-lease and off-lease construction were to occur on a particular day and were to use SR 257, traffic volume would increase by about 76 percent (from the current AADT of 1,055 to 1,854 vehicle trips per day). Although this is a substantial increase, current traffic levels are relatively low. The addition of Project traffic to this highway is not expected to measurably reduce travel speeds or increase travel time between Delta and Milford. Much of the increased traffic is likely to use Crystal Peak Road and Crystal Peak Spur Road, where daily trips are expected to increase substantially from current conditions; however, Project traffic is not expected to measurably reduce travel speeds or increase travel time over current conditions. Limited construction traffic would use other roads in the general access and Project road networks. Given the expected low level of additional traffic on these roads, no change to existing travel speeds or times are expected.

4.1.5.3.4 Operational Traffic

Vehicles and equipment to be used for operation and maintenance of the Mining Project and ROWs are listed in Table 6-31 in the Mining Plan. Once delivered to the Project, it is expected these vehicles would operate within the facility and on the Project road network. Infrequent use of the general access road network may occur when equipment or vehicles are moved to other locations.

During operations, haul trucks would carry products between the Processing Facility and the Rail Loadout Facility for final screening and loading into rail cars. The trucks would depart the Processing Facility on CPM Spur Road then travel south on Crystal Peak Spur Road and make a left turn onto Crystal Peak Road, then east to the Rail Loadout Facility access roads for delivery. On average, up to five 25-ton, over-the-road haul trucks would each make approximately four or five round trips each day (for a total of 20 to

25 total round trips daily). Hauling of products to the Rail Loadout Facility would occur at any time, day or night. Some of the returning haul trucks would carry muriate of potash (MOP) from the Rail Loadout Facility to the Processing Facility; however, the total number of truck trips would not increase because these trucks would otherwise be returning empty.

Products from the Processing Facility would also be shipped by truck to locations within the United States. This would occur when a quantity of product is needed on a timeline or at a destination that is not suitable for routine rail shipment. Up to 50,000 tons annually may be transported by truck. Trucks in a single-trailer or double-trailer configuration would each carry up to 51 tons per shipment. If bridges are crossed, a permit from the UDOT would be required for use of state roads. Such a permit would allow transport of up to 129,000 pounds (64.5 tons) gross vehicle weight. Up to 1,000 trucks per year, or as many as three to four trucks per weekday, on average, could transport products from the site.

Operation and maintenance of the Project, including on- and off-lease facilities, would require approximately 175 full-time employees, distributed among on-playa operations, the Processing Facility, drivers for transport of materials to and from the Rail Loadout Facility, operation of the Rail Loadout Facility, and miscellaneous off-playa maintenance and operations tasks. The Processing Facility would operate on two 12-hour shifts, while most other work would take place during one, generally daylight, shift. Worker commute is expected to generate about 350 daily one-way trips. Most employee traffic would be to and from the Processing Facility area, accessed by Crystal Peak Road and Crystal Peak Spur Road. The majority of the employees would be full-time over the calendar year and throughout the life of the Project.

As with construction traffic, most operational traffic would likely use SR 257, Crystal Peak Road, and Crystal Peak Spur Road. During the operations phase of the Project, traffic is expected to remain substantially above current levels on these roads, though somewhat lower than during the construction period. Project traffic is not expected to measurably reduce travel speeds or increase travel time over current conditions on SR 257. On Crystal Peak Road and Crystal Peak Spur Road, speeds of Project vehicles would be limited to no more than 30 miles per hour (**Appendix K**). This restriction may delay non-Project vehicles that are currently accustomed to traveling faster on Crystal Peak Road. Limited operational traffic would use other roads in the general access and Project road networks. Given the expected low level of additional traffic on these roads, no change to existing travel speeds or times are expected.

In general, existing roads in the Project road network currently available for public use would remain open to the public during Project construction, operation, maintenance, and decommissioning. CPM would post warning signs to inform the public that access on existing roads ends at the Perimeter Road. Short-term, temporary closures of some roads may be required at times to protect public safety during construction or maintenance. These closures would follow the guidance in the Transportation and Traffic Management Plan (CPM 2019m) to protect public safety and minimize Project effects to existing road users.

New access roads constructed on or around the Sevier Playa (for example, the Perimeter Road) would be closed to public access to protect the safety of the public and CPM employees, as well as to protect infrastructure investments made by CPM. Public access would be restricted around facilities constructed on-lease through methods such as gates and signs. Unauthorized access or vandalism of closure structures would be addressed immediately through repair of the vandalism and installation of new structures.

4.1.5.3.5 At-Grade Railroad Crossings

The Rail Facility would be connected to the UPRR Lynndyl Subdivision mainline track via the Rail Spur. The Rail Spur would cross SR 257 and Headlight Canyon Road at grade. The at-grade rail crossings and associated warning devices would be designed and constructed to achieve compliance with UDOT standards. A new Railroad Crossing Application, including a development plan and preliminary engineering drawings, would be submitted to UDOT to begin the approval process. CPM (or an approved party designated by the applicant) would be responsible for the engineering of the roadway aspects of the

crossing in compliance with UPRR specifications. This preliminary engineering would be incorporated into the railroad agreement with UPRR.

At peak production, an estimated 24 rail shipments per year (two per month) of SOP, each made up of 100 rail cars, would leave the Rail Loadout Facility, travel along the Rail Spur, cross Headlight Canyon Road and SR 257, and then proceed along the UPRR tracks to their final destination. An estimated 120 rail shipments per year (10 per month) of MOP, each made up of 10 rail cars, would arrive at the Rail Loadout Facility. An equivalent number of trips would be made in reverse – 24 trips per year for 100 empty SOP rail cars and 120 trips per year for 10 empty MOP rail cars. This means that, on average, 288 rail shipments per year, or slightly less than one rail shipment per day, would cross SR 257 and Headlight Canyon Road. No substantial effect on traffic on these roads is predicted because of the relatively low frequency of rail shipments.

4.1.5.3.6 Access to Public Lands

Other than uses related to livestock grazing and recreation, public use of the analysis area is low. The Project would restrict access to nearly the entire playa surface; however, this restriction would affect few members of the public since access is currently limited by the soft surface conditions. Roads and trails that are currently open for public use would remain open. During construction, access to some ROWs may be temporarily restricted to protect public health and safety as per the design features listed in **Appendix K**. CPM would use signs and other means to advise the public of any temporary closures. In the long-term, public access outside the playa would be the same as current conditions.

4.1.5.4 *Alternative 1 - 69-kV Power and Communication Line, North End*

Alternative 1 would change the route of the northern segment of the 69-kV Power and Communication Line. This alternative replaces the cross-country route of Segment T1 with Segment T5, a route that follows SR 257 and SR 257 Cutoff Road; however, Segment T5 would cross the same utility ROWs as Segment T1 (**Table 4.1.5-1**), but the crossings would be in a different location. Alternative 1 would increase the length and area of ROW for the 69-kV Power and Communication Line on BLM, state, and private lands compared with the proposed action (**Table 4.1.5-4**). Alternative 1 would have the same effects on other land users, access to public lands, traffic, and at-grade railroad crossings as the proposed action.

Table 4.1.5-4 Land Ownership, Proposed Action and Alternative 1

Alternative, ROW Type	ROW Width (feet)	Total Length (miles)	Total Area (acres)	BLM		State		Private	
				Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)
Proposed Action (Segment T1)									
Temporary ROW [A]	Variable		9.5	Variable	8.4	Variable	1.2	--	--
Permanent ROW	100	7.87	95.4	6.90	83.6	0.98	11.9	--	--
Alternative 1 (Segment T5)									
Temporary ROW [A]	Variable		13.9	Variable	11.3	Variable	1.6	Variable	1.0
Permanent ROW	100	11.43	138.5	9.32	113.0	1.30	15.8	0.81	9.8

Notes: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.
A: The exact location and extent of the temporary ROW associated with the 69-kV Power and Communication Line has not been determined. It has been estimated as 10 percent of the permanent ROW.

4.1.5.5 *Alternative 2 - 69-kV Power and Communication Line, South End*

Alternative 2 would change the route of the southern portion of the 69-kV Power and Communication Line. This alternative replaces the cross-country route of Segment T3 with Segment T6, a route that follows the Power Line Access Road to Crystal Peak Road, and then follows Crystal Peak Road and Crystal Peak Spur Road to the Processing Facility. Millard County holds a ROW for Crystal Peak Road and Crystal Peak Spur Road; however, Segment T6 would not affect Millard County's use of its ROW,

because CPM would construct Segment T6 outside of Millard County's ROW. Alternative 2 would increase the length and area of disturbance for the 69-kV Power and Communication Line on BLM-administered lands compared with the proposed action (**Table 4.1.5-5**). Alternative 2 would have the same effects on other land users, access to public lands, traffic, and at-grade railroad crossings as the proposed action.

Table 4.1.5-5 Land Ownership, Proposed Action and Alternative 2

Alternative, ROW Type	ROW Width (feet)	Total Length (miles)	Total Area (acres)	BLM		State		Private	
				Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)
Proposed Action (Segment T3)									
Temporary ROW [A]	Variable		1.8	Variable	1.8	--	--	--	--
Permanent ROW	100	1.46	17.7	1.46	17.7	--	--	--	--
On-lease [B] – temporary [A]	Variable		2.2	Variable	2.2	--	--	--	--
On-lease [B] – permanent	100	1.83	22.0	1.83	22.0	--	--	--	--
Total Temporary		**Variable**	**4.0**	**Variable**	**4.0**	--	--	--	--
Total Permanent		**3.29**	**39.8**	**3.29**	**39.8**	**--**	**--**	**--**	**--**
Alternative 2 (Segment T6)									
Temporary ROW [A]	Variable		7.5	Variable	7.5	--	--	--	--
Permanent ROW	100	6.16	74.7	6.16	74.7	--	--	--	--
On-lease [B] – temporary [A]	Variable		0.5	Variable	0.5	--	--	--	--
On-lease [B] – permanent	100	0.41	5.0	0.41	5.0	--	--	--	--
Total Temporary		**Variable**	**8.0**	**Variable**	**8.0**	--	--	--	--
Total Permanent		**6.57**	**79.7**	**6.57**	**79.7**	**--**	**--**	--	--

Notes: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding. Total lengths only include permanent ROWs.
A: The exact location and extent of the temporary ROW associated with the 69-kV Power and Communication Line has not been determined. It has been estimated as 10 percent of the permanent ROW.
B: No ROW required. Length, width, and area provided as a basis for the analysis of effects.

4.1.5.6 *Alternative 3 - Natural Gas Pipeline, Black Rock*

Alternative 3 would shift the Natural Gas Pipeline north, from Segment G2 to Segment G7. This shift would place the entire segment on BLM-administered lands, rather than crossing private lands. This would reduce the length and area of disturbance for the Natural Gas Pipeline on private lands, while increasing the length and area of disturbance on BLM lands, compared with the proposed action (**Table 4.1.5-6**). Alternative 3 would have the same effects on existing ROWs, access to public lands, traffic, and at-grade railroad crossings as the proposed action.

Table 4.1.5-6 Land Ownership, Proposed Action and Alternative 3

Alternative, ROW Type	ROW Width (feet)	Total Length (miles)	Total Area (acres)	BLM		State		Private	
				Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)
Proposed Action (Segment G2)									
Temporary ROW	20	2.36	5.7	1.29	3.1	-	-	1.07	2.6
Permanent ROW	30	2.36	8.6	1.29	4.7	-	-	1.07	3.9
Alternative 3 (Segment G7)									
Temporary ROW	20	2.36	5.7	2.36	5.7	-	-	-	-
Permanent ROW	30	2.36	8.6	2.36	8.6	-	-	-	-

Table 4.1.5-6 Land Ownership, Proposed Action and Alternative 3									
Alternative, ROW Type	ROW Width (feet)	Total Length (miles)	Total Area (acres)	BLM		State		Private	
				Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)

Note: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

4.1.5.7 *Alternative 4 - Natural Gas Pipeline, West End*

Alternative 4 would change the route of the western portion of the Natural Gas Pipeline. This alternative replaces the cross-country route of Segment G5 with Segment G8, a route that follows Crystal Peak Road, and Crystal Peak Spur Road to the Processing Facility. Millard County holds a ROW for Crystal Peak Road and Crystal Peak Spur Road; however, Segment G8 would not affect Millard County's use of its ROW, because CPM would construct Segment G8 outside of Millard County's ROW. Alternative 4 would increase the length and area of ROW for the Natural Gas Pipeline on BLM-administered lands compared with the proposed action (**Table 4.1.5-7**). Alternative 4 would have the same effects on other land users, access to public lands, traffic, and at-grade railroad crossings as the proposed action.

Table 4.1.5-7 Land Ownership, Proposed Action and Alternative 4									
Alternative, ROW Type	ROW Width (feet)	Total Length (miles)	Total Area (acres)	BLM		State		Private	
				Length (miles)	Area (acres)	Length (miles)	Area (acres)	Length (miles)	Area (acres)
Proposed Action (Segment G5)									
Temporary ROW	20	3.33	8.1	3.33	8.1	--	--	--	--
Permanent ROW	30	3.33	12.1	3.33	12.1	--	--	--	--
On-lease [A] – temporary	20	1.63	3.9	1.63	3.9	--	--	--	--
On-lease [A] – permanent	30	1.63	5.9	1.63	5.9	--	--	--	--
Total Temporary		**4.95**	**12.0**	**4.95**	**12.0**	--	--	--	--
Total Permanent		**4.95**	**18.0**	**4.95**	**18.0**	--	--	--	--
Alternative 4 (Segment G8)									
Temporary ROW	20	5.77	14.0	5.77	14.0	--	--	--	--
Permanent ROW	30	5.77	21.0	5.77	21.0	--	--	--	--
On-lease [A] – temporary	20	0.37	0.9	0.37	0.9	--	--	--	--
On-lease [A] – permanent	30	0.37	1.3	0.37	1.3	--	--	--	--
Total Temporary		**6.13**	**14.9**	**6.13**	**14.9**	--	--	--	--
Total Permanent		**6.13**	**22.3**	**6.13**	**22.3**	--	--	--	--

Notes: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.
[A]: No ROW required. Length, width, and area provided as a basis for the analysis of effects.

4.1.5.8 *Alternative 5 - Sevier River Diversion*

Alternative 5 would shift the features of the Sevier River Diversion slightly; however, this alternative would have the same effects on existing ROWs, other land users, access to public lands, traffic, or at-grade railroad crossings as the proposed action. Alternative 5 would slightly decrease the length, but would increase the area of disturbance for the Sevier River Diversion compared with the proposed action (**Table 4.1.5-8**). This difference is primarily caused by the re-location and larger size of the Diversion Channel (Alternative 5), compared with the Diversion Berm and Canal (proposed action). Other differences associated with relocation of the Perimeter Road (Segments P2 and P3), recharge system (Segments R2 and R3), and Perimeter Road spur (Segments S2 and S3) are minimal.

Table 4.1.5-8 Land Ownership, Proposed Action and Alternative 5			
Alternative, Disturbance Type	**Disturbance Width (feet)***	**Length (miles)**	**Area (acres)**
Proposed Action (Segment P2, R2, S2, and Diversion Berm)			
Diversion Berm – permanent	Irregular	Irregular	0.4
Diversion Canal - permanent	125	0.28	4.3
Perimeter Road Segment P2 - temporary	20	0.40	1.0
Perimeter Road Segment P2 - permanent	60	0.40	2.9
Perimeter Road Spur 1 Segment S2 - temporary	20	0.28	0.7
Perimeter Road Spur 1 Segment S2 - permanent	60	0.28	2.0
Recharge Canal Segment R2 - temporary	20	0.33	0.8
Recharge Canal Segment R2 - permanent	120	0.33	4.8
Total Temporary	**--**	**1.01**	**2.4**
Total Permanent	**--**	**1.29**	**14.40**
Alternative 5 (Segment P3, R3, S3, and Diversion Channel)			
Diversion Channel - permanent	Irregular	Irregular	13.3
Perimeter Road Segment P3 - temporary	20	0.34	0.8
Perimeter Road Segment P3 - permanent	60	0.34	2.5
Perimeter Road Spur 1 Segment S3 - temporary	20	0.39	0.9
Perimeter Road Spur 1 Segment S3 - permanent	60	0.39	2.8
Recharge Canal Segment R3 - temporary	20	0.26	0.6
Recharge Canal Segment R3 - permanent	120	0.26	3.8
Total Temporary	**--**	**0.99**	**2.3**
Total Permanent	**--**	**0.99**	**22.44**

Notes: All lengths have been rounded to the nearest hundredth of a mile and areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.
All Project components associated with Alternative 5 would be located in the lease area; therefore, no ROW would be required.
* Disturbance widths are estimated based on the ROW widths of equivalent components that would be located in off-lease ROWs.

4.1.5.9 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Road improvements and construction proposed by CPM would not occur. Existing ROWs would not be affected. Existing land uses would continue. Access to public lands would not change. Traffic would remain at current levels. The at-grade railroad crossings of Headlight Canyon Road and SR 257 would not be constructed. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.6 Native American Religious Concerns

The analysis area, methods, and direct and indirect effects described in this section are summarized from the Resource Report for Native American Religious Concerns (ENValue 2019e).

4.1.6.1 *Analysis Area*

The analysis area for potential direct, indirect, and cumulative effects to Native American religious concerns includes the area that may be directly affected by development of the Project, as well as the area from which Project components would most likely be visible. Visibility is an important factor to consider because the view from a Traditional Cultural Property (TCP) can be an integral component of its setting and its relevance to Native American religious beliefs and practices. The analysis area includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands

within the proposed and alternative ROWs (off-lease lands), and a 15-mile buffer surrounding both the on-lease and off-lease lands.

4.1.6.2 *Methods*

This section describes, compares, and contrasts the potential effects to Native American religious concerns that could be caused by implementation of the proposed action, action alternatives, or no-action alternative. The issue addressed in this section is the potential for the Project to affect TCPs.

4.1.6.3 *Proposed Action*

Based on the notifications and consultations described in Section 6.0 in the Resource Report for Native American Religious Concerns (ENValue 2018e), no Native American religious concerns or potentially affected TCPs have been identified at this time; however, consultation would continue as outlined in the PA. Once the Class III surveys and reports have been completed, the BLM would host a field visit for any interested tribes. If any TCPs are identified through this process, they would be evaluated in accordance with the PA. Potential measures to mitigate effects to TCPs may include, but are not limited to: 1) relocating Project facilities to avoid direct effects; 2) minimizing ground disturbance by careful placement of Project facilities; and 3) scheduling Project activities to avoid conflicts with traditional cultural activities. Based on the lack of known TCPs or other concerns, the proposed action would have no direct or indirect effects on Native American religious concerns.

4.1.6.4 *Alternatives 1 through 5*

Alternatives 1 through 5 would have no direct or indirect effects on Native American religious concerns because there are no known TCPs or other concerns related to the alternative segments.

4.1.6.5 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented. There would be no effect to TCPs or other Native American religious concerns. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.7 Paleontology

The analysis area, methods, and direct and indirect effects described in this section are summarized from the Resource Report for Paleontology (ENValue 2019f) (Paleontology Report).

4.1.7.1 *Analysis Area*

The analysis area for potential direct, indirect, and cumulative effects to paleontological resources is the area that may be affected by development of the Project. This includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands) (Figure 1 in the Paleontology Report). The analysis area is based on the area within which there is the potential for the Project to affect paleontological resources.

4.1.7.2 *Methods*

This section describes, compares, and contrasts the effects to paleontology that could be caused by implementation of the proposed action, action alternatives, or no action alternative. The issue addressed in this section is the potential for loss or degradation of paleontological resources during Project construction, operation, maintenance, or decommissioning.

Geographic Information Systems (GIS) were used to assess the potential presence of fossil-bearing rock formations in the analysis area. The Potential Fossil Yield Classification (PFYC) is a dataset that attributes fossil-bearing potential to a given formation, ranking formations from very low potential (Class I) to very high (Class V), including those formations with Unknown potential. The PFYC was applied to the geologic units in the analysis area based on BLM guidelines provided in Instructional Manual 2016-124 (BLM 2016). These PFYC ratings are preliminary because they are based on literature and

paleontological records. Fieldwork has not been conducted and ground-truthing would be required to make final determinations.

4.1.7.3 *Proposed Action*

Paleontological resources may be affected by excavation and other surface-disturbing activities. Grading, trenching, blasting, and auguring could come across fossils or other resources. These resources may be damaged or destroyed by such activities, reducing or eliminating their potential scientific contribution. Construction activities may also expose fossils, expediting their degradation by the elements or increasing their potential for unauthorized collection. However, not all effects may be adverse. Fossils may be exposed during construction and, if properly collected, could contribute information to the field that would otherwise have remained buried. To minimize effects from the inadvertent discovery of paleontological resources, the applicable design features listed in **Appendix K** would be implemented.

None of the Project facilities, whether on-playa or off-playa, would be constructed in areas with a PFYC of Moderate (Class 3), High (Class 4), or Very High (Class 5); therefore, effects to important paleontological resources in these areas are not expected. However, paleontological resources have been discovered in the Project's general vicinity (for example, near Milford and Fillmore), and the potential for unanticipated resource discovery exists. Per BLM guidance (BLM 2008b, 2016), areas of PFYC 1 and 2 typically have negligible management concerns unless there are known paleontological resources present. There are no known paleontological resources in the area; therefore, Project activities would have no direct or indirect effects in areas with a PFYC of 1 or 2.

The majority of ground disturbance would be within or around the margins of the Sevier Playa. The playa deposits are categorized as Unknown PFYC. Given the geologically recent age of the deposits and the relatively shallow excavations (up to 25 feet), the potential to encounter important fossils is unlikely; however, areas of Unknown PFYC are treated as medium to high management concerns (BLM 2016). Off-playa, linear facilities would cross formations that are considered to have Very Low to Low fossil-bearing potential, as well as areas of Unknown potential. **Table 4.1.7-1** shows the acres of potential effects from the proposed action by PFYC and land ownership. A large portion of the analysis area has an Unknown PFYC, and therefore has a medium to high management concern. Over 80 percent of this Unknown area is the playa itself, an area where paleontological resources are not expected given the nature and age of the sediments. Likewise, the northern portion of the playa is categorized as Deltaic mud, PFYC Very Low to Low. Activities on the playa surface account for 95 percent of the potential effects in this category. Areas of Low potential are primarily associated with the 12.47-kV Power and Communication Line (132.4 acres). Given the limited belowground disturbance caused by power line construction, effects are expected to be negligible.

Table 4.1.7-1 Potential Effects - Proposed Action

Effect Type	PFYC (acres)												Total
	Unknown (U)			Very Low (1)			Very Low (1) to Low (2)			Low (2)			
	BLM	State	Private	BLM	State	Private	BLM	State	Private	BLM	State	Private	
Temporary	390	35	9	--	1	--	461	71	--	27	--	--	**993**
Permanent	109,624	3,898	27	3	--	--	1,907	275	--	63	<1	--	**115,897**
Total	**113,982**	**3,933**	**36**	**3**	**1**	**--**	**2,368**	**346**	**--**	**190**	**<1**	**--**	**116,890**

Note: All areas have been rounded to the nearest acre. Totals may not appear exact because of rounding.
--: Indicates this category does not occur on this ownership.

4.1.7.4 *Alternative 1 - 69-kV Power and Communication Line, North End*

Alternative 1 would increase potential effects because Segment T5 is longer than Segment T1 (**Table 4.1.7-2**); however, these effects would be in an area of Unknown PFYC and cannot be inferred. Given the limited belowground disturbance caused by power line construction, effects are expected to be negligible and not substantially different from the proposed action.

Table 4.1.7-2 Potential Effects – Alternative 1

Effect Type	PFYC (acres)												Total
	Unknown (U)			Very Low (1)			Very Low (1) to Low (2)			Low (2)			
	BLM	State	Private	BLM	State	Private	BLM	State	Private	BLM	State	Private	
Proposed Action - Segment T1													
Temporary	--	--	--	--	--	--	--	--	--	--	--	--	--
Permanent	--	--	--	--	--	--	83	12	--	--	--	--	**95**
Total	**--**	**--**	**--**	**--**	**--**	**--**	**83**	**12**	**--**	**--**	**--**	**--**	**95**
Alternative 1 - Segment T5													
Temporary	--	--	--	--	--	--	--	--	--	--	--	--	--
Permanent	35	--	--	--	--	--	102	--	--	--	--	--	**137**
Total	**35**	**--**	**--**	**--**	**--**	**--**	**102**	**--**	**--**	**--**	**--**	**--**	**137**

Note: All areas have been rounded to the nearest acre. Totals may not appear exact because of rounding.
--: Indicates this category does not occur on this ownership.

4.1.7.5 *Alternative 2 - 69-kV Power and Communication Line, South End*

Alternative 2 would increase potential effects because Segment T6 is longer than Segment T3 (**Table 4.1.7-3**); however, these effects would be in an area of Unknown PFYC and cannot be inferred. Given the limited belowground disturbance caused by power line construction, effects are expected to be negligible and not substantially different from the proposed action.

Table 4.1.7-3 Potential Effects – Alternative 2

Effect Type	PFYC (acres)												Total
	Unknown (U)			Very Low (1)			Very Low (1) to Low (2)			Low (2)			
	BLM	State	Private	BLM	State	Private	BLM	State	Private	BLM	State	Private	
Proposed Action - Segment T3													
Temporary	--	--	--	--	--	--	--	--	--	--	--	--	--
Permanent	--	--	--	--	--	--	39	--	--	--	--	--	**39**
Total	**--**	**--**	**--**	**--**	**--**	**--**	**39**	**--**	**--**	**--**	**--**	**--**	**39**
Alternative 2 - Segment T6													
Temporary	--	--	--	--	--	--	--	--	--	--	--	--	--
Permanent	21	--	--	--	--	--	58	--	--	--	--	--	**79**
Total	**21**	**--**	**--**	**--**	**--**	**--**	**58**	**--**	**--**	**--**	**--**	**--**	**79**

Note: All areas have been rounded to the nearest acre. Totals may not appear exact because of rounding.
--: Indicates this category does not occur on this ownership.

4.1.7.6 *Alternative 3 - Natural Gas Pipeline, Black Rock*

The Natural Gas Pipeline segment that comprises Alternative 3 (Segment G7) is approximately the same length as the proposed segment (G2) (**Table 4.1.7-4**). Compared to surface activities like utility line construction, excavations for pipeline installation have a higher potential for exposing resources. Segment G7 would cross a larger area of Unknown PFYC than Segment G2, increasing the risk for effects to unknown resources.

Table 4.1.7-4 Potential Effects – Alternative 3

Effect Type	PFYC (acres)												Total
	Unknown (U)			Very Low (1)			Very Low (1) to Low (2)			Low (2)			
	BLM	State	Private	BLM	State	Private	BLM	State	Private	BLM	State	Private	
Proposed Action - Segment G2													

Table 4.1.7-4 Potential Effects – Alternative 3													
Effect Type	PFYC (acres)												Total
	Unknown (U)			Very Low (1)			Very Low (1) to Low (2)			Low (2)			
	BLM	State	Private	BLM	State	Private	BLM	State	Private	BLM	State	Private	
Temporary	3	--	3	--	--	--	--	--	--	--	--	--	**6**
Permanent	5	--	4	--	--	--	--	--	--	--	--	--	**9**
Total	**8**	**--**	**7**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**14**
Alternative 3 - Segment G7													
Temporary	6	--	--	--	--	--	--	--	--	--	--	--	**6**
Permanent	9	--	--	--	--	--	--	--	--	--	--	--	**9**
Total	**14**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**14**

Note: All areas have been rounded to the nearest acre. Totals may not appear exact because of rounding.
--: Indicates this category does not occur on this ownership.

4.1.7.7 *Alternative 4 - Natural Gas Pipeline, West End*

The Natural Gas Pipeline segment that comprises Alternative 4 (Segment G8) is slightly longer than the proposed segment (G5) (**Table 4.1.7-5**). Compared to primarily surface activities like utility line construction, excavations for pipeline installation have a higher potential for exposing resources. Alternative 4 avoids a small area of PFYC 2 that would be crossed by the proposed action. Except where paleontological resources are known or found to exist, management concerns for paleontological resources for PFYC 2 areas are generally low and further assessment is usually unnecessary except in occasional or isolated circumstances. Therefore, potential effects from Alternative 4 are expected to be about the same as the proposed action.

Table 4.1.7-5 Potential Effects – Alternative 4													
Effect Type	PFYC (acres)												Total
	Unknown (U)			Very Low (1)			Very Low (1) to Low (2)			Low (2)			
	BLM	State	Private	BLM	State	Private	BLM	State	Private	BLM	State	Private	
Proposed Action - Segment G5													
Temporary	12	--	--	--	--	--	--	--	--	--	--	--	**12**
Permanent	19	--	--	--	--	--	--	--	--	--	--	--	**19**
Total	**31**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**31**
Alternative 4 - Segment G8													
Temporary	15	--	--	--	--	--	--	--	--	--	--	--	**15**
Permanent	22	--	--	--	--	--	--	--	--	--	--	--	**22**
Total	**37**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**37**

Note: All areas have been rounded to the nearest acre. Totals may not appear exact because of rounding.
--: Indicates this category does not occur on this ownership.

4.1.7.8 *Alternative 5 - Sevier River Diversion*

Since Alternative 5 involves the northern end of the playa, and specifically the area where the Sevier River enters the playa, the deposits that would be affected are largely of Unknown or Very Low PFYC (**Table 4.1.7-6**). Deposits in this area are unlikely to contain fossil resources because of their young age and recent disturbance from river flows. The Diversion Channel in Alternative 5 would affect a larger area than the Diversion Berm that is part of the proposed action; however, it would be located in the same playa sediments of Unknown PFYC. Therefore, potential effects are expected to be about the same as the proposed action.

Table 4.1.7-6 Potential Effects – Alternative 5

Effect Type	PFYC (acres)												Total
	Unknown (U)			Very Low (1)			Very Low (1) to Low (2)			Low (2)			
	BLM	State	Private	BLM	State	Private	BLM	State	Private	BLM	State	Private	
Proposed Action – Segments P1, P2, S1, S2, R1, R2, and Diversion Berm													
Temporary	--	--	--	--	--	--	3	--	--	--	--	--	**3**
Permanent	9	--	--	--	--	--	12	--	--	--	--	--	**21**
Total	**9**	**--**	**--**	**--**	**--**	**--**	**15**	**--**	**--**	**--**	**--**	**--**	**24**
Alternative 5 – Segments P1, P3, S1, S3, R1, R3, and Diversion Channel													
Temporary	--	--	--	--	--	--	3	--	--	--	--	--	**3**
Permanent	19	--	--	--	--	--	12	--	--	--	--	--	**31**
Total	**19**	**--**	**--**	**--**	**--**	**--**	**15**	**--**	**--**	**--**	**--**	**--**	**34**

Note: All areas have been rounded to the nearest acre. Totals may not appear exact because of rounding.
--: Indicates this category does not occur on this ownership.

4.1.7.9 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as described in the proposed action and there would be no potential to expose or damage paleontological resources. Any resources present would remain undiscovered, but still available for discovery in the future. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.8 Range Management

The analysis area, methods, and direct and indirect effects described in this section are summarized from the Resource Report for Range Management (ENValue 2019g) (Range Report).

4.1.8.1 *Analysis Area*

The analysis area for potential direct, indirect, and cumulative effects to range management includes all livestock grazing allotments that may be affected by development of the Project. This includes all allotments that contain lands within the boundaries of the potash leases controlled by CPM (on-lease lands), as well as all allotments that contain lands within the proposed or alternative ROWs (off-lease lands) (Figure 1 in the Range Report).

4.1.8.2 *Methods*

This section describes, compares, and contrasts the effects to range management that could be caused by implementation of the proposed action, action alternatives, or no action alternative. The issues addressed in this section include conflicts with allotment management; attraction of livestock to open water (brine or recharge water) and potential for livestock fatalities; loss, reduction, or degradation of water sources used by livestock; loss of forage, including off-playa ROWs; potential for livestock fatalities from increased Project-related traffic; and achievement of rangeland health standards

4.1.8.3 *Proposed Action*

The Project would affect BLM-managed allotments surrounding the playa, as well as SITLA and private lands that may support livestock grazing. Effects are presented by land management entity (BLM, SITLA, or private). The analysis of effects focuses on BLM-managed allotments; however, grazing on state and private lands would be affected as well. Grazing permits are issued by SITLA for state-owned parcels, some of which fall within the boundaries of BLM allotments. In those cases, grazing permittees provide the BLM copies of their state grazing permit(s) and identify parcels of their private land that they want included within an allotment. The state and private lands are then incorporated into the BLM grazing allotments. Permittees agree that all grazing use within the allotment will be within BLM's season-of-use and within the BLM, state, and private AUMs documented on their BLM grazing permit. The analysis

focuses on the overall effects to the grazing allotments in terms of acres and AUMs because grazing permits on state and private lands are included within the BLM grazing allotments. While the analysis splits effects to allotments (acres) by land ownership, it does not differentiate the effects to AUMS between different ownerships.

The Project would affect range resources either by altering the ability of the land to support livestock grazing or by creating potential conflicts between livestock and Project facilities or activities. Project facilities that would be in place for the life of the Project would permanently prevent use of lands within their footprint for livestock grazing. For this analysis, the extent (in acres) of permanent facilities was also included in the permanent effects, even though interim reclamation may provide for some livestock use of these areas. Temporary ROWs were analyzed as temporary effects on the assumption that reclamation in these areas would provide for livestock use following construction and successful reclamation. The analysis assumes that any given acre in an allotment, and across all allotments, is equivalent to any other acre in terms of productivity (as represented by AUMs), access, and use by livestock. While this is unlikely to be true, no data exist to provide for a more detailed analysis. Potential conflicts between livestock and Project facilities or activities are assessed qualitatively. The degree to which livestock would be attracted to Project facilities, both during construction and operation, is unknown.

4.1.8.3.1 Conflicts with Grazing Practices

The proposed action would affect grazing allotments as shown in **Table 4.1.8-1**. Although the playa surface does not provide forage and is rarely used by livestock, several allotment boundaries extend into the playa (Figure 1 in the Range Report**)**. In particular, the Skull Rock Allotment extends quite far beyond the western shore of the playa, over 1.5 miles in some locations. About 15 percent of the Skull Rock Allotment falls within the playa, though the other allotments are entirely off-playa, or nearly so (Table 3 in the Range Report). The large majority (87 percent) of predicted loss of rangelands shown in **Table 4.1.8-1** would be from on-playa facilities (for example, the Perimeter Road, recharge canals, and extraction and recharge trenches) that overlap the range allotments. Since there is no existing forage on the playa, these facilities would not affect the availability of forage across any allotment. To focus the analysis on lands that are more likely to be used for grazing, and where Project activities may reduce forage availability, the playa surface was removed from the analysis. **Table 4.1.8-2** presents effects to the allotments as if they did not extend into the playa and provides a more realistic assessment of effects to lands that are most likely to be used for grazing. All effects presented hereafter, including those related to the alternatives (**Tables 4.1.8-3** through **4.1.8-13**), reflect the removal of the playa surface from the analysis.

Table 4.1.8-1 Effects to Allotments (on- and off-playa), Proposed Action

Allotment	Temporary acres			Permanent acres			Total
	BLM	State	Private	BLM	State	Private	
Beaver Lake	7.0	--	--	14.6	--	--	21.5
Black Rock Winter	9.1	--	--	21.3	--	1.6	32.0
Coates	14.3	5.5	--	116.5	18.3	--	154.5
Crickett	95.9	--	8.5	460.7	25.3	11.8	602.2
Crystal Peak	23.9	16.9	--	43.2	167.1	--	251.1
Deseret	51.3	0.6	--	1,136.2	32.3	--	1,220.3
Red Rock	33.6	2.6	--	59.5	4.1	--	99.8
Seely	36.3	1.5	--	184.0	2.6	--	224.4
Skull Rock	121.7	20.4	--	9,621.2	1,004.9	--	10,768.2
Steamboat	1.3	--	--	25.0	--	--	26.3
Twin Peaks	29.3	2.7	--	81.9	6.6	11.6	132.0
Wheeler	20.1	2.2	--	98.2	3.8	--	124.3

Table 4.1.8-1 Effects to Allotments (on- and off-playa), Proposed Action							
	Temporary acres			Permanent acres			
Allotment	BLM	State	Private	BLM	State	Private	Total
Total	**443.6**	**52.4**	**8.5**	**11,862.2**	**1,264.9**	**25.0**	**13,656.6**

Note: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

Table 4.1.8-2 Effects to Allotments (off-playa only), Proposed Action							
	Temporary acres			Permanent acres			
Allotment	BLM	State	Private	BLM	State	Private	Total
Beaver Lake	4.4	--	--	7.0	--	--	11.5
Black Rock Winter	9.1	--	--	21.3	--	1.6	32.0
Coates	7.5	18.3	--	104.0	18.3	--	134.9
Crickett	76.8	5.1	8.5	345.9	25.3	13.7	470.3
Crystal Peak	23.1	--	--	34.6	5.6	--	66.9
Deseret	24.2	3.6	--	183.7	29.6	--	242.7
Red Rock	36.1	5.2	--	67.0	4.1	--	109.9
Seely	27.7	2.6	--	163.0	2.6	--	194.8
Skull Rock	0.4	1.5	--	15.3	--	--	15.7
Steamboat	0.6	--	--	19.7	--	--	20.4
Twin Peaks	29.3	--	--	81.9	6.6	11.6	132.0
Wheeler	12.4	2.7	--	84.8	3.8	--	103.2
Total	**251.8**	**22.9**	**8.5**	**1,128.2**	**95.9**	**27.0**	**1,534.3**

Note: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

All AUMs are considered to be located off-playa and evenly distributed across BLM-managed lands within each allotment. The potential effect of the proposed action on AUMs available in an allotment has been evaluated in terms of temporary and permanent changes. It is important to note that the analysis in this report does not officially reassess range capability or alter the number of AUMs set for any allotment. The purpose of this analysis is to estimate potential effects to AUMs in addition to the estimate of acres affected. AUMs would be affected by the proposed action as shown in **Table 4.1.8-3.** Allotments with the largest disturbance areas generally have the largest number of AUMs affected because total AUMs affected is partially a function of the total area affected. As **Table 4.1.8-3** shows, effects to AUMs would be minor, with no allotment having greater than 0.5 percent of its total AUMs affected. It is not anticipated that the Project would affect the level and availability of current AUM allocations.

Table 4.1.8-3 AUMs Affected, Proposed Action					
Allotment	Total AUMs	AUMs/ac[1]	AUMs Temporarily Affected	AUMs Permanently Affected	Total AUMs Affected
Beaver Lake	3,255	0.045	0.20	0.32	0.52
Black Rock Winter	1,245	0.125	1.14	2.86	4.01
Coates	1,691	0.082	1.03	10.02	11.06
Crickett	7,890	0.078	6.61	29.84	36.46
Crystal Peak	4,835	0.208	5.54	8.35	13.89
Deseret	8,892	0.028	0.83	5.99	6.82
Red Rock	1,320	0.061	2.37	4.35	6.71
Seely	4,635	0.090	2.65	14.97	17.62

Table 4.1.8-3 AUMs Affected, Proposed Action					
Allotment	Total AUMs	AUMs/ac[1]	AUMs Temporarily Affected	AUMs Permanently Affected	Total AUMs Affected
Skull Rock	2,394	0.041	0.02	0.62	0.64
Steamboat	2,309	0.047	0.03	0.93	0.96
Twin Peaks	15,180	0.070	2.22	6.98	9.20
Wheeler	1,807	0.089	1.31	7.91	9.22

[1] Calculated as the total number of AUMs divided by the off-playa acres within the allotment

The off-playa effects would be caused primarily by the linear Project components, such as the power and communication lines, access roads, and the Natural Gas Pipeline, which generally cross multiple allotments. Specific facilities would affect substantial areas of individual allotments, namely the Rail Loadout Facility (131.8 acres in the Crickett Allotment) and the Processing Facility (70.9 acres in the Crystal Peak Allotment).

The BLM may require grazing restrictions on the reclaimed areas to allow the seeded species to grow and establish. Possible restrictions may include rest during the growing season or no grazing for at least two years following reclamation. The BLM may require fencing of the ROW during reclamation, particularly of underground utilities (for example, the Natural Gas Pipeline or the Water Supply Pipelines). If grazing allotments have pastures, the pastures may be rotated during reclamation so there would be no grazing in the spring. On sheep allotments, the permittees may be required to have their herders keep the sheep off the ROW.

SITLA has issued grazing permits for several state-owned parcels in the analysis area (State of Utah 2018b). The Processing Facility and all nearby facilities fall within a sheep-grazing permit. A portion of this permit would not be affected by the Project; however, the permit may have to be adjusted to remove potential conflicts from about half the area. Portions of a SITLA grazing permit area in Township 22 South, Range 11 West would be affected by access roads and trenches. Water Supply Well 1 is also within a SITLA grazing permit; however, given the small area affected by the well, a measureable loss of forage or other conflict is not expected. The 69-kV Power and Communications Line would cross a parcel of SITLA land on Segment T1. This parcel is permitted for grazing; however, the power line is not expected to cause substantial loss of forage or other conflicts, at least in the long-term. Lastly, the Natural Gas Pipeline would cross a SITLA grazing permit. Temporary effects during construction of the pipeline are contingent upon successful reclamation.

Overall forage production would be reduced by permanent ground disturbance, either from a discrete facility (for example, the Rail Loadout Facility), or from maintenance of a vegetation-free condition (for example, on an access road). Reclamation of temporary disturbances would restore forage production in the temporary ROWs. Grazing allotments containing a substantial portion of the permanent Project footprint may require adjustment to account for the loss of forage with a commensurate reduction in AUMs.

The Project would not preclude or hinder progress towards achieving rangeland health. The majority of effects would be within the playa, which is not managed rangeland. Linear and block facilities off-playa would reduce the overall productivity of allotments by removing a portion of available forage; however, overall health of the rangelands would not be affected. Maintaining ROWs to BLM standards (for example, through erosion control and noxious weed treatment) would facilitate progress towards achieving rangeland health objectives. An existing Rangeland Health Trend Transect is located adjacent to Segment T2 of the 69-kV Power and Communication Line. Prior to construction in this area, the transect should be relocated to avoid effects during construction.

Potential drawdown of groundwater levels by pumping of the water supply wells for freshwater supply was evaluated in a scoping-level analysis presented in detail in the Water Report (Whetstone and

ENValue 2019). A four-tier ranking system was used to describe the likelihood that measurable changes in water levels or flows would occur (**Section 4.1.13.2**). The results of the analysis suggest that drawdown may be five feet or more within a three-mile radius of the water supply well field over the planned 30-year pumping period. Several water sources have a 'moderate' likelihood of drawdown given their close proximity to the well field. However, the drawdown severity of effects was rated as 'minor' or 'no measurable impact anticipated' for all potentially affected wells. Lease stipulations require that CPM replace any water sources that are lost or adversely affected by the Project (**Appendix E**). As part of the Project, water levels in wells would be monitored (CPM 2019n). Considering the low degree of potential effects, monitoring, and requirement for replacement of water in the event of adverse effects, no substantial loss of water sources for livestock is expected.

During construction, Project activities may prevent or limit access to existing watering locations. If this occurs, temporary supplemental water sources may be necessary. Given the sparse, but widespread nature of water sources, CPM should be able to avoid or mitigate (see additional mitigation in **Section 4.4.3**) any limitation or loss of access to watering locations; therefore, no substantial effects are expected.

4.1.8.3.2 Conflicts with Livestock

Certain construction and operation activities may conflict with grazing livestock. Design features (**Appendix K**), have been developed to avoid or minimize potential conflicts. These include coordinating construction activities with the BLM and grazing permittees, maintaining effectiveness of range improvements such as fences and water developments, repairing any inadvertent damage to range improvements, and conducting reclamation to maintain or enhance forage availability.

Livestock may be attracted to open water created by the Project, namely the canals and evaporation ponds. This attraction may come directly from the livestock observing or detecting the water itself, or indirectly by attraction to Project activity on the playa, and then encountering the open water facilities. This attraction could lead to livestock becoming trapped or injured in soft playa mud, livestock could fall in, or they could become ill from ingesting brine or other accumulated salts. This situation may be exacerbated at locations where livestock already frequent the playa margins, such as the numerous small reservoirs near the playa edge or where the Sevier River enters the playa (Figure 1 in the Range Report). The extent to which livestock would be attracted to open water is unknown. CPM, in coordination with the BLM and the grazing permittees, may need to adaptively respond to livestock conflicts. This may include temporary or permanent fencing at the playa boundary, constructing barriers around standing waters created by the Project, installation of cattle guards on access roads, or other measures, all of which would be constructed and maintained by CPM (see additional mitigation in **Section 4.4.3**).

Project traffic would be primarily within the playa boundary, around the Processing Facility, and at the Rail Loadout Facility. This traffic is not expected to conflict with livestock as grazing animals would be excluded from these areas. The largest increase in traffic would be on the roads carrying workers and materials to the site for construction and operations, as well as transporting SOP and MOP between the Processing and Rail Loadout Facilities. These roads include Crystal Peak Road, Crystal Peak Spur Road, and CPM Spur Road. Traffic would also increase on other roads, though not to the same extent. Speed limits have been developed for Project traffic (**Appendix K**) to minimize fugitive dust and reduce the risk of collisions with livestock and wildlife. Along with notification of Project personnel when livestock are present in the area (**Appendix K**), these design features would minimize the risk of collisions with livestock. If any livestock are injured or killed by Project activities, CPM would compensate the permittees for their value. Should conflicts arise between Project vehicles and livestock, temporary fencing, traffic controls, or additional signage may be necessary to reduce the potential for collision.

4.1.8.4 *Alternative 1 - 69-kV Power and Communication Line, North End*

Alternative 1 would replace the cross-country route of Segment T1 with Segment T5, increasing the extent of effects to allotments. This reroute would avoid conflict with one grazing permit area on SITLA land within the Deseret Allotment, although it would cross a larger area of state lands that may have a grazing permit area (**Table 4.1.8-4**). Alternative 1 would affect a greater area (**Table 4.1.8-4**) of potential

grazing lands; however, since Segment T5 would be located adjacent to existing roads, it may affect some areas that are not typically grazed. Overall, assuming all of Segment T5 is available and used for grazing, the 42.7 additional acres of rangeland that may be affected by Alternative 1 represents an increase in total disturbance of about three percent, compared with the proposed action. Since Alternative 1 presents a minor change in the overall Project footprint, the remaining effects to grazing and livestock conflicts would be the same as the proposed action. As only one allotment is affected, corresponding effects to AUMs are proportional to the acreage of effects to BLM-managed lands (**Table 4.1.8-5**)

Table 4.1.8-4 Effects to Allotments, Alternative 1

Alternative, Allotment	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
Proposed Action – Segment T1					
Deseret	Temporary	--	--	--	**--**
	Permanent	82.8	11.7	--	**94.5**
	Total Temporary	**--**	**--**	**--**	**--**
	Total Permanent	**82.8**	11.7	--	**94.5**
Alternative 1 – Segment T5					
Deseret	Temporary	--	--	--	**--**
	Permanent	111.9	15.6	9.7	**137.2**
	Total Temporary	**--**	**--**	**--**	**--**
	Total Permanent	111.9	15.6	9.7	**137.2**

Note: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

Table 4.1.8-5 AUMs Affected, Alternative 1

Alternative, Allotment	Effect Type	AUMs Affected
Proposed Action – Segment T1		
Deseret	Temporary	**--**
	Permanent	2.32
	Total Temporary	**--**
	Total Permanent	**2.32**
Alternative 1 – Segment T5		
Deseret	Temporary	**--**
	Permanent	3.14
	Total Temporary	**--**
	Total Permanent	**3.14**

4.1.8.5 *Alternative 2 - 69-kV Power and Communication Line, South End*

Alternative 2 would replace the cross-country route of Segment T3 with Segment T6, which is nearly double the length of Segment T3; therefore, the associated effects to rangelands are also nearly doubled (**Table 4.1.8-6)**. Effects to AUMs are estimated in **Table 4.1.8-7**. This alternative would only affect BLM-managed lands; however, Segment T6 would affect an additional allotment, Crystal Peak. Unlike Segment T3, which has a cross-country route, Segment T6 would follow existing Crystal Peak Road and Crystal Peak Spur Road. Routing the power line along roads may reduce grazing effects if the roadsides are not typically grazed or do not support forage. Overall, assuming all of Segment T6 is available and used for grazing, the 39.5 additional acres of rangeland that may be affected by Alternative 2 represents an increase in total disturbance of about three percent, compared with the proposed action. Since

Alternative 2 presents a minor change in the overall Project footprint, the remaining effects to grazing and livestock conflicts would be the same as the proposed action.

Table 4.1.8-6 Effects to Allotments, Alternative 2

Alternative, Allotment	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
Proposed Action – Segment T3					
Crickett	Temporary	--	--	--	**--**
	Permanent	39.4	--	--	**39.4**
	Total Temporary	**--**	**--**	**--**	**--**
	Total Permanent	**39.4**	**--**	**--**	**39.4**
Alternative 2 – Segment T6					
Crickett	Temporary	--	--	--	**--**
	Permanent	69.6	--	--	**69.6**
Crystal Peak	Temporary	--	--	--	**--**
	Permanent	9.4	--	--	**9.4**
	Total Temporary	**--**	**--**	**--**	**--**
	Total Permanent	**78.9**	**--**	**--**	**78.9**

Note: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

Table 4.1.8-7 AUMs Affected, Alternative 2

Alternative, Allotment	Effect Type	AUMs Affected
Proposed Action – Segment T3		
Crickett	Temporary	**--**
	Permanent	3.05
	Total Temporary	**--**
	Total Permanent	**3.05**
Alternative 2 – Segment T6		
Crickett	Temporary	**--**
	Permanent	5.40
Crystal Peak	Temporary	--
	Permanent	1.93
	Total Temporary	**--**
	Total Permanent	**7.33**

4.1.8.6 *Alternative 3 - Natural Gas Pipeline, Black Rock*

Alternative 3 (Segment G7) is approximately the same length as the proposed action (Segment G2), so their effects would be comparable, although the alternative would shift effects from private to BLM-managed lands (**Table 4.1.8-8**). Though this alternative avoids private land, the resulting change in effects to AUMs is minimal because of the relatively small areas in question (**Table 4.1.8-9**). In both cases, effects are shown as permanent; however, reclamation of the pipeline excavation would replace some forage. Reclamation may take time to be successful, temporarily reducing the availability of forage. Segment G7 would create a new cross-country ROW, while Segment G2 would follow the Rail Spur. Routing the pipeline along the Rail Spur may reduce grazing effects because disturbed areas from different facilities (the Rail Spur, Rail Spur Access Corridor, and Natural Gas Pipeline) may overlap. It is unknown if the private landowners graze their parcels; however, it is assumed any conflicts would be

resolved in a ROW agreement between the landowner and CPM. Alternative 3 presents a minor change in the overall Project footprint; therefore, the remaining effects to grazing and livestock conflicts would be the same as the proposed action.

Table 4.1.8-8 Effects to Allotments, Alternative 3

Alternative, Allotment	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
Proposed Action – Segment G2					
Crickett	Temporary	3.1	--	2.6	**5.7**
	Permanent	4.6	--	3.9	**8.5**
	Total Temporary	**3.1**	**--**	**2.6**	**5.7**
	Total Permanent	**4.6**	**--**	**3.9**	**8.5**
Alternative 3 – Segment G7					
Crickett	Temporary	5.7	--	--	**5.7**
	Permanent	8.6	--	--	**8.6**
	Total Temporary	**5.7**	**--**	**--**	**5.8**
	Total Permanent	**8.6**	**--**	**--**	**8.6**

Note: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

Table 4.1.8-9 AUMs Affected, Alternative 3

Alternative, Allotment	Effect Type	AUMs Affected
Proposed Action – Segment G2		
Crickett	Temporary	0.24
	Permanent	0.36
	Total Temporary	**0.24**
	Total Permanent	**0.36**
Alternative 3 – Segment G7		
Crickett	Temporary	0.44
	Permanent	0.67
	Total Temporary	**0.44**
	Total Permanent	**0.67**

4.1.8.7 *Alternative 4 - Natural Gas Pipeline, West End*

Alternative 4 (Segment G8) would affect portions of two additional allotments not affected by the proposed action (Segment G5), Crystal Peak and Red Rock, as shown in **Table 4.1.8-10**; however, those allotments would already be affected by other Project components. Though the Crystal Peak Allotment possesses the highest AUM per-acre value, only a small part of the allotment would be affected and the estimated effect to AUMs is minimal (**Table 4.1.8-11**). Despite a longer route with greater effects, routing the pipeline along roads may reduce effects to grazing if the roadsides are not typically grazed or do not support forage. Overall, assuming all of Segment G8 is available and used for grazing, the 6.1 additional acres of rangeland that may be affected by Alternative 4 represents an increase in total disturbance of less than one percent, compared with the proposed action. In both cases, effects are shown as permanent; however, reclamation of the pipeline excavation would replace some forage. Reclamation may take time to be successful, temporarily reducing the availability of forage. Since Alternative 4 presents a minor change in the overall Project footprint, the remaining effects to grazing and livestock conflicts would be the same as the proposed action.

Table 4.1.8-10 Effects to Allotments, Alternative 4					
Alternative, Allotment	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
Proposed Action – Segment G5					
Crickett	Temporary	12.4	--	--	**12.4**
	Permanent	18.6	--	--	**18.6**
	Total Temporary	**12.4**	**--**	**--**	**12.4**
	Total Permanent	**18.6**	**--**	**--**	**18.6**
Alternative 4 – Segment G8					
Crickett	Temporary	12.8	--	--	**12.8**
	Permanent	19.1	--	--	**19.1**
Crystal Peak	Temporary	2.0	--	--	**2.0**
	Permanent	3.1	--	--	**3.1**
Red Rock	Temporary	0.1	--	--	**0.1**
	Permanent	0.1	--	--	**0.1**
	Total Temporary	**14.9**	**--**	**--**	**14.9**
	Total Permanent	**22.3**	**--**	**--**	**22.3**

Note: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

Table 4.1.8-11 AUMs Affected, Alternative 4		
Alternative, Allotment	Effect Type	AUMs Affected
Proposed Action – Segment G5		
Crickett	Temporary	0.96
	Permanent	1.45
	Total Temporary	**0.96**
	Total Permanent	**1.45**
Alternative 4 – Segment G8		
Crickett	Temporary	1.00
	Permanent	1.49
Crystal Peak	Temporary	0.42
	Permanent	0.64
Red Rock	Temporary	0.01
	Permanent	0.01
	Total Temporary	**1.42**
	Total Permanent	**2.14**

4.1.8.8 *Alternative 5 - Sevier River Diversion*

Alternative 5 would create a larger channel for the Sevier River diversion, rather than the smaller berm in the proposed action, and therefore would affect a greater area (**Table 4.1.8-12**). Other differences associated with relocation of the Perimeter Road (Segments P2 and P3), recharge system (Segments R2 and R3), and Perimeter Road spur (Segments S2 and S3) are minimal. The differences between Alternative 5 and the proposed action are largely within the playa boundary and are excluded from this analysis. Only the portions of the segments and berm/channel that lie off-playa are included in this analysis. Alternative 5, like the proposed action, would affect only one allotment, Deseret; therefore, effects to AUMs are proportional to the area affected (**Table 4.1.8-13**). The Deseret Allotment would be

affected in an area on the edge of the playa that may receive little or no grazing use. Alternative 5 presents a minor change in the overall Project footprint; therefore, the remaining effects to grazing and livestock conflicts would be the same as the proposed action.

Table 4.1.8-12 Effects to Allotments, Alternative 5

Alternative, Allotment	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
Proposed Action – Segments P2, R2, S2, and Berm					
Deseret	Temporary	0.7	--	--	--
	Permanent	7.3	--	--	--
	Total Temporary	**0.7**	--	--	--
	Total Permanent	**7.3**	--	--	--
Alternative 5 – Segments P3, R3, S3, and Channel					
Deseret	Temporary	0.3	--	--	--
	Permanent	8.6	--	--	--
	Total Temporary	**0.3**	--	--	--
	Total Permanent	**8.6**	--	--	--

Note: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

Table 4.1.8-13 AUMs Affected, Alternative 5

Alternative, Allotment	Effect Type	AUMs Affected
Proposed Action – Segments P2, R2, S2, and Berm		
Deseret	Temporary	0.02
	Permanent	0.21
	Total Temporary	**0.02**
	Total Permanent	**0.21**
Alternative 5 – Segments P3, R3, S3, and Channel		
Deseret	Temporary	0.01
	Permanent	0.24
	Total Temporary	**0.01**
	Total Permanent	**0.24**

4.1.8.9 *No Action Alternative*

Under the No Action alternative, the Project would not be constructed and there would be no effects to grazing or allotments. Grazing and range improvement practices would continue per the terms of the grazing permits. At its discretion, CPM may retain control of its mineral leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.9 Recreation

The analysis area, methods, and direct and indirect effects described in this section are summarized from the Resource Report for Recreation (ENValue 2019h) (Recreation Report).

4.1.9.1 *Analysis Area*

The analysis area for direct, indirect, and cumulative effects to recreation includes all public lands within a 15-mile radius of Project facilities (**Figure 1**), which is the same distance used for the Visual Resources analysis area. This area was selected as the analysis area for recreation because it contains not only recreational opportunities that may be directly affected, but also areas where recreation users may be able

to view the Project, which could indirectly affect the experience for those users. The analysis area contains several designated or developed recreation opportunities, described below, as well as extensive public lands that are generally open for dispersed (non-developed) uses.

4.1.9.2 *Methods*

This section describes, compares, and contrasts the effects to recreation that could be caused by implementation of the proposed action, action alternatives, or no action alternative. The issue addressed in this section is the potential for conflicts between recreation uses and construction, operation, maintenance, and decommissioning of the Project.

4.1.9.3 *Proposed Action*

Construction, operation, maintenance, and decommissioning of the proposed action would primarily affect the playa and its immediate surroundings. Recreational use of the playa itself is limited by the soft surface; however, some use does occur, as evidenced by vehicle tracks near access points. This use would cease for the life of the Project, to protect public health and safety; however, most recreational users do not access the playa – lands surrounding the playa would remain available for recreational use.

The Cricket Mountain All-Terrain Vehicle (ATV) Trail System lies on the east side of the Project (Figure 1 in the Recreation Report). Its network of trails connects to, and in some places shares, several Project access roads, including the Power Line Access Road, Access Road Segment C2, and Headlight Canyon Road. Public use of these routes may be temporarily restricted to protect public safety when construction activities are taking place on or immediately adjacent to these routes. This may include flaggers controlling traffic, signage directing the public around or away from the work area, or temporary closures during construction. These measures would be detailed in the final Transportation and Traffic and Management Plan (CPM 2019m). All of these routes would remain open to public use during operation, maintenance, and decommissioning of the Project, though the possibility of short-term restrictions would remain when Project activities take place on or immediately adjacent to the roads. At other times, the routes would be open but the public may experience increased traffic from Project vehicles. Given the large extent of available trails adjacent and connected to this area and the low level of anticipated Project traffic on these routes, the ability of the public to use this system would not be substantially reduced.

The Millard County ATV Trail System encompasses all Class B roads, several of which are within the analysis area. Of those, the Project would use Crystal Peak and Crystal Peak Spur Roads, Headlight Canyon Road, Iron Mine Pass Road, Steamboat Pass Road, Long Ridge Reservoir Road, Lake Point Road, Black Rock Road, SR 257 Cutoff Road, and South Peak Road. These routes would remain open to public use at all times, except that Crystal Peak Road may be closed for short periods when the water supply pipelines are under construction. If a pipeline crossing requires extensive construction time, provisions would be made for detours or other measures to permit traffic flow. Recreation users would also experience increased traffic on these roads throughout the life of the Project; however, traffic increases would be relatively minor and would not reach a level that alters the ability of the public to use these routes.

Guy wires pose a known risk to OHV users, particularly in areas where travel is not limited to designated routes. An estimated 93 (five percent) of the 1,773 power and communication line structures would require guy wires, based on detailed engineering of these lines by CPM. About half of the structures with guy wires would be located in places that would not generally be accessible to the public (for example, on the on-playa portion of the 12.47-kV Power Line where it parallels the Perimeter Road). These guyed structures are not expected to pose a risk to OHV users. The other half of the guyed structures would be located in ROWs, often adjacent to existing roads, that would be accessible to the public. Many of these structures would be along the 12.47-kV Power and Communication Line, adjacent to Crystal Peak Road and Crystal Peak Spur Road, while other would be along the 69-kV Power and Communication Line, 25-kV Power Line, 12.47-kV Power Line (the off-playa portions), and 12.47-kV power line spurs. Some of these structures would be adjacent to routes that are part of the Cricket Mountain and Millard County ATV systems.

All guyed structures would include design features (**Figure L-15**) to increase their visibility and reduce the risk of OHV users colliding with the guy wires. The design features would include eight-foot-long yellow sleeves on the guy wires, extending from about one to three feet above ground level to about six to eight feet above ground level. These sleeves would increase the visibility of the guy wires at the height most likely to be encountered by OHV users. In addition, bird flight diverters would be placed on the guy wires above and below the sleeve. The diverters are made of a reflective material and would flutter in the wind, further increasing the visibility of the guy wires. Although CPM has minimized the number of guyed structures through detailed engineering studies and would implement design features to reduce the risk of OHV users colliding with the guy wires, a limited potential for collisions and risk to public safety would remain.

Wildlife viewing opportunities at the mouth of the Sevier River would be affected both by construction and operation of Project facilities and by increased fresh water in the river. Public access to this area may be facilitated by improvements to Access Road A; however, public access would be prohibited on the Perimeter Road. The use of the Sevier River to transport acquired recharge water may increase the quality of wildlife habitat and wildlife use above the diversion, which would provide additional viewing opportunities. However, improved wildlife habitat within and upstream of the analysis area would only be present during Project operation. Once the Project is terminated, acquired water would no longer be necessary, and the Sevier River would return to pre-Project flow regimes. Excess water would no longer be available and any benefits to wildlife would cease, thereby reducing viewing opportunities.

Hunting opportunities would generally not be affected. The playa does not provide habitat for game species; therefore, facilities and activities on the playa would not affect hunting. Off the playa, individual game animals would likely avoid the immediate vicinity of Project facilities when activities are taking place. This effect would be most likely during construction and decommissioning, when activities would take place along the various ROWs.

Recreation activities at locations not immediately adjacent to Project facilities (for example, rock-hounding, sightseeing, and hiking) would not be directly affected. Distant views from these areas toward the Project may be indirectly affected by Project facilities, which are discussed in the visual resource report; however, the ability of the public to pursue these activities would not be affected.

Construction noise has the potential to affect nearby recreational activities. There is an overall absence of sensitive receptors, recreational or otherwise; therefore, effects from noise are not expected (CH2M 2015c). The most frequently used opportunities closest to the Project are OHV trail areas, which would be unaffected because this activity inherently produces its own noise and users are not typically seeking quiet. Effects on opportunities further from the Project are not expected because any noise would be attenuated over the greater distances. During operations, noise would generally be limited to certain facilities, such as the Processing Facility and Rail Loadout Facility. Existing recreational opportunities are located at sufficient distance from these facilities that any noise would be attenuated.

4.1.9.4 *Alternatives 1 through 5*

Alternatives 1 through 5 would not have measurably different effects on recreation, compared with the proposed action, because the recreation opportunities on the proposed and alternative segments are essentially the same.

4.1.9.5 *No Action Alternative*

Under the No Action Alternative, the Project would not be implemented as described in the proposed action. Existing recreation opportunities would continue unaffected in existing locations. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.10 Socioeconomics

The analysis area, methods, and direct and indirect effects described in this section are summarized from the Resource Report for Socioeconomics (ENValue 2018i) (Socioeconomics Report).

4.1.10.1 *Analysis Area*

The analysis area for potential direct, indirect, and cumulative effects to socioeconomics is composed of Millard and Beaver Counties **(**Figure 1 in the Socioeconomic Report). These counties include the communities that are most likely to be affected environmentally, socially, or economically by construction and operation of the Project. The analysis area includes the municipalities of Fillmore and Delta in Millard County and Beaver, Minersville, and Milford in Beaver County. These areas are expected to provide the majority of the local workforce and housing for non-local workers given their proximity to the Project.

4.1.10.2 *Methods*

This section describes, compares, and contrasts the effects to socioeconomics that could be caused by implementation of the proposed action, action alternatives, or no action alternative. The issues addressed in this section include increased local employment and revenue, increased demand for housing and services, and economic effects of water right acquisition

4.1.10.3 *Proposed Action*

4.1.10.3.1 Local Employment and Revenue

Labor would likely be recruited both locally and from throughout Utah and the Rocky Mountain west. The southwest Utah region has a history of mining for precious and base metals, alunite, and uranium, and likely would be a source of both skilled and unskilled labor. The operations producing both potash and halite from brine at the Great Salt Lake as well as Intrepid Potash Inc.'s Wendover, Nevada, facility suggest the ready availability of personnel skilled in the crystallization, harvesting, and processing aspects of brine (CPM 2018a).

The construction workforce is estimated to be approximately 275 workers during peak construction. This includes 100 contractors as well as CPM staff. An estimated 175 full-time workers would be employed during operations. The operations workforce would include an on-site facility manager, administrative support, earthwork, transportation, and other personnel. The majority of the employees would be full-time over the calendar year and throughout the anticipated life of the Project. A large percentage of the workforce would likely come from local communities or elsewhere within Utah, although workers from various parts of the country may be required, particularly for specialized labor. Some temporary staff hired during the construction phase would likely be hired as permanent staff as construction transitions to operation and maintenance.

The Project would contribute directly to the local economy through workforce employment and purchase of goods and services. There would be secondary benefits as well, such as an increase in housing demand; however, it would be speculative to estimate the magnitude of those effects. Nonetheless, the Project is expected to be beneficial to the local economy through tax payments as well as direct and secondary contributions.

4.1.10.3.2 Demand for Housing and Services

Temporary (construction) staff would most likely reside in temporary housing or rental units in Delta, Fillmore, Beaver, Milford, or other locations in Millard or Beaver Counties. Other large construction projects in the analysis area have been successful in securing and housing the necessary construction workforce (for example, the Milford Wind Corridor Phase I and II, UNEV Pipeline, and Magnum Gas Storage projects).

Permanent staff would be hired locally or would move to the area and likely would take up residence in Delta, Fillmore, Beaver, Milford, or other locations in Millard or Beaver Counties. Housing vacancies indicate sufficient inventory to support the permanent housing need created by the Project.

At the Processing and Rail Loadout Facilities, domestic water and sanitary sewage would be collected via an underground sanitary sewer line that is conveyed to an on-site wastewater treatment facility (septic system). The resulting effluent would meet the requirements for discharge to the environment. CPM

would be responsible for ensuring the treatment facility is maintained to the performance standards required by discharge authorizations and would comply with the Utah Administrative Code Rule R317-3 - Design Requirements for Wastewater Collection, Treatment, and Disposal Systems. For remote buildings that have sanitary facilities, a holding tank would be installed and emptied on a regular basis by the Processing Facility maintenance crew or by a third-party contractor for disposal at an approved facility.

Millard County would require a Conditional Use Permit (CUP) for the Project. CUPs focus on direct effects to the health, general welfare, and safety of persons in the immediate area or the county as a whole, and establish reasonable conditions to protect the public interest. Thus, the County's consideration of CPM's application for a CUP would involve an analysis of the effects of the Project on such aspects as schools, medical facilities, law enforcement, employee housing, traffic, and noise. CPM has been proactive in maintaining good communication with the local community. County officials and community members have expressed strong support for the Project and high interest in seeing the Project succeed.

4.1.10.3.3 Economic Effects of Water Right Acquisition

Operation of the Project would require 48,339 ac-ft/yr of recharge water (**Appendix L**). Recharge water would come from a combination of 1) mountain block recharge (groundwater inflow from the bedrock and alluvial aquifers into the playa aquifer); 2) local watershed runoff onto the playa; 3) precipitation on the playa; and 4) the Sevier River, both surplus (natural) flows, and acquired water (that is, water leased or purchased from upstream users and conveyed to the playa). CPM's currently approved water rights (described in Whetstone and ENValue 2019) would contribute to recharge water from mountain block recharge, local watershed runoff, precipitation on the playa and surplus natural flows in the Sevier River; however, in 71 percent of the years between 1985 and 2015 (CH2M 2017a), these sources would not have been adequate to meet the Project's recharge requirements.

In years without adequate natural recharge, CPM would need to acquire (lease or purchase) additional water rights, in addition to its currently approved rights, to make up the difference between recharge requirements and the natural supply. Including transmission losses, CPM would need to acquire an average of 50,179 ac-ft/yr of recharge water (CPM 2019o), as measured at Conks Dam, which is located on the Sevier River about two miles downstream of Deseret. Based on current water use and availability, it is estimated that 40 percent of the acquired recharge water would come from water that is currently being used for agriculture, 40 percent from industrial use, and 20 percent from other uses (CPM 2019o). This water would come from existing water rights on the Sevier River; however, the specific water rights that would be acquired are not currently known.

In the case of conversion of an agricultural water right, there may be a corresponding reduction in local agricultural production and secondary economic activity, depending on the current use of the water rights acquired. This could reduce local business revenue and employment. To illustrate the potential magnitude of this effect, estimates can be made using cost assumptions for crop inputs, yields, and sales. The example provided below is greatly simplified and should be considered speculative. The actual economic effects of acquiring recharge water would be the summation of many factors that are unknown or outside the scope of this analysis.

In those years when recharge water is needed (estimated to be 7 out of 10 years), about 20,000 ac-ft would be acquired from agricultural sources. Assuming all agricultural water is converted from alfalfa production, which typically requires between 2.35 and 3 ac-ft of irrigation water per acre per year, the agricultural portion of the recharge water may equate to between 6,700 and 8,500 fewer acres of alfalfa production. Millard County alfalfa yield averages 4.8 tons per acre (U. S. Department of Agriculture [USDA] 2019a), at a price of between $100 and $200 per ton in the Great Basin (USDA 2019b). This equates to a potential market value of between $3,220,000 and $8,160,000.

In addition to the loss of revenue from sales, reduced production would reduce revenue of supporting businesses such as applicators of fertilizer and pesticides, equipment sales and repair, farm suppliers, and others. These costs can be highly variable, depending on how much labor the farmers supply themselves

versus hiring others, whether they own or rent the land, and other factors. Specific published data on these costs are not available for the analysis area. The University of Idaho (2017) estimated operating costs, including labor and harvesting, at $447 per acre. Assuming a similar cost ($450) for the analysis area, lost secondary revenue could range between $3,015,000 and $3,825,000.

Similarly, acquisition of an industrial water right may reduce economic contributions from the previous industrial use. At the same time, use of the water right(s) by the Project would provide both employment and economic benefits to the local area. Regardless of the source of the water right(s), it would be speculative to evaluate the potential effects of CPM's water right acquisition without knowing the current use of that right. All decisions regarding the transfer, sale, or reallocation of water rights would be administered through UDWRi.

4.1.10.4 *Alternatives 1 through 5*

Alternatives 1 through 5 would not have measurably different effects on employment, housing, services, or water right acquisition, compared with the proposed action, because the number of construction and operation workers, their demand for services, and the need for recharge water would remain the same as for the proposed action.

4.1.10.5 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as described in the proposed action. No temporary or permanent jobs would be created, nor would any employees moving to the area have a need for local housing or community services. Secondary benefits, such as local purchase of goods or services, would not be realized. Existing water rights would remain as currently held and used by their owners. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.11 Soils

The analysis area, methods, and direct and indirect effects described in this section are summarized from the Resource Report for Soils (ENValue 2019j) (Soils Report).

4.1.11.1 *Analysis Area*

The analysis area for potential direct, indirect, and cumulative effects to soils is the area that may be affected by construction, operation, maintenance, and decommissioning of the Project. This includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands) and mineral material sale areas (gravel pits) (Figure 1 in the Soils Report).

4.1.11.2 *Methods*

This section describes, compares, and contrasts the effects to soils that could be caused by implementation of the proposed action, action alternatives, or no action alternative. The issues addressed in this section include soil erosion; loss of productivity; and ability to successfully reclaim and revegetate disturbed areas with desirable species.

GIS data were used to identify the soil types in the analysis area. Effects to soil are calculated by area, and their properties were assessed using soil surveys and other resources from the Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS).

4.1.11.3 *Proposed Action*

Components of the proposed action would be located on the soil types shown in **Table 4.1.11-1**. The large majority (98.7 percent) of all effects would be to Playa soils, which are fine-textured and prone to wind erosion when dry. Excavations and equipment operations on playa soils would generate fugitive dust; however, control measures described in the FDCP (CPM 2019f) would be implemented to reduce wind erosion. The playa itself is for the most part unvegetated, only minimally vegetated around the edges, and is inherently a low-productivity area. Successful reclamation of disturbed playa soils would be

Table 4.1.11-1 Effects by Soil Type, Proposed Action

Soil Type	Temporary Acres			Permanent Acres			Total
	BLM	Private	State	BLM	Private	State	
Alluvial Land	0.4	--	--	2.2	--	--	2.6
Amtoft-Amtoft, Very Shallow-Lodar Families Association, 15 to 60 percent slopes	--	--	--	0.1	--	--	0.1
Antelope Springs-Kessler Association, 1 to 10 percent slopes	1.0	--	1.8	1.5	--	2.7	7.0
Avalon Family-Robozo-Petaca Family Association, 0 to 4 percent slopes	10.7	--	--	34.1	5.9	--	50.7
Bluewing Very Cobbly Loam, 3 to 10 percent slopes, eroded	4.9	--	1.5	26.0	--	2.6	35.1
Checkett Family-Rock Outcrop Complex, 15 to 50 percent slopes	11.1	--	0.4	18.2	--	0.4	29.8
Decca Loam, 1 to 3 percent slopes	--	--	0.6	--	--	0.9	1.5
Dera Sandy Loam Families Association, 2 to 8 percent slopes	207.2	7.5	29.3	821.4	12.3	192.6	1,270.4
Dune Land	1.7	--	--	14.3	--	--	16.0
Escalante Sandy Loam, 2 to 10 percent slopes, eroded	1.8	--	--	9.7	3.4	2.6	17.5
Firmage-Oakden Association, 5 to 30 percent slopes	3.8	--	--	7.1	--	--	10.9
Goshute Gravelly Loam-Goshute Gravelly Sandy Loam Families Association, 2 to 8 percent slopes	--	--	--	6.5	--	--	6.5
Goshute Gravelly Silt Loam	0.2	--	--	<0.1	--	2.4	2.7
Hiko Springs Sandy Loam, 3 to 10 percent slopes, eroded	5.1	--	--	110.6	--	8.8	124.5
Kessler Cobbly Loam, 3 to 20 percent slopes	0.7	--	--	1.1	--	--	1.8
Kessler Loam, 1 to 10 percent slopes	2.8	--	--	8.1	--	--	10.9
Kessler-Hiko Peak Association, 1 to 20 percent slopes	4.4	--	--	6.9	--	--	11.3
Kessler-Hiko Peak-Heist Families Association, 1 to 8 percent slopes	3.2	--	--	7.4	--	--	10.6
Kessler-Penoyer Association, 1 to 20 percent slopes	3.4	--	--	5.0	--	--	8.4
Lynndyl-Uvada Families-Duneland Association, 0 to 15 percent slopes	1.1	--	--	26.6	--	--	27.6
Penoyer Silt Loam, 1 to 3 percent slopes	1.3	--	0.2	13.4	3.3	1.4	18.6
Playas	591.1	--	72.4	110,479.0	--	3,941.7	115,084.1
Uvada Silt Loam	7.3	--	--	83.6	--	18.4	109.3
Uvada-Skumpah Families Association, 0 to 2 percent slopes	5.7	1.0	--	15.1	2.0	--	23.8
Yaki Family-Rock Outcrop Complex, 10 to 40 percent slopes	8.8	--	--	14.4	--	--	23.1
Total	**877.9**	**8.5**	**106.4**	**111,712.2**	**27.0**	**4,173.1**	**116,905.1**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

limited by the physical and chemical properties of the soils and no attempt would be made to establish vegetation in areas that are not currently vegetated.

Of the remaining soils, 0.9 percent of effects would be to Dera sandy loams. Textures of this soil type are sandy loam throughout the profile with up to 20 percent rock fragments, primarily gravel. These soils would be affected by the 69-kV Power and Communications Line, Processing Facility, and Rail Loadout Facility, among other components of the proposed action. Dust suppression would likely be necessary to reduce wind erosion from these soils. Dera soils have a Soil Capability Class of 7s. Class 7 soils have very severe limitations that make them unsuited to cultivation and the 's' Subclass indicates the limitations are within the rooting zone (SCS 1961). This rating is a function of the high gravel content and limited development typical of the alluvial fans where these soils are mapped. Productivity and reclamation would be limited by soil properties, and topsoil salvage or other reclamation techniques may not be effective.

The remaining soils types affected by the Project are typical of the dry climate and varied topography of the analysis area. Control of wind erosion from disturbed soils, as described in the FDCP (CPM 2019f), would likely be necessary. Productivity and reclamation potential would be limited by environmental conditions (for example, low annual precipitation). A Reclamation Plan (CPM 2018h) has been developed to improve the likelihood of successful reclamation. The Reclamation Plan includes measures for topsoil salvage and replacement, contouring to match surrounding topography, and seeding procedures. Monitoring and reporting procedures are in place to ensure reclamation is successful per the goals of the plan. Those goals reflect a baseline condition that captures the natural limitations of the soils, including adaptive management to correct areas that are not meeting reclamation goals.

4.1.11.4 *Alternative 1 - 69-kV Power and Communication Line, North End*

Although Alternative 1 would follow existing disturbance along several roads, it would increase overall effects to soils because Segment T5 is longer than Segment T1 (**Table 4.1.11-2**). In some locations, playa soils are present outside the Sevier Playa, where conditions exist to support their formation, including along Segment T1. Effects to playa soils along Segment T1 would not be on the Sevier Playa, but rather to soils that share the characteristics and properties of the playa, as mapped by the NRCS. Uvada soils are indicative of old lakebeds and would be affected by both segments. Segment T5 would affect additional areas of Hiko Springs soils. These soils are coarser than Uvada soils and may not be as susceptible to wind erosion, depending on site conditions. Both soils present equally difficult challenges for reclamation with a Soil Capability Class of 7s indicating severe limitations within the rooting zone. Overall, Alternative 1 would increase disturbance by 42.7 acres, which would increase the extent of non-playa soil disturbance by about three percent.

Table 4.1.11-2 Effects to Soils, Alternative 1

Soil Type	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
Proposed Action – Segment T1					
Playas	Temporary	--	--	--	**--**
	Permanent	16.8	--	--	**16.8**
Hiko Springs Sandy Loam	Temporary	--	--	--	**--**
	Permanent	12.1	--	--	**12.1**
Uvada Silt Loam	Temporary	--	--	--	**--**
	Permanent	53.8	11.7	--	**65.6**
	Total Temporary	**--**	**--**	**--**	**--**
	Total Permanent	**82.8**	**11.7**	**--**	**94.5**
Alternative 1 – Segment T5					
Playas	Temporary	--	--	--	--

Table 4.1.11-2 Effects to Soils, Alternative 1					
Soil Type	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
	Permanent	1.0	--	--	**1.0**
Hiko Springs Sandy Loam	Temporary	--	--	--	--
	Permanent	28.0	8.3	--	**36.6**
Uvada Silt Loam	Temporary	--	--	--	--
	Permanent	82.9	7.3	9.7	**99.9**
Total Temporary		**--**	**--**	**--**	--
Total Permanent		**111.9**	**15.6**	**9.7**	**137.2**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

4.1.11.5 *Alternative 2 - 69-kV Power and Communication Line, South End*

Although Alternative 2 would follow existing disturbance along several roads, it would increase overall effects to soils because Segment T6 is longer than Segment T3 (**Table 4.1.11-3**). Both the proposed action and Alternative 2 would affect the same soil type, Dera sandy loam; therefore, specific issues regarding erosion and reclamation would not be substantially different. Overall, Alternative 2 would increase soil disturbance by 39.5 acres, which would increase the extent of non-playa soil disturbance by about two percent.

Table 4.1.11-3 Effects to Soils, Alternative 2					
Soil Type	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
Proposed Action – Segment T3					
Dera Sandy Loam	Temporary	--	--	--	--
	Permanent	39.4	--	--	**39.4**
Total Temporary		**--**	**--**	**--**	**--**
Total Permanent		**39.4**	**--**	**--**	**39.4**
Alternative 2 – Segment T6					
Dera Sandy Loam	Temporary	--	--	--	--
	Permanent	78.9	--	--	**78.9**
Total Temporary		**--**	**--**	**--**	--
Total Permanent		**78.9**	**--**	**--**	**78.9**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

4.1.11.6 *Alternative 3 - Natural Gas Pipeline, Black Rock*

Alternative 3 (Segment G7) and the proposed action (Segment G2) are nearly the same length and would have the same overall effects to soils (**Table 4.1.11-4**). Alternative 3 would avoid an area of Uvada silt loam, but this soil type is similar to the Dera Sandy Loam that would be affected by the proposed action. No substantial difference in overall effects is anticipated.

Table 4.1.11-4 Effects to Soils, Alternative 3					
Soil Type	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
Proposed Action – Segment G2					
Dera Sandy Loam	Temporary	2.8	--	1.7	**4.5**

Table 4.1.11-4 Effects to Soils, Alternative 3					
Soil Type	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
	Permanent	4.2	--	2.5	**6.7**
Uvada Silt Loam	Temporary	0.3	--	0.9	**1.2**
	Permanent	0.5	--	1.4	**1.9**
	Total Temporary	**3.1**	**--**	**2.6**	**5.7**
	Total Permanent	**4.6**	**--**	**3.9**	**8.5**
Alternative 3 – Segment G7					
Dera Sandy Loam	Temporary	5.7	--	--	**5.7**
	Permanent	8.6	--	--	**8.6**
Uvada Silt Loam	Temporary	--	--	--	**--**
	Permanent	--	--	--	**--**
	Total Temporary	**5.7**	**--**	**--**	**5.7**
	Total Permanent	**8.6**	**--**	**--**	**8.6**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

4.1.11.7 *Alternative 4 - Natural Gas Pipeline, West End*

Although it would follow existing disturbance along several roads, Alternative 4 (Segment G8) is slightly longer than Segment G5 (proposed action) and would affect a slightly large area of soils (**Table 4.1.11-5**). However, this alternative would affect the same soil type as the proposed action and no substantial difference in overall effects is anticipated. Overall, Alternative 4 would increase soil disturbance by 6.1 acres, which would increase the extent of non-playa soil disturbance by less than one percent.

Table 4.1.11-5 Effects to Soils, Alternative 4					
Soil Type	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
Proposed Action – Segment G5					
Dera Sandy Loam	Temporary	12.4	--	--	**12.4**
	Permanent	18.6	--	--	**18.6**
	Total Temporary	**12.4**	**--**	**--**	**12.4**
	Total Permanent	**18.6**	**--**	**--**	**18.6**
Alternative 4 – Segment G8					
Dera Sandy Loam	Temporary	14.9	--	--	**14.9**
	Permanent	22.3	--	--	**22.3**
	Total Temporary	**14.9**	**--**	**--**	**14.9**
	Total Permanent	**22.3**	**--**	**--**	**22.3**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

4.1.11.8 *Alternative 5 - Sevier River Diversion*

Alternative 5 would be located on the northern margin of the playa and would affect dune and playa soils. Alternative 5 would affect a slightly higher extent of playa soils and a slightly lower extent of dune lands than the proposed action (**Table 4.1.11-6**). This difference is primarily caused by the re-location and larger size of the Diversion Channel (Alternative 5), compared with the Diversion Berm and Canal (proposed action)., totaling an increase of about 0.9 acres of permanent soil disturbance compared to the proposed action. Other differences associated with relocation of the Perimeter Road (Segments P2 and

P3), recharge system (Segments R2 and R3), and Perimeter Road spur (Segments S2 and S3) are minimal. Both soil types have low productivity and support limited vegetation. They have a high potential for erosion and would pose challenges for reclamation. Other than the extent of soils that would be affected, no substantial differences in soil effects are anticipated between Alternative 5 and the proposed action.

Table 4.1.11-6 Effects to Soils, Alternative 5

Soil Type	Effect Type	Area Affected (acres)			
		BLM	State	Private	Total
Proposed Action – Segments P2, R2, S2, and Diversion Berm					
Dune Lands	Temporary	--	--	--	--
	Permanent	6.2	--	--	**6.2**
Playas	Temporary	3.3	--	--	**3.3**
	Permanent	17.4	--	--	**17.4**
Total Temporary		**3.3**	**--**	**--**	**3.3**
Total Permanent		**23.6**	**--**	**--**	**23.6**
Alternative 5 – Segments P3, R3, S3, and Diversion Channel					
Dune Lands	Temporary	--	--	--	--
	Permanent	2.1	--	--	2.1
Playas	Temporary	2.8	--	--	2.8
	Permanent	23.0	--	--	23.0
Total Temporary		**2.8**	**--**	**--**	**2.8**
Total Permanent		**25.1**	**--**	**--**	**25.1**

Notes: All areas have been rounded to the nearest tenth of an acre. Totals may not appear exact because of rounding.

4.1.11.9 *No Action Alternative*

Under the No Action alternative, the Project would not be constructed and soils would not be affected. Natural process of wind and water erosion would continue. Soils would remain undisturbed and subject to local soil forming factors such as climate, parent material, and the action of organisms. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.12 Visual Resources

The analysis area, methods, and direct and indirect effects described in this section are summarized from the Resource Report for Visual Resources (ENValue 2019k) (Visual Report).

4.1.12.1 *Analysis Area*

The analysis area for potential direct, indirect, and cumulative effects to visual resources extends 15 miles from all Project facilities and is shown in Figure 1 in the Visual Report. This analysis area was selected because it encompasses the areas that the BLM considers the foreground, middleground, and background viewing zones from which various Project components may be visible.

4.1.12.2 *Methods*

This section describes, compares, and contrasts the effects to visual resources that could be caused by implementation of the proposed action, action alternatives, or no-action alternative. The issues addressed in this section include visibility of Project facilities and visual effects of fugitive dust.

The majority of the visual effects analysis was conducted by CH2M (2017b, 2018) and CPM (2019p). The process used by CH2M (2017b, 2018) to identify the potential visual effects of the Project is described in the Visual Report. In summary:

- A viewshed analysis was conducted to identify the area from which the Project has the potential to be visible. The results of this analysis are shown in Figure 2 in the Visual Report.
- Key observation points (KOPs) were selected for representative and sensitive viewing areas. The KOPs are shown in Figure 2 in the Visual Report.
- Visual simulations were developed that show existing views from the KOPs, as well as the views as they would appear with the Project in place. The visual simulations are provided in Appendix A in the Visual Report
- Visual Contrast Rating Worksheets were completed to characterize the existing conditions, assess the degree of contrast that would be created by the Project, and determine the consistency of predicted effects with the degree of contrast allowed by the designated VRM classifications. The Visual Contrast Rating Worksheets are provided in Appendix B in the Visual Report.
- CH2M's (2017b, 2018) and CPM's (2019p) visual effects analysis was reviewed extensively by the BLM and ENValue. The Visual Contrast Rating Worksheets were reviewed and edited as needed to conform to BLM's and ENValue's analysis of effects. Editorial changes were made to the captions of the visual simulations for clarity and consistency, but the simulations themselves were deemed accurate and were not edited. The analysis of effects was developed by BLM and ENValue, without input from CH2M or CPM.

4.1.12.3 *Proposed Action*

4.1.12.3.1 Fugitive Dust

Background information on fugitive dust, as well as the predicted effects of the Project on fugitive dust, is described in the resource report for Air Quality and Climate (MMA and ENValue 2019). In summary, the Project would be located in an area with a dry and windy climate, meaning that fugitive dust is occasionally produced from both natural sources and areas that have been disturbed by human activity. The Project would have the potential to generate additional fugitive dust, particularly during high wind events. Design Features in the Fugitive Dust Control Plan (CPM 2019f) would be employed to avoid, minimize, and mitigate dust emissions from the Project. Despite use of these measures, there would likely be occasions when visible fugitive dust is produced from areas occupied by the Project. These events would be infrequent and short-lived, such that no substantial impairment of visual quality would occur.

4.1.12.3.2 Viewshed Analysis

The viewshed analysis (Figure 2 in the Visual Report) shows the parts of the analysis area from which one or more Project components would be visible. In general, many of the areas from which the Project would be visible receive little public use. The main areas from which the public would see portions of the Project include Hwy 6/50, SR 257, Crystal Peak Road, and several designated ATV trail areas. Project facilities would not be visible from Crystal Peak, King's Canyon, Elephant Rock, the "Old Pig" formation, Lace Curtain, or Cove Fort because of distance and intervening topography.

Travelers on Hwy 6/50 would have views of the north end of the playa, including the preconcentration ponds, Perimeter Road, and extraction and recharge trenches, collectors, and canals. KOPs 1, 3, and 4 were used to assess potential visual effects of the Project on travelers on Hwy 6/50.

Travelers on SR 257 would see fewer Project components. Those on the highway near Black Rock substation would see the 69-kV Power and Communication Line, as well as the Black Rock Communication Tower. From SR 257 near Black Rock, the Rail Loadout Facility and the Rail Spur (which would cross SR 257), would be the most visible Project components. The 12.47-kV Power and Communication Line and the potential aboveground segment of the Natural Gas Pipeline may also be visible from SR 257. Of note, none of the Mining Project, including the on-playa facilities and the Processing Facility, would be visible from SR 257 because the Cricket Mountains would screen views of these components. KOPs 13 and 14 were used to assess potential visual effects of the Project on travelers on SR 257.

Travelers on Crystal Peak Road would have different views depending on location. East of the Cricket Mountains, the Rail Loadout Facility including Rail Spur, 12.47-kV Power and Communication Line, and Pass Federal Pit may be visible. KOPs 10 and 11 were used to assess potential visual effects of the Project on travelers on this segment of Crystal Peak Road. West of the Cricket Mountains, travelers would have views of the south end of the playa, including the Processing Facility, production ponds, Waste Product Storage Area, Perimeter Road, several linear utilities, and extraction and recharge trenches, collectors, and canals. KOPs 6, 7A, and 7B were used to assess potential visual effects of the Project on travelers on this segment of Crystal Peak Road.

The Amasa Basin and Cricket Mountains ATV trail system attract OHV users to the analysis area. Trail users at Amasa Basin would have views of the north end of the playa, including the preconcentration ponds, Perimeter Road, and extraction and recharge trenches, collectors, and canals. KOP 2 was used to assess potential visual effects of the Project on users of the Amasa Basin ATV trail system. Users of the Cricket Mountain ATV trail system would have different views of the Project, depending on which trail(s) they were using. On the east side of the Cricket Mountains, views may include the Rail Loadout Facility and Rail Spur, the 12.47-kV Power and Communication Line, and the potential aboveground segment of the Natural Gas Pipeline. On the west side of the Cricket Mountains, views may include the Processing Facility, preconcentration ponds, production ponds, Waste Product Storage Area, Perimeter Road, several linear utilities, and extraction and recharge trenches, collectors, and canals. Of particular note, the 69-kV Power and Communication Line, North Playa Substation, and 25-kV Power Line would be located near the Power Line Access Road, which is part of the Cricket Mountain ATV trail system. Users of this route would have foreground views of these Project components. KOPs 8, 9, and 12 were used to assess the potential visual effects on users of the Cricket Mountain ATV trail system.

The viewshed analysis did not take into account the potential screening effects of vegetation or structures. As a result, although the analysis suggests that the Rail Loadout Facility could be seen from residences at Black Rock, it would not be readily visible because of the viewing distance and intervening vegetation. Similarly, the potential aboveground segment of the Natural Gas Pipeline would not be visible from these residences because it would be located approximately 1.8 miles to the northwest and views would be blocked by intervening topography.

From Notch Peak, the closest edge of the playa (near Access Road Segment F) is about 12 miles away. The nearest edge of the preconcentration ponds would be about 16 miles away, and the Processing Facility would be more than 30 miles away. In most situations, these distances would limit visual effects, particularly if topography or vegetation were to screen the proposed facilities from view. In the case of Notch Peak, the angle of view from high above the Sevier Desert would increase the visibility of Project features. The extraction and recharge trenches, recharge collectors, recharge canals, extraction canal, spoil piles, Perimeter Road, and preconcentration pond berms would form distinct lines across the currently homogenous playa surface. Initially, these features would be darker gray in color compared with the smooth, light gray to white surface of the playa. Over time, their color is expected to fade to one more similar to that of the surrounding playa, which would reduce their degree of visibility. Water would be visible in the preconcentration ponds, trenches, and canals, contrasting with the generally dry playa surface. More distant Project features, such as the Processing Facility would not be visible from Notch Peak. While the appearance of the playa would be noticeably altered, the Project would introduce a relatively small element of change to the vast panoramic landscape and create a weak level of contrast.

4.1.12.3.3 Key Observation Points and Visual Simulations

This section provides a narrative summary of the assessment of visual effects, based on the degree of visual contrast that would be created by the Project, which is described in the BLM Visual Contrast Rating Worksheets (Appendix B in the Visual Report), and the systematic comparison of existing conditions and the with-Project views in the visual simulations (Appendix A in the Visual Report). Consistency with the designated VRM class is discussed in **Section 4.3.12**. The analysis in the Visual Report considers how the Project would interact with the results of the 2011 VRI inventory and potential

future VRM classes if they were to be adopted; however, that analysis is not summarized here because the WSRA RMP has not been amended to incorporate the results of the 2011 VRI inventory

4.1.12.3.3.1 KOP 1

Eastbound travelers on Hwy 6/50 near KOP 1 may notice modifications to the playa's surface caused by the preconcentration ponds, Perimeter Road, extraction and recharge trenches, recharge collectors, recharge canals, extraction canal, and extraction well solar panels. The preconcentration ponds would appear as a large expanse of water across the northeast side of the playa, with thin divisions of the internal berms. The expanse of water would be smooth and reflect the sky and the nearby mountains, contrasting with the surface of the playa. The long spoils piles from trench, collector, and canal excavation, as well as the low berm of the Perimeter Road, would form a series of horizontal lines across the remainder of the playa surface. Initially, these features would be darker gray in color and would have rough edges, compared with the smooth, light gray to white surface of the playa. Over time, their color is expected to fade to one more similar to that of the surrounding playa, which would reduce their degree of visual effect. From this viewpoint and at this distance, the trenches themselves would be only faintly visible, as would any water in the trenches. The extraction well solar panels would be visible as faint black dots spread across the playa surface. The Project, as visible from this KOP, would generally cause weak to moderate changes to the landscape. Project features would be visible, and some may attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.2 KOP 2

Members of the public at the staging area for the Amasa Basin ATV trail system, where KOP 2 is located, may notice modifications to the playa's surface caused by the preconcentration ponds, Perimeter Road, extraction and recharge trenches, recharge collectors, recharge canals, extraction canal, and extraction well solar panels. The preconcentration ponds would appear as a large expanse of water on the far side of the playa, with thin divisions of the internal berms. The expanse of water would be smooth and reflect the sky and the nearby mountains, contrasting with the surface of the playa. The long spoils piles from trench, collector, and canal excavation, as well as the low berm of the Perimeter Road, would form a series of horizontal lines across the remainder of the playa surface. Initially, these features would be darker gray in color and would have rough edges, compared with the smooth, light gray to white surface of the playa. Over time, their color is expected to fade to one more similar to that of the surrounding playa, which would reduce their degree of visual effect. From this viewpoint and at this distance, the trenches themselves would be only faintly visible, as would any water in the trenches. The extraction well solar panels would be barely visible, as faint black dots spread across the playa surface. The Project, as visible from this KOP, would generally cause weak to moderate changes to the landscape. Project features would be visible, and some may attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.3 KOP 3

Travelers on Hwy 6/50 near KOP 3 would likely notice modifications to the playa's surface caused by the Perimeter Road, extraction and recharge trenches, recharge collectors, recharge canals, extraction canal, and extraction well solar panels. The long spoils piles from trench, collector, and canal excavation, as well as the low berm of the Perimeter Road, would form a series of distinct horizontal lines across the currently homogenous playa surface. These lines would give the appearance that the surface of the playa is divided into blocks. Initially, these features would be darker gray in color and would have rough edges, compared with the smooth, light gray to white surface of the playa. Over time, their color is expected to fade to one more similar to that of the surrounding playa, which would reduce their degree of visual effect; however, they would remain clearly visible from this KOP because of their proximity and vertical relief. Water would likely be visible in some trenches. The extraction well solar panels would be clearly visible as black blocks that stand out against the otherwise smooth, white to light gray surface of the playa. The Project, as visible from this KOP, would cause moderate to strong changes to the landscape, primarily because the KOP is located close to the playa, where the Perimeter Road, extraction and recharge trenches and canals, and other Project features are located in the foreground and middleground.

Project features would be visible, and some would likely attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.4 KOP 4

Travelers on Hwy 6/50 near KOP 4 may notice modifications to the playa's surface caused by the preconcentration ponds, Perimeter Road, extraction and recharge trenches, recharge collectors, recharge canals, extraction canal, and extraction well solar panels. The berms that define the preconcentration ponds would be visible in the distance. The long spoils piles from trench, collector, and canal excavation, as well as the low berm of the Perimeter Road, would be visible across the playa surface. The overall effect of the preconcentration pond berms, spoils piles, and Perimeter Road would be a series of new horizontal features on the playa that would be consistent with the other horizontal elements in the view. Initially, these features would be darker gray in color and would have rough edges, compared with the smooth, light gray to white surface of the playa. Over time, their color is expected to fade to one more similar to that of the surrounding playa, which would reduce their degree of visual effect. The preconcentration ponds would add an area of reflective water to the center of the playa; however, because of the flat angle of view, the water would not become a dominant element in the view. The apparent color of the water would depend on weather conditions at the time of observation. From this viewpoint and at this angle, the trenches themselves would be only faintly visible, as would any water in the trenches. The extraction well solar panels would be visible as small black dots spread across the playa surface. The Project, as visible from this KOP, would generally cause weak to moderate changes to the landscape. Project features would be visible, and some may attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.5 KOP 5

While KOP 5 is located on a dirt road south of Hwy 6/50 and east of Steamboat Pass Road that likely receives little use, it provides a useful viewpoint to illustrate potential visual effects in this area. Project features visible from this KOP would include the preconcentration ponds, Perimeter Road, extraction and recharge trenches, recharge collectors, recharge canals, extraction canal, and extraction well solar panels. The berms that define the preconcentration ponds would be visible in the distance. A small area of water would be visible in these ponds; however, because of the flat angle of view, the water would not become a dominant element in the view. The apparent color of the water would depend on weather conditions at the time of observation. The numerous, long spoils piles from trench, collector, and canal excavation, as well as the low berm of the Perimeter Road, would be visible across the playa surface. The overall effect of the preconcentration pond berms, spoils piles, and Perimeter Road would be a series of new horizontal features on the playa that would be consistent with the other horizontal elements in the view. Much of the light gray to white playa surface would be broken up by the lines of darker gray spoils because of the angle of view from this KOP and the orientation of the spoils piles. Over time, their color is expected to fade to one more similar to that of the surrounding playa, which would reduce their degree of visual effect. From this viewpoint and at this angle, any water in the trenches or canals would be only faintly visible. The extraction well solar panels would be visible as small black dots spread across the playa surface. The Project, as visible from this KOP, would generally cause moderate to strong changes to the landscape, primarily because an observer would view the Project from an angle that clearly shows the Perimeter Road, extraction and recharge trenches and canals, and other Project features. Project features would be visible, and some would likely attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.6 KOP 6

Users of Crystal Peak Road near KOP 6 would likely notice modifications to the landscape caused by the Processing Facility, production ponds, Perimeter Road, haul roads, extraction and recharge trenches, recharge collectors, recharge canals, 69-kV Power and Communication Line, 12.47-kV Power and Communication Line, 12.47-kV Power Line, and gravel pits. The Processing Facility would be clearly visible at the south end of the playa as a rectangular mass with a composition of horizontal and vertical lines. Although the gray color proposed for this facility would blend with the vegetation in the foreground

and the mountains in the far background, it would cause the structures to contrast strongly with the white surface of the playa behind it. The soil stockpile would form a distinct horizontal line in front of the Processing Facility. The light tan color of the stockpile would contrast with the darker tans, grays, and greens of the surrounding vegetation. The production ponds would appear as a large expanse of water with thin divisions of the internal berms to the left (west) of the Processing Facility. The expanse of water would be smooth, reflecting the sky and the nearby mountains, which would contrast with the surface of the playa. The long spoils piles from trench, collector, and canal excavation, as well as the low berm of the Perimeter Road and haul roads, would form a series of horizontal lines across the remainder of the playa surface. Initially, these features would be darker gray in color and would have rough edges, compared with the smooth, light gray to white surface of the playa. Over time, their color is expected to fade to one more similar to that of the surrounding playa, which would reduce their degree of visual effect. From this viewpoint and at this distance, the trenches themselves would be only faintly visible, as would any water in the trenches. The extraction well solar panels would be barely visible, as faint black dots spread across the playa surface. The line of H-frame structures for the 69-kV Power and Communication Line that extend along the southern edge of the playa east from the Processing Facility would be noticeable. The degree of contrast would be weak to moderate because of the relatively small scale when seen at this distance and the consistency of the line of structures with the horizontal lines created by the playa's shoreline. The lines of poles for the 12.47-kV Power and Communication Line and 12.47-kV Power Line leading south and north, respectively, from the Processing Facility would be barely noticeable because of the small scale of the poles. Barren areas of the tops of the gravel pits would be visible; however, they would only add weak horizontal lines because of the low angle of the view and because they would be excavated below the level of the plain. The Project, as visible from this KOP, would generally cause moderate to strong changes to the landscape, primarily because the Processing Facility, production ponds, and other Project features would be located in the middleground. Project features would be visible, and some would likely attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.7 KOP 7A

Users of Crystal Peak Road near KOP 7A would likely notice modifications to the landscape caused by the Processing Facility, production ponds, Waste Product Storage Area, Perimeter Road, haul roads, extraction and recharge trenches, recharge collectors, recharge canals, extraction well solar panels, 69-kV Power and Communication Line, 12.47-kV Power and Communication Line, 12.47-kV Power Line, Natural Gas Pipeline and gravel pits. This elevated panoramic view encompasses a large part of the southern playa and surrounding basin. The Processing Facility would be seen as a small but distinct group of blocky structures in the distance at the playa's southern end. Although distant, the facility would contrast moderately with the white to light gray surface behind it as seen from this viewpoint. The light-colored soil stockpile would add a horizontal line in front of the Processing Facility that would contrast noticeably with the surrounding darker vegetation. The production ponds and Purge Brine Storage Pond would appear as a large expanse of water with thin divisions of the internal berms across a large part of the playa. The expanse of water would be smooth, reflecting the sky and the nearby mountains, which would contrast with the surface of the playa. The Tailings Storage area would be visible as a light gray horizontal line slightly darker than the nearby undisturbed playa surface. The long spoils piles from trench, collector, and canal excavation, as well as the low berm of the Perimeter Road and haul roads, would form a series of horizontal lines across the remainder of the playa surface. Initially, these features would be darker gray in color and would have rough edges, compared with the smooth, light gray to white surface of the playa. Over time, their color is expected to fade to one more similar to that of the surrounding playa, which would reduce their degree of visual effect. From this viewpoint and at this distance, the trenches themselves would be only faintly visible, as would any water in the trenches. The extraction well solar panels would be barely visible as faint black dots spread across the playa surface. The line of H-frame structures for the 69-kV Power and Communication Line that would extend along the southern edge of the playa east from the Processing Facility would be noticeable; however, the degree of contrast would be moderate because of their relatively small scale when seen at this distance. The lines of

poles for the 12.47-kV Power and Communication Line and 12.47-kV Power Line leading south and north, respectively, from the Processing Facility would be barely noticeable because of the small scale of the poles. The area disturbed by construction of the Natural Gas Pipeline would be visible in the foreground primarily because of contrast with the form and color of adjacent undisturbed vegetation. Barren areas of the tops of the gravel pits would be barely visible because of the distance and because they would be excavated below the level of the plain. The Project, as visible from this KOP, would generally cause moderate to strong changes to the landscape, primarily because an observer would view the Project from an angle that clearly shows the Processing Facility, Production Ponds, Waste Product Storage Area, and other Project features. Project features would be visible, and some would likely attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.8 KOP 7B

Users of Crystal Peak Road near KOP 7B would likely notice modifications to the landscape caused by the Processing Facility, production ponds, Tailings Storage Area, Perimeter Road, haul roads, 69-kV Power and Communication Line, 12.47-kV Power and Communication Line, 12.47-kV Power Line, Natural Gas Pipeline, water supply wells, 12.47-kV power line spurs, water supply well access roads, and gravel pits. This elevated view encompasses the southern end of the playa and the basin south of the playa. The Processing Facility would be seen as a small but distinct group of blocky structures in the distance at the playa's southern end. In this view, the facility would blend with the similarly colored vegetation behind it; however, the lighter color of the soil stockpile would add a horizontal line in front of the Processing Facility that would contrast noticeably with the surrounding darker vegetation. The berms that define the production ponds would be visible in the distance. A small area of water would be visible in these ponds; however, because of the flat angle of view, the water would not become a dominant element in the view. The apparent color of the water would depend on weather conditions at the time of observation. The Tailings Storage area would be visible as a light gray horizontal line slightly darker than the nearby undisturbed playa surface. The low berms of the Perimeter Road and haul roads would form thin horizontal lines at the edge of the playa. The line of H-frame structures for the 69-kV Power and Communication Line that would extend along the southern edge of the playa east from the Processing Facility would be barely noticeable. The lines of poles for the 12.47-kV Power and Communication Line, 12.47-kV Power Line, and 12.47-kV power lines spurs would be barely noticeable in the middle ground and background because of the small scale of the poles. Where the 12.47-kV Power and Communication Line and 12.47-kV Power Line Spur 4 enter the foreground, their poles and conductors would create distinct vertical form and horizontal lines that would be readily visible along the road. The area disturbed by construction of the Natural Gas Pipeline would be visible in the foreground primarily because of contrast with the form and color of adjacent undisturbed vegetation. Barren areas of the tops of the gravel pits would be barely visible because of the distance and because they would be excavated below the level of the plain. Although encompassed in the view, the water supply wells and their access roads would not be visible because of their low profile and distance from the KOP. The Project, as visible from this KOP, would generally cause moderate to strong changes to the landscape, primarily because of the 12.47-kV Power and Communication Line and 12.47-kV Power Line Spur 4 in the foreground. Project features would be visible, and some would likely attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.9 KOP 8

Users of Access Road Segment C2, which is part of the Cricket Mountain ATV trail system, near KOP 8 may notice modifications to the landscape caused by the production ponds, Waste Product Storage Area, Perimeter Road, haul roads, extraction and recharge trenches, recharge collectors, recharge canals, extraction well solar panels, pump station solar arrays, and 69-kV Power and Communication Line. The berms that define the production ponds and Waste Product Storage Area would be visible in the distance. A small area of water would be visible in these ponds; however, because of the flat angle of view, the water would not become a dominant element in the view. The long spoils piles from trench, collector, and canal excavation, as well as the low berm of the Perimeter Road and haul roads, would form a series of horizontal lines across the playa surface. Initially, these features would be darker gray in color and would

have rough edges, compared with the smooth, light gray to white surface of the playa. Over time, their color is expected to fade to one more similar to that of the surrounding playa, which would reduce their degree of visual effect. From this viewpoint and at this distance, the trenches themselves would be only faintly visible, as would any water in the trenches. The extraction well solar panels would be barely visible, as faint black dots spread across the playa surface. The pump station solar arrays would be visible as faint black lines on the playa. The line of H-frame structures for the 69-kV Power and Communication Line in the near middleground would contrast with the white color and horizontal lines of the playa against which they are back-dropped. The Project, as visible from this KOP, would generally cause weak to moderate changes to the landscape. Project features would be visible, and some may attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.10 KOP 9

Users of the Power Line Access Road, which is part of the Cricket Mountain ATV trail system, near KOP 9 would likely notice modifications to the landscape caused by the preconcentration ponds, extraction and recharge trenches, recharge collectors, recharge canals, extraction well solar panels, 69-kV Power and Communication Line, 25-kV Power Line, and the North Playa Substation. The berms that define the preconcentration ponds would be visible in the distance. The preconcentration ponds would appear as a large expanse of water in the middle of the playa, with thin divisions of the internal berms. The expanse of water would be smooth and reflect the sky and the nearby mountains, contrasting with the surface of the playa. The spoils piles from trench, collector, and canal excavation, as well as the low berm of the Perimeter Road, would be barely visible beyond the preconcentration ponds. The light gray to white playa surface would be broken up by indistinct lines of darker gray spoils. Over time, their color is expected to fade to one more similar to that of the surrounding playa, which would reduce their degree of visual effect. From this viewpoint and at this angle, any water in the trenches or canals would be only faintly visible. The extraction well solar panels would be visible as faint black dots spread across the playa surface. The poles and conductors for the 69-kV Power and Communication Line and 25-kV Power Line would create distinct vertical and horizontal lines in the foreground. The North Playa Substation would add small horizontal, vertical, and boxy elements to the view. Collectively, these Project components would contrast moderately with the surrounding landscape because of their distinct form, lines, and close range. The Project, as visible from this KOP, would generally cause moderate changes to the landscape, primarily because the 69-kV Power and Communication Line, 25-kV Power Line, and North Playa Substation would be constructed in the foreground. Project features would be visible, and some would likely attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.11 KOP 10

Users of Crystal Peak Road near KOP 10 would likely notice modifications to the landscape caused by the Pass Federal Pit, 12.47-kV Power and Communication Line, and Natural Gas Pipeline. Operation of the gravel pit would alter the contours of the hillside on the right side of the view, creating a steep-sloped area and a depression in the flat plain at its base. The excavated area would be gray in color, a texture that would be smoother than that of the surrounding terrain, and would create a horizontal line across the hillside. Vegetation in the excavated areas would be sparse to non-existent. Where the 12.47-kV Power and Communication Line enters the foreground, its poles and conductors would create distinct vertical form and horizontal lines that would be readily visible along the road. The area disturbed by construction of the Natural Gas Pipeline would be visible in the foreground primarily because of contrast with the form and color of adjacent undisturbed vegetation. The Project, as visible from this KOP, would generally cause moderate to strong changes to the landscape, primarily because the Pass Federal Pit and 12.47-kV Power and Communication Line would be located in the foreground. Project features would be visible, and some would likely attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.12 KOP 11

Users of Crystal Peak Road near KOP 11 would likely notice modifications to the landscape caused by the Rail Loadout Facility, Rail Spur and Access Corridor, Rail Loadout Facility access roads, 12.47-kV

Power and Communication Line, and Natural Gas Pipeline. The structures at the Rail Loadout Facility would be visually prominent and distinctive elements in the center of this view. Although they would be painted to blend with the surrounding landscape, the clear vertical, diagonal, and rounded lines of the structures would create a strong level of visual contrast. The Rail Spur would also be visible, although it would not be as prominent because it would appear as a distinct horizontal line. The topsoil and subsoil stockpiles would form a noticeable horizontal line to the right of the Rail Loadout Facility. The light tan color of the stockpiles would contrast with the slightly darker tans of the vegetation behind the stockpiles. The lines of the poles for the 12.47-kV Power and Communication Line would be barely noticeable because of their small scale in the view. Although present in the view, the Rail Loadout Facility access roads and Natural Gas Pipeline are not visible because of screening by the intervening vegetation. The Project, as visible from this KOP, would generally cause moderate to strong changes to the landscape, primarily based on the presence of the Rail Loadout Facility in the center middleground. Project features would be visible, and some would likely attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.13 KOP 12

Users of Headlight Canyon Road near KOP 12 may notice modifications to the landscape caused by the Rail Loadout Facility, Rail Spur and Access Corridor, Rail Loadout Facility access roads, 12.47-kV Power and Communication Line, and Natural Gas Pipeline. The Rail Loadout Facility would be visible in the center of this view, approximately 3 miles away. The structures at the rail loadout facility would create a small, solid mass in the far middleground with an assemblage of distinct horizontal, vertical, and angled lines. The color and texture of the structures would blend somewhat with the backdrop at this distance. The Rail Spur, fence around the Rail Loadout Facility, and a line of railcars would create long horizontal lines similar to the existing landscape, with colors and textures that blend with the backdrop. The topsoil and subsoil stockpiles would form a noticeable horizontal line to the right of the Rail Loadout Facility. The light tan color of the stockpiles would contrast with the darker tans of the vegetation in front of and behind the stockpiles. The line of poles for the 12.47-kV Power and Communication Line would be barely noticeable because of the distance and their small scale in the view. Although present in the view, the Rail Loadout Facility access roads and Natural Gas Pipeline are not visible because of distance and screening by the intervening topography and vegetation. The Project, as visible from this KOP, would generally cause weak to moderate changes to the landscape. Project features would be visible, and some may attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.14 KOP 13

Travelers on SR 257 may notice modifications to the landscape caused by the Natural Gas Pipeline, specifically the section of the pipeline that may be constructed aboveground. The only Project feature that would be noticeable in this view would be a short segment of aboveground gas pipeline that would extend from the area east of the UPRR tracks up the slope of the escarpment to the east. Belowground segments of the pipeline in the view are not visible because of intervening vegetation and topography. The aboveground segment would appear as an assemblage of horizontal and vertical forms creating a linear feature extending up the slope. This segment would create limited contrast because it would be elevated only slightly above the ground surface, small in scale, and have colors and textures that would blend into the backdrop. The Project, as visible from this KOP, would generally cause weak to moderate changes to the landscape. Project features would be visible, and some may attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.3.3.15 KOP 14

Travelers on SR 257 may notice modifications to the landscape caused by the 69-kV Power and Communication Line, the Black Rock Communication Tower, and related equipment at the Black Rock Substation. In this view, the wood H-frame structures of the 69-kV Power and Communication Line would approach Black Rock Substation from the left (west). Thin, vertical forms would be added to the view, but these would not stand out from other existing transmission lines in the area in terms of scale or appearance. The Black Rock Communication Tower would be constructed of thin steel lattice, similar in

appearance and height to existing equipment at the Black Rock Substation. The tower would to a large degree be visually absorbed by its backdrop. Related equipment at the Black Rock Substation would be small in scale and similar in appearance to existing equipment at the substation; therefore, it would also generally be absorbed into its backdrop. The Project, as visible from this KOP, would generally cause weak changes to the landscape. Project features would be visible, and some may attract the attention of the casual observer; however, they would not dominate the view.

4.1.12.4 *Action Alternatives*

None of the alternatives would have measurably different direct or indirect effects on the generation of fugitive dust, compared with the proposed action. Other direct and indirect visual effects of each alternative are described in the following sections.

4.1.12.4.1 Alternative 1 - 69-kV Power and Communication Line, North End

Alternative 1 would be more visible to travelers on SR 257 and the SR 257 Cutoff Road because it would be located in the foreground, immediately adjacent to these roads. A portion of the area crossed by Segment T5 would be visible from KOP 14. The line would exit the Black Rock Substation and head east, although it would blend somewhat with the existing line that also runs east from the substation. Then, the line would cross the view in the foreground, adjacent to SR 257, where it would be readily visible. In this area, the line would create a moderate to strong degree of contrast and may dominate the view. Although this level of contrast would be consistent with the objectives of this area's VRM IV classification, it would present a substantially greater visual intrusion for travelers on SR 257 and the SR 257 Cutoff Road than Segment T1 (proposed action).

4.1.12.4.2 Alternative 2 - 69-kV Power and Communication Line, South End

Alternative 2 (Segment T6) would be more visible to users of Crystal Peak Road than Segment T3 (proposed action) because it would be located in the foreground, immediately adjacent to the road. Portions of the area crossed by Segment T6 would be visible from KOPs 6, 7A, and 7B. As viewed from KOP 6, Segment T6 would run south (to the right) where it would enter the middleground and be slightly more visible, compared with Segment T3, which recedes into the background. As viewed from KOP 7A, Segment T6 would run south (to the left), where it would cross the middleground and be slightly more visible, compared with Segment T3, which would recede into the background as it approaches the Processing Facility. Segment T6 would also be visible in the background view from KOP 7A where it runs up Crystal Peak Spur Road to the Processing Facility. As viewed from KOP 7B, Segment T6 would enter the middle ground from the north (to the right), then run into the background along the north (right) side of Crystal Peak Road before turning north (right) up Crystal Peak Spur Road to the Processing Facility. As seen from each of these KOPs, Segment T6 would present a weak to moderate degree of contrast; however, for users of Crystal Peak Road, Segment T6 would create a moderate to strong degree of contrast and may dominate the view. Although this level of contrast would be consistent with the objectives of this area's VRM IV classification, it would present a substantially greater visual intrusion for users of Crystal Peak Road than Segment T3.

4.1.12.4.3 Alternative 3 - Natural Gas Pipeline, Black Rock

Both Segment G2 (proposed action) and Segment G7 (Alternative 3) would be below ground; therefore, the only visual effect would be differences in the appearance of the vegetation cover. Both of these segments are located away from areas generally accessed by the public, such as SR 257 and Crystal Peak Road; therefore, no difference in visual effects is expected. The view from KOP 12 encompasses the area that would be crossed by Segment G7; however, the segment would not visible because of distance and screening by the intervening topography and vegetation. Alternative 3 would be consistent with the objectives of this area's VRM IV classification.

4.1.12.4.4 Alternative 4 - Natural Gas Pipeline, West End

Both Segment G5 (proposed action) and G8 (Alternative 4) would be below ground; therefore, the only visual effect would be differences in the appearance of the vegetation cover. Segment G8 would be more

visible to users of Crystal Peak Road than Segment G5 because it would be located in the foreground, immediately adjacent to the road. Portions of the area crossed by Segment G8 would be visible from KOPs 6, 7A, and 7B. The view from KOP 6 encompasses the area that would be crossed by Segment G8; however, the segment would not visible because of distance and screening by the intervening topography and vegetation. From KOP 7A, Segment G8 would be slightly less visible than Segment G5 because the alternative route would run to the west out of the view after crossing the foreground, rather than running back across the middleground to the north (right) like the proposed route. From KOP 7B, Segment G8 would be slightly more visible than Segment G5 because this view encompasses Crystal Peak Road and Crystal Peak Spur Road. As seen from each of these KOPs, Segment G8 would present no contrast or a weak degree of contrast. For users of Crystal Peak Road, Segment G8 would also create a weak degree of contrast because of its limited visual effects, even in a foreground view. Although this level of contrast would be consistent with the objectives of this area's VRM IV classification, it would present a slightly greater visual intrusion for users of Crystal Peak Road than Segment G5.

4.1.12.4.5 Alternative 5 - Sevier River Diversion

Alternative 5 would not appear substantially different from the proposed action except in the immediate foreground. The proposed and alternative diversion of the Sevier River would not be visible from any KOPs, nor would they be visible from any routes commonly used by the public. If a viewer were to approach either the proposed or the alternative diversion on Access Road Segment A, they would likely notice a moderate level of contrast between the features of the diversion and surrounding landscape. This level of contrast would be consistent with the objectives of this area's VRM IV classification.

4.1.12.5 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Since no new facilities would be constructed, there would be no change in the existing visual landscape. Existing land uses and their appearance on the landscape would continue. At its discretion, CPM may retain control of its leases and the rights to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.1.13 Water Resources

The analysis area, methods, and potential direct and indirect effects described in this section are summarized from the Resource Report for Water Resources (Whetstone and ENValue 2019) (Water Report).

4.1.13.1 *Analysis Area*

The analysis area for potential direct, indirect, and cumulative effects to water resources includes:

- The USGS-defined sixth-level (Hydrologic Unit Code-12 [HUC-12]) sub-watersheds (Seaber et al. 1987) that would contain Project facilities or that are upstream of the Sevier Playa or directly tributary to the Sevier River below Gunnison Bend Reservoir (Figure 2 in the Water Report).
- The USGS-defined sixth-level sub-watersheds that contain the ephemeral channel of the Beaver River in Millard County east of the Sevier Playa and the Cricket Mountains (Figure 2 in the Water Report).
- A 15-mile radius around the proposed freshwater supply well field that may be affected by drawdown related to groundwater pumping (Figure 2 in the Water Report). The potential radius of influence was evaluated in a scoping-level numerical model prepared by Whetstone Associates, Inc. (Whetstone) and is defined by the simulated 1-foot drawdown contour line (Whetstone 2017a). The model was created using the software package MODFLOW (MacDonald and Harbaugh 1988) and simulated groundwater pumping at a rate of 1,500 ac-ft/yr for 30 years from a 2,500-feet thick confined horizontal aquifer with uniform hydrologic characteristics. The input values were estimated from pumping test data developed by CPM (Whetstone 2017a).

4.1.13.2 *Methods*

This section describes, compares, and contrasts the effects to water resources that could be caused by implementation of the proposed action, action alternatives, or no-action alternative. The issues addressed in this section include alteration of quantity or quality of surface or groundwater (decreased groundwater levels, including reduced flows from springs, reduced quality of groundwater, including springs, increased or decreased flows in ephemeral drainages, and decreased water quality in ephemeral drainages); alteration of quantity or quality of groundwater near the Sevier Playa (increased or decreased water levels of playa brines, altered chemistry of playa brines; and decreased bedrock groundwater [freshwater] levels or quality); alteration of the Sevier River channel, flow paths, or floodplain by conveyance of recharge water, diversion facilities, or other Project components; alteration of the location, extent, and water quality of wetlands by conveyance of recharge water in the Sevier River channel; alteration of the quantity or quality of surface water or groundwater by conveyance of recharge water in the Sevier River channel; alteration of patterns of surface water flow or water quality by Project components including roads, pipelines, or culverts; and loss, reduction, or degradation of groundwater that supports existing water rights.

Baseline data for the water resources analysis were compiled from public domain sources and Project-specific studies completed by CPM. The public domain sources included published reports by governmental agencies and other authors, unpublished spring data compiled by BLM, data from USGS 7.5-minute series topographic maps, and databases maintained by the Western Regional Climate Center (WRCC), USGS (National Water Information System [NWIS]) and Environmental Protection Agency (EPA) (STOrage and RETrieval [STORET]). Project-specific sources of data for the baseline water resources analysis included:

- Geologic data from 756 borings and wells that were completed to support the Feasibility Study for the project (CPM 2018a).
- Streamflow and water quality monitoring data from 12 stations located on the Sevier River and its irrigation diversions between Gunnison Bend Reservoir and Sevier Playa.
- Groundwater level and water quality monitoring data from 42 wells and one open borehole.
- Hydrogeologic data from 76 single-well pumping tests, four multiple well pumping tests, and seven trench pumping tests.

Detailed descriptions of the monitoring locations, methods of testing, and data analysis are presented in the Water Resources Technical Report (Whetstone 2017b).

Potential effects on water resources are evaluated using four metrics:

- Magnitude – negligible, minor, moderate, or major.
- Duration – temporary, short-term, long-term, or permanent.
- Potential to occur – unlikely, possible, or probable.
- Geographic extent – limited, local, regional.

The descriptions for the magnitude of an effect are defined for this analysis as:

- Negligible – the effect would be at the lowest levels of detection.
- Minor – the effect would be slight, but detectable.
- Moderate – the effect would be readily apparent.
- Major – the effect would be severe, adverse, or beneficial.

The descriptions for the duration of an effect are defined for this analysis as:

- Temporary – the duration of the effect is concurrent with a specific activity that is less than the life of the Project.
- Short-term – the duration of the effect would not last longer than the approximate life of the Project, including initial reclamation.

- Long-term – the duration of the effect would extend beyond the life of the Project including initial reclamation.
- Permanent – the duration of the effect would extend into the foreseeable future.

The descriptions for the potential of an effect to occur are defined for this analysis as:

- Unlikely – effects are not expected to occur or have a low probability of occurring.
- Possible – effects are reasonably foreseeable but may or may not occur.
- Probable – effects are expected to occur or have a high probability of occurring.

The descriptions for the geographic extent of an effect are defined for this analysis as:

- Limited – effects are expected to occur only in the immediate area of a specific facility or Project-related activity.
- Local – effects are expected to extend beyond the immediate area of a specific facility or Project-related activity but are limited to the analysis area or a portion of the analysis area.
- Regional – The effects are expected to extend beyond the boundary of the analysis area.

Potential effects to water resources were evaluated using the following methods: a scoping-level numerical model was prepared to estimate potential changes in groundwater levels associated with pumping for the Project's freshwater supply (Whetstone 2017a), GIS data and satellite imagery were used to evaluate potential changes to the Sevier River floodplain from the conveyance of recharge water to the Project via the river channel, and calculations of seepage rates were used to evaluate potential effects to groundwater from the Project facilities.

4.1.13.3 *Proposed Action*

4.1.13.3.1 Groundwater

Under the proposed action, the Project would have direct effects on the groundwater brine system within the lease area. The effects would include changes in the chemical composition and TDS content of the brine, which are evaluated to be probable, major, permanent, and local. Potential effects to groundwater levels (quantity) in the brine system under the proposed action are evaluated to be probable, minor, short-term, and limited. The production of brine from extraction trenches and wells is expected to have minor to moderate effects to playa groundwater levels during the life of the Project. Shallow groundwater at Sevier Playa is typically confined by the Fat Clay Zone (FCZ) and has potentiometric elevations that are near or above ground surface. The potentiometric elevation is the level to which water would rise in a cased and properly constructed well. Extraction and recharge trenches would be excavated through the FCZ and would release confined groundwater in areas where the potentiometric elevation is above ground surface. In these areas, the resulting groundwater level would stabilize near the water level in the trenches during operation of the Project and would be 1 to 5 feet lower (approximate) than the natural potentiometric surface. In areas of the playa where the natural groundwater level is near but below ground surface, the effect of the extraction and recharge trenches would be less pronounced because the trenches would be operated in a manner that balances the volume of brine removed from the system with the volume of water recharged. In these areas, groundwater levels would remain near the original potentiometric level during operation of the Project.

Extraction wells would also be operated in a way that balances the volume of brine removed with the volume of water recharged. Groundwater levels immediately adjacent to the wells may be lowered by up to several tens of feet (estimated) during pumping, but the cones of depression would have limited areal extent because of water entering the system through the adjacent recharge trenches. The extraction and recharge trenches would be backfilled at the end of the Project and, with time, groundwater levels in the playa system would slowly re-equilibrate to near the pre-Project potentiometric elevations. The abandonment method for the extraction wells would leave the well casings and screens open from about five feet below ground surface to the bottom of the Siliceous Clay Zone (SCZ), which would provide long-term permeable pathways for vertical groundwater movement after the end of mining. This method

of well abandonment is expected to result in a long-term reduction of the upward vertical gradients that are currently observed in the upper 100 feet of the playa sediments.

The proposed preconcentration, production, and purge brine storage ponds also have the potential to affect groundwater levels near the north and south ends of the playa. However, precipitation of salts in the ponds shortly after the start of the Project would form low-permeability layers at the base of the ponds (salt floors) that would limit potential seepage to the underlying brine groundwater system. Typical hydraulic conductivities of salt range from about 2.8×10^{-7} to 2.8×10^{-5} ft/d (Domenico and Schwartz 1990). Assuming an average hydraulic conductivity of 2.8×10^{-6} ft/d for the salt floors, the calculated seepage rates for the ponds during Project operation are presented in **Table 4.1.13-1**. The calculated seepage rates are generally low and potential effects to groundwater levels from pond seepage would be probable, minor, short-term, and limited.

Table 4.1.13-1 Estimated Pond Seepage Rates

Facility	Pond Area (sq ft)	Salt Thickness (ft)	Pond Depth (ft)	Hydraulic Conductivity (ft/d)	Unit Seepage (ft/yr)	Pond Seepage (ft^3/yr)	Pond Seepage (gpm)
Pre-Concentration Ponds (Years 0-3)	765,044,280	2	5	2.80E-06	0.0026	1,954,688	27.8
Production Ponds (Years 0-30)	110,598,840	2	5	2.80E-06	0.0026	282,580	4.0
Purge Brine Storage Pond (Years 0-2)	13,372,920	0.19	2.71	2.80E-06	0.0146	194,936	2.8
Purge Brine Storage Pond (Years 2-5)	31,319,640	0.21	3.07	2.80E-06	0.01497	467,936	6.7
Purge Brine Storage Pond (Years 5-15)	31,798,800	0.63	9.2	2.80E-06	0.01492	474,579	6.7
Purge Brine Storage Pond (Years 15-30)	32,495,760	1.27	18.4	2.80E-06	0.0148	481,162	6.8

Note: Unit seepage calculated as Q=KIA, where Q = seepage (ft/yr); K= hydraulic conductivity (ft/d); I = the distance from the top of the pond surface to the bottom of the salt (ft) and A = the area of the pond. The pond depths and salt thickness are from CPM and Stantec 2019a and CPM 2018b.

The proposed action would also affect the chemistry of the playa groundwater system. The natural TDS concentration of the groundwater brine ranges from about 10,000 to 200,000 mg/l. Production of the brine and recharge of the system with freshwater would reduce TDS concentrations and alter the balance of major ions in groundwater over the majority of the playa. These changes would be probable, major, permanent, and local. Construction and operation of the preconcentration, production, and purge brine storage ponds would also affect groundwater chemistry below the facilities. TDS concentrations in the ponds would be greater than the natural levels in groundwater, and seepage from the facilities would increase TDS concentrations and alter the major ion balance of groundwater below the ponds. Based on the relatively low seepage rates calculated in **Table 4.1.13-1**, potential increases in TDS concentrations and changes to the ion balance in groundwater from pond seepage would be probable, minor, permanent, and local.

4.1.13.3.2 Recharge Water Conveyance via the Sevier River Channel

Sustained production of brine over the planned 32-year life of the Project would require that water be conveyed to the Project via the Sevier River to recharge the brine groundwater system and maintain brine levels in the extraction trenches. Recharge water from the Sevier River would enter the recharge trench and canal system at a diversion structure located at the north end of the playa (Figure 8 in the Water Report). The diversion structure would include an earthen berm and canal designed to accommodate flow rates of up to 213 cfs. Flows exceeding 213 cfs would be conveyed over the diversion berm and onto the playa (CPM and Stantec 2019a). The berm would only direct river water into the diversion canal and

would not impound water within the Sevier River floodplain. A Drop Structure consisting of gabions and reno mattresses (wire baskets and mats filled with rocks) would be built about 2,500 feet upstream from the diversion structure to control an existing head cut in the river channel.

The proposed action would require an estimated 48,339 ac-ft/yr of recharge water to support brine extraction (CPM and Stantec 2019a). The recharge water would be derived from four sources listed in **Table 4.1.13-2.** Depending on the year, natural groundwater flow, runoff, and direct precipitation could provide 2,277 to 34,658 ac-ft/yr of recharge for the Project. The remaining 13,681 to 46,062 ac-ft/yr of water would have to be supplied by the Sevier River. Based on water balance modeling by CH2M (2017a), the average annual recharge volume from the Sevier River that would be required for the proposed action is estimated to be 35,164 ac-ft/yr. After accounting for transmission losses that would occur by conveying the water in the Sevier River channel from Gunnison Bend Reservoir to the Project, CPM would have to acquire (lease or purchase) an average volume of 50,234 ac-ft/yr from upstream sources. The estimated maximum volume of recharge water that would need to be acquired and released from Gunnison Bend Reservoir any given year is about 69,000 ac-ft/yr (CH2M 2017c, SWCA 2017).

Table 4.1.13-2 Sources of Recharge Water

Source	Estimated Recharge Volume
Natural Groundwater flow to Playa	≈330 ac-ft/yr
Runoff from Local Drainages	941 to 9,487 ac-ft/yr
Direct Precipitation on Playa	1,006 to 24,841 ac-ft/yr
Sevier River	6,413 to 44,407 ac-ft/yr

Source: CH2M 2017a

The Sevier River below Gunnison Bend Reservoir is a Category 3 waterbody that is designated as Class 2B, 3C, and 4 (secondary contact recreation, non-game fish and other aquatic life, and agricultural use). A six-mile segment of the river directly below the reservoir and above Conks Dam flows perennially and has a well-defined channel. The channel below Conks Dam is less well defined and flows intermittently. Review of aerial photographs for the period from 1984 through 2016 indicates that the river channel below Conks Dam has migrated extensively in response to varying flow conditions. These changes in the flow path have occurred between years and in some cases between storms, and have included expansion and cut off of oxbow bends, overtopping of channel banks to erode and create new channel segments, and the capture of adjacent channels at new connection points. It is expected that recharge water for the Project would follow the natural channel from Gunnison Bend Reservoir to Conks Dam. The most likely flow path below Conks Dam is expected to include the segments listed in **Table 4.1.13-3** and shown on Figure 8 in the Water Report (CPM 2018b).

Table 4.1.13-3 Most Likely Flow Path for Acquired Recharge Water

Stream Segment	Description
Segment 1a	Conks Dam outlet to Pete Black Cut artificial channel
Segment 1b	Artificial channel of Pete Black Cut to Deep Lake
Deep Lake	Fill Deep Lake to overflow point
Segment 2	Natural channel to Cocklebur Lake
Cocklebur Lake	Fill Cocklebur Lake to overflow point
Segment 3	Natural channel to area of Alexander Lake overflow
Segment 4	Natural channel from Alexander Lake overflow to Crafts Lake
Crafts Lake	Fill Crafts Lake to overflow point
Segment 5	Natural channel to Unnamed Lake
Unnamed Lake	Fill Unnamed Lake to overflow point

Table 4.1.13-3 Most Likely Flow Path for Acquired Recharge Water	
Stream Segment	**Description**
Segment 6	Natural channel to Power Line Crossing
Segment 7	Natural channel to Hwy 257 Cutoff Crossing
Segment 8	Natural channel to Diversion Berm

The flow of acquired recharge water is expected to range from 0 to 95.24 cfs depending on the availability of water from the drainage above Gunnison Bend Reservoir, the season, and the amount of irrigation return flows. It is anticipated that the full flow of acquired water (95.24 cfs) would be required during the winter season when the river is typically dry below Conks Dam. Acquired recharge water may not be required in the spring during wet years. The need to release additional water from Gunnison Bend Reservoir during the summer months would vary depending on the volume of return flow from irrigation.

The ability of the Sevier River to convey the required maximum flow of recharge water within the existing channel was evaluated by CPM by comparing the channel dimensions as determined by SWCA (2017) to the calculated flow depths for segments below Conks Dam (CPM 2018b). The flow depth calculations were based on the Manning equation for flow in an open trapezoidal channel assuming 2.5:1 (h:v) side slopes, a bottom slope of 0.02 percent, and the maximum flow rate of 95.24 cfs (**Table 4.1.13-4)**. The results of the calculations indicate flow depths ranging from 2.27 to 3.19 feet for channels with wetted perimeters ranging from 33.6 to 45.2 feet. The average depth of the Sevier River channel below Conks Dam is estimated to be about three to four feet with some sections being deeper or shallower (CPM 2018b). The flow depth calculations in **Table 4.1.13-4** assume that all flow released from Gunnison Bend Reservoir would be conveyed to the playa. However, transmission losses by evaporation and seepage would decrease the flow volume and depth with increasing distance downstream. Transmission losses are difficult to accurately predict because of variations in streambed permeability, channel width, vegetation, and groundwater levels, but are estimated to be between 5 and 30 percent (CH2M 2017c, SWCA 2017).

Table 4.1.13-4 Summary of Flow Depth Calculations for the Sevier River Channel				
Stream Segment	**Description**	**Bottom Width (feet)**	**Flow Depth (feet)**	**Wetted Perimeter (feet)**
Segment 1a	Conks Dam to Pete Black Cut	18.7	3.01	34.9
Segment 1b	Pete Black Cut to Deep Lake	23.0	2.73	37.7
Segment 2	Deep Lake to Cocklebur Lake	26.2	2.56	39.9
Segment 3	Cocklebur Lake to Alexander Lake overflow	18.0	3.06	34.5
Segment 4	Alexander Lake to Crafts Lake	29.5	2.40	42.4
Segment 5	Crafts Lake to Unnamed Lake	23.0	2.73	37.7
Segment 6	Unnamed Lake to Power Line Crossing	16.4	3.19	33.6
Segment 7	Power Line Crossing to Hwy 257 Cutoff	29.5	2.40	42.4
Segment 8	Hwy 257 Cutoff to Diversion Berm	32.8	2.27	45.2

In addition to the flow depth calculations, CPM also estimated the areas of the intermittent lakes that would be inundated by using the Sevier River to convey recharge water to the Project (**Table 4.1.13-5**). These lakes are part of the Sevier River flow system, and with the exception of Alexander Lake, would be part of the flow path for the recharge water. Alexander Lake is tributary to the Sevier River, but is not part of the main channel.

Table 4.1.13-5 Estimated Inundation Areas for Intermittent Lakes	
Name	**Area (acres)**
Deep Lake	63.2
Cocklebur Lake	27.9
Alexander Lake	0.0
Crafts Lake	128.2
Unnamed Lake	52.4

Conveyance of acquired recharge water in the Sevier River channel under the proposed action would lead to perennial flows in the river below Conks Dam during operation of the Project. At the end of the Project, the release of recharge water from Gunnison Bend Reservoir would be discontinued and the river below Conks Dam would return to flowing intermittently.

The exact course that the recharge water would follow below Conks Dam is not precisely known and would be modified over time by currently occurring processes of sedimentation, erosion, and channel migration. The river channel is indistinct in some areas and frequently migrates by head cutting, expansion of oxbow bends, overtopping of stream banks, and the capture of adjacent channels. These processes would continue to occur but may be accelerated by increased streamflow related to conveying recharge water in the channel. The overall course of the river from Gunnison Bend Reservoir to its inlet at Sevier Playa is constrained by regional topography and would not change in a general sense, but migration of the channel on the scale of a mile or more over the life of the Project may occur for portions of the stream segments shown on Figure 8 in the Water Report. The 100-year floodplain for the Sevier River has not been delineated and although it is possible that conveyance of recharge water in the river channel may result in permanent changes that affect the floodplain in limited areas, potential effects to the overall extent of the floodplain are expected to be negligible.

The increased flow and duration of flow in the Sevier River from the proposed action would increase surface water availability for wildlife and livestock during the life of the Project. It would also likely cause expansion of riparian areas adjacent to the river corridor. Conveyance of recharge water under the proposed action would also increase the volume of surface water lost to evapotranspiration and seepage as it flows from Gunnison Bend Reservoir to the Project. It is estimated that the transmission loss could be 5 to 30 percent of the maximum recharge flow of 69,000 ac-ft/yr that would be released from Gunnison Bend Reservoir (CH2M 2017c, SWCA 2017).

Water in the Sevier River is a well-buffered sodium chloride water with TDS concentrations that have an observed range of 884 to 4,700 mg/l. The highest TDS concentrations typically occur during low flow conditions in the late fall or winter. A secondary peak in TDS concentrations may also occur during spring runoff (Whetstone 2017b). Water in the Sevier River sporadically exceeds applicable secondary contact recreation (Class 2B) and aquatic life (Class 3C) standards for cadmium, lead, mercury, selenium, silver, zinc, and pH. TDS concentrations are also typically greater than the Class 4 agricultural standard of 1,200 mg/l. The release of up to an additional 69,000 ac-ft/yr of recharge water from Gunnison Bend Reservoir under the proposed action is not expected to change TDS concentrations in the Sevier River outside of the currently observed range. The river water is expected to continue to exceed the TDS agricultural standard of 1,200 mg/l during most portions of the year and have sporadic pH levels and concentrations of cadmium, lead, mercury, selenium, silver and zinc that exceed applicable standards. Potential effects to water quality in the Sevier River under the proposed action are evaluated to be possible, short-term, minor, and local in extent. At the end of the Project, the flow of acquired recharge water from Gunnison Bend Reservoir would cease and the quality of the water that flows intermittently in the river would be similar to the currently existing condition.

Recharge water conveyed in the Sevier River is expected to affect groundwater levels and water quality in the alluvium adjacent to the river. The alluvium is part of the regional aquifer system and seepage losses

from the river would increase recharge to groundwater along the stream segments from Conks Dam to the Sevier Playa. Although it is difficult to accurately evaluate the potential increase in groundwater recharge that may occur, CPM estimates that the total transmission loss by seepage from the riverbed could be 5 to 30 percent of the additional flow released from Gunnison Bend Reservoir (CH2M 2017c, SWCA 2017). If it is assumed that the entire 69,000 ac-ft of water is released for the Project during a given year and that the transmission loss is equal to the maximum estimated value of 30 percent, the additional recharge to the regional groundwater system may be as much as 20,700 ac-ft/yr. The additional recharge to groundwater may increase groundwater levels near the river by up to several feet (estimated) during Project operation. Seepage from the streambed may also increase spring flows at Anderson, Jenson, and Rocky Knoll springs, which are located near the river and discharge water from the regional aquifer. Under the proposed action, probable effects to groundwater recharge, water levels in alluvium, and spring flows near Sevier River are expected to be local, minor to moderate, and short-term. At the end of the Project, the release of acquired recharge water from Gunnison Bend Reservoir would cease and groundwater recharge rates, water levels in alluvium, and spring flows near Sevier River would return to the pre-Project condition.

Groundwater quality in alluvium near the Sevier River is variable with observed TDS concentrations ranging from 688 mg/l at the Mudhole Well to 82,700 mg/l at the 257 Cutoff Well. This variability is affected by localized conditions of evapotranspiration and recharge from surface water. Project-related seepage from the river under the proposed action may either increase or decrease TDS concentrations in alluvial groundwater, depending on location. These effects are probable and are expected to be short-term, minor to moderate, and local in extent. At the end of the Project, the release of acquired recharge water from Gunnison Bend Reservoir would cease and with time, the quality of alluvial groundwater would return to the pre-Project condition.

4.1.13.3.3 Perimeter Road, Haul Roads, and Access Roads

Development of the Perimeter Road, haul roads, and access roads under the proposed action is expected to have limited minor to negligible effects to the overall patterns of surface water flow and the quantity and quality of surface water and groundwater on or near the Sevier Playa. With the exception of the Sevier River, the surface water drainages tributary to the Sevier Playa are ephemeral, flowing only in direct response to precipitation or snowmelt. Flow in the Sevier River is intermittent where it enters the playa, and the river does not flow at this location during all years because of upstream diversions for irrigation.

Under the proposed action, the new and improved roads would have the potential to affect peak flows in the intersected drainages through two primary mechanisms. First, the road drainage network of in-slope ditches and cross-drains may alter peak flows and accelerate runoff by increasing drainage density, extending the stream network, and causing small-scale trans-drainage diversions (Furniss et al. 2000). The BLM would require that CPM address this issue by designing roads to minimize the extent of hydrologic connection (**Section 4.4.4**).

Second, if a stream crossing or culvert cannot pass all stream flow, either because it is blocked or because the design event is exceeded, the flow could overtop the crossing or culvert, flow down the road, and be redirected to a tributary channel other than the intended one, which could cause locally higher peak flows, head-cutting, and erosion (Furniss et al. 1997). The BLM would require that CPM address this concern by designing all ditches, culverts, and crossings for the 25-year, 6-hour storm event (**Section 4.4.4**). Effects to peak flows and the quantity of flow in drainages tributary to the playa from development of roads under the proposed action would be probable, short-term, minor to negligible, and limited in extent once the design features listed in **Appendix K**, and the additional measures in **Section 4.4.4** are implemented.

Temporary effects to water quality from increased sediment yield to the ephemeral streams may occur from disturbances related to construction, improvement, and maintenance of roads. Design features including silt fences, straw bales, or geotextiles would be used to mitigate sediment and turbidity in runoff during construction. Specific design features and their locations would be identified in the SWPPP

(CPM 2019l). Effects to water quality by increased sediment yield from construction, improvement, and maintenance of roads would be probable, temporary, minor to negligible, and limited in extent. Effects to groundwater quality and quantity are not expected to occur from development of roads under the proposed action and would be unlikely, short-term, negligible, and limited in extent.

4.1.13.3.4 Freshwater Supply Well Field

A groundwater supply well field would be developed to provide freshwater for the SOP processing facilities, potable and service water for the administration facilities, and potentially water for dust suppression. The well field would produce water from Cambrian- to Precambrian-age quartzite bedrock and would be located on BLM and SITLA land about 5.5 miles south of the Processing Facility (Figure 1 in the Water Report). CPM has applied for, and been granted, approval for two 20-year fixed-time water rights to appropriate a total of 1,500 ac-ft/yr of underground water starting April 30, 2014. Water right 69-106 includes 9 points of diversion for a total of 1,000 ac-ft of water and has a priority date of March 3, 2009. Water right 69-111 includes 3 points of diversion for a total of 500 ac-ft of water and has a priority date of March 27, 2012. Neither of the water rights has been perfected. An extension of the water rights would be needed to supply fresh water to the Project after April 30, 2034.

The area that may be affected by reduced groundwater levels related to pumping from wells for freshwater supply was evaluated using a scoping-level numerical model prepared by Whetstone (2017a). The model was constructed in MODFLOW, a groundwater modeling software package that was developed by the USGS (MacDonald and Harbaugh 1988).

The model considered a confined aquifer simulated as a flat-lying single layer that was 2,500 feet thick. The modeled area was approximately 9,487 square miles and was large enough to ensure that the boundaries of the model did not affect the simulated cone of depression related to pumping. A west-flowing gradient of 0.001 feet per foot was established across the model domain using constant head cells located on the east and west sides of the model grid. The area within the model was assigned uniform input parameters for hydraulic conductivity (2.8 ft/d) and specific storage (0.00001 unitless). The hydraulic conductivity input value was the geometric mean of values provided by five pumping tests in bedrock at the site (Whetstone 2017a, 2017b). The specific storage value was estimated from literature.

The model was prepared in two parts including an initial steady-state simulation that was completed to develop the pre-pumping flow field and starting heads for the second transient simulation that modeled pumping from the freshwater well field. The transient run simulated simultaneous pumping from four wells discharging at a rate of 375 ac-ft/yr each for 30 years. The results of the model predict that the cone of depression's one-foot drawdown contour would extend about 15 miles from the pumped wells at the end of the Project. The maximum predicted drawdown is about 12 feet at the center of the well field at the end of the 30-year pumping period. The groundwater level near the center of the well field is predicted to recover to 75 percent of the original level about 10 years after the end of pumping and about 90 percent of the original level 30 years after the end of pumping. Modeled drawdown and recovery curves for groundwater are presented as a function of time for various distances from the center of the proposed well field in Figure 9 in the Water Report.

It should be noted that the modeled drawdowns are based on a simple set of assumptions that include a homogenous aquifer with constant thickness. The geology of the analysis area is relatively complex and spatial variations in aquifer thickness, hydraulic conductivity, and specific storage are not considered by the simulation. For this reason, the predicted drawdowns should be considered to be qualitative rather than quantitative estimates of drawdown at any location. The uncertainty associated with the input parameters is difficult to assess and may be relatively large. In general, higher input values for hydraulic conductivity would result in a wider area of influence around the well field with lower drawdowns. Lower input values for specific storage would result in a wider area of influence with higher drawdowns. Recharge to the aquifer by infiltration of precipitation is not considered by the model, and would have the effect of decreasing both drawdown and the extent of the area of influence.

Based on the results of the model, the following system was used to describe the likelihood that measurable changes in water levels or flows would occur to wells, springs, and water rights by the proposed pumping for freshwater supply.

- Effects are considered to be **probable** for wells, springs, and water rights that are connected to the regional aquifer and located within a three-mile radius of the center of the proposed freshwater well field.
- Effects are considered to be **possible** for wells, springs, and water rights that are connected to the regional aquifer and are located between three and fifteen miles from the center of the proposed freshwater well field.
- Effects are considered to be **unlikely** for wells, springs, and water rights that are connected to the regional aquifer and are located more than fifteen miles from the center of the proposed freshwater well field.
- Effects are **not predicted** for wells and springs that are not connected to the regional aquifer regardless of their distance from the well field.

The potential magnitude of effects to wells in the regional aquifer and water rights was also evaluated using the following system:

- Potential effects to wells are considered to be **major** if the predicted drawdown is equal to, or exceeds, fifty percent of the height of the water column in the well.
- Potential effects to water rights are considered to be **major** if the predicted drawdown at the water right location is greater than or equal to 3 feet.
- Potential effects to wells in the regional aquifer are considered to be **moderate** if the predicted drawdown is greater than or equal to twenty-five percent but less than fifty percent of the height of the water column in the well.
- Potential effects to water rights are considered to be **moderate** if the predicted drawdown at the water right location is greater than or equal to 2 feet but less than 3 feet.
- Potential effects to wells in the regional aquifer are considered to be **minor** if the predicted drawdown is greater than or equal to one foot but less than twenty-five percent of the height of the water column in the wells.
- Potential effects to water rights are considered to be **minor** if the predicted drawdown at the water right location is greater than or equal to 1 foot but less than 2 feet.
- Potential effects to wells in the regional aquifer are considered to be **negligible** if the predicted drawdown is less than one foot.
- Potential effects to water rights are considered to be **negligible** if the predicted drawdown at the water right location is less than one foot.

The potential magnitude of effects to springs is omitted from this analysis because of the previously discussed limitations of the model and the lack of specific information about the geologic connection and flow for most springs. At some springs, a groundwater drawdown of less than one foot may be sufficient to interrupt flow and cause them to go dry. For these springs, relatively small changes in groundwater levels would result in major effects. Other springs may continue to flow at reduced rates when affected by the same or greater amount of drawdown and the effects would be minor to moderate.

In addition to the results of the scoping-level numerical model, the potential for effects to springs in the Black Rock Area by pumping from the freshwater well field was evaluated by a field reconnaissance completed by Summers (2018). The conclusion of the geologic reconnaissance was that pumping-related effects to springs such as Kaufman and Coyote Springs are unlikely during the life of the Project because they are not fed by deep groundwater sources and intervening faults between the well field and the springs are likely to act as groundwater flow barriers limiting the propagation of drawdown into this area.

The potential for effects to wells, springs, and water rights deemed to be connected to the regional aquifer by pumping from the freshwater supply well field under the proposed action are summarized in **Tables**

4.1.13-6, **4.1.13-7**, and **4.1.13-8,** respectively. **Table 4.1.13-6** includes only those wells with sufficient data on well parameters and water levels to allow an analysis of relative drawdown. The potential magnitude of effects to springs in **Tables 4.1.13-7** and **4.1.13-8** was not estimated because of limitations of the model and the lack of specific information about the geologic connection and flow for most springs. At some springs, a groundwater drawdown of less than one foot may be sufficient to interrupt flow and cause them to go dry. For these springs, relatively small changes in groundwater levels would cause major effects. Other springs may continue to flow at reduced rates when affected by the same or greater amount of drawdown and the effects would be minor to moderate. **Table 4.1.13-8** includes many more wells; however, most of these wells have limited or no data on well parameters and water levels and could only be assessed in terms of absolute drawdown. Figures 10a-d in the Water Report show wells, springs, and water rights that may be affected by the proposed action. Water resources that are outside of the predicted 15-mile radius of influence or that are not in communication with the regional aquifer are omitted from the summary tables because effects to these features are evaluated to be unlikely and negligible. With regard to potential federal reserved water rights, any potential effects of the Project are unknown because the underlying water source (surface water, spring, or groundwater) for each potential right is unknown.

The results of the groundwater model were also used to evaluate the potential for increased seepage of brine from the playa groundwater system to freshwater in bedrock because of drawdown related to pumping. The southern edge of the playa is located about 6.7 miles from the center of the proposed well field and has a predicted maximum drawdown of about 3.5 feet. Review of the modeled potentiometric contours after simulating pumping for 30 years indicates that drawdown has negligible effect on both the direction of flow (dominantly westward) and gradient in this area. Based on this analysis, pumping from the freshwater supply well field is evaluated to be unlikely to affect seepage rates from the playa groundwater brine system to freshwater in bedrock.

Table 4.1.13-6 Potential Effects to Wells

Well Name	Map ID # / Water Right #	Depth (feet)	Depth to Water (feet)	Water Column Height (feet)	Distance from Well Field (mi)	Maximum Drawdown (feet)	Drawdown Percent (%)	Measurable Effect	Potential Magnitude
Wells in Bedrock									
Coyote	--	765	353	412	12.6	1.5	0.36 %	Possible	Minor
Monument Pt.	--	1,215	298	917	10.0	2.25	0.25 %	Possible	Minor
Black Hills	821 / 69-21	560	207	353	11.1	1.75	0.50 %	Possible	Minor
Lakeview	968 / 69-96	532	83	449	2.3	7.25	1.61 %	Possible	Minor
Wells in Unconsolidated Deposits									
Bonneville	837 / 1369001M00	315	181	134	10.6	2.00	1.49 %	Possible	Minor
Black Rock	973 / 71-2501	91	13	78	10.9	2.00	2.52 %	Possible	Minor
Crystal Peak Road	--	195	179	16	6.0	3.75	23.44 %	Possible	Minor
Wah Wah	992 / 69-25	294	212	82	7.0	3.25	3.25 %	Possible	Minor

Note: ID # refers to Figures 10a, 10b, 10c, and 10d in the Water Report.

Table 4.1.13-7 Potential Effects to Springs					
Spring Name	Map ID # / Water Right #	Distance from Well Field (miles)	Modeled Maximum Drawdown (feet)	Measurable Effect	Potential Magnitude
Alkali Spring	985 / 71-2649	12.1	1.5	Unlikely	--
Big Spring	981 / 71-2565	12.1	1.5	Unlikely	--
Cottage Spring	978 / 71-2723	12.1	1.5	Unlikely	--
House Spring	979 / 71-2566	12.1	1.5	Unlikely	--
Kaufman Spring	975 / 71-2648	12.1	1.5	Unlikely	--
Tie House Spring	976 / 71-2682	12.1	1.5	Unlikely	--

Notes: ID # refers to Figures 10a, 10b, 10c, and 10d. The potential for effects to the listed springs is based on the conclusions of the Summers (2018) field reconnaissance for Kaufman Spring rather than the results of the groundwater model. Although the analysis by Summers only evaluated Kaufman Spring, the other springs are clustered in the same immediate area and are believed to be fed from the same source. For this reason, Summer's conclusion is applied to all of the springs in this table.

4.1.13.3.5 Other Major Off-Lease Project Components

Other major off-lease components, including the power and communication lines, Natural Gas Pipeline, and Rail Loadout Facility, may have limited effects on surface water quality from increased sediment yield during construction, operation, maintenance, or decommissioning. BMPs including silt fences, straw bales, or geotextiles would be used to mitigate sediment and turbidity in runoff during construction. Interim and final reclamation, as applicable, would establish vegetation on disturbed areas, which would also mitigate sediment and turbidity. Specific mitigation measures would be identified in the SWPPP (CPM 2019l). Effects to water quality by increased sediment yield during construction of the facilities would be probable, temporary, minor to negligible, and limited in extent. Potential effects to groundwater quality and quantity from the facilities would be unlikely, short-term, negligible, and limited in extent.

Blasting, if required for construction of the Natural Gas Pipeline, would have the potential to alter or disrupt spring flows or alter the quality of spring water in the Black Rock area. Potentially affected springs would include Kaufman Spring, Tie House Spring, Cottage Spring, House Spring, Big Spring, and Alkali Spring. Potential effects from blasting for the pipeline would be mitigated using measures described in the Blasting Plan (CPM 2019c) and **Appendix K**. Potential effects from blasting for the pipeline may also be mitigated by constructing a portion of the pipeline aboveground, removing the need for blasting close to several springs. With full implementation of the mitigation measures, effects to the listed springs would be unlikely, temporary, negligible, and limited in extent.

4.1.13.4 *Alternatives 1 and 2 – 69-kV Power and Communication Line, North End and South End*

Potential effects to water resources under Alternatives 1 and 2 would be the same as for the proposed action with the exception that the rerouted section of the 69-kV Power and Communication Line would have a slightly greater potential to generate additional sediment loads to intermittent drainages during construction and maintenance because the total area of disturbance would be larger.

4.1.13.5 *Alternative 3 - Natural Gas Pipeline, Black Rock*

Potential effects to water resources under Alternative 3 would be the same as for the proposed action but the disturbance areas with the potential to generate sediment loads to small intermittent drainages would be shifted to the new pipeline route.

4.1.13.6 *Alternative 4 - Natural Gas Pipeline, West End*

Potential effects to water resources under Alternative 4 would be the same as for the proposed action with the exception that the rerouted section of the Natural Gas Pipeline would have less potential to generate additional sediment loads to intermittent drainages during construction and maintenance because the total area of new disturbance would be smaller.

Table 4.1.13-8 Potential Effects to Water Rights

Map ID #	Water Right Number	Type of Right	Status of Application	Priority Date	Uses	Permitted Flow (cfs)	Permitted Volume (ac-ft)	Owner	Source	Distance from Well Field Center (miles)	Modeled Drawdown at 30 Years (feet)	Measurable Effect	Potential Magnitude
968	69-96	Underground	Perfected	01/10/1905	Other, Stock	0.015	0	USA BUREAU OF LAND MANAGEMENT	Underground Water Well	2.3	7.25	Probable	Major
989	1269002M00	Underground	Approved		Not Specified	0	0	PEAK MINERALS	Non-Production Well: Monitor	2.3	7.25	Probable	Major
967	1169003M00	Underground	Approved		Not Specified	0	0	US AIR FORCE	Non-Production Well: Monitor	2.4	7.00	Probable	Major
959	1369001M00	Underground	Approved		Not Specified	0	0	CH2M HILL FOR PEAK MINERALS INC.	Non-Production Well: Monitor	2.6	6.75	Probable	Major
950	1369001M00	Underground	Approved		Not Specified	0	0	CH2M HILL FOR PEAK MINERALS INC.	Non-Production Well: Monitor	2.9	6.50	Probable	Major
962	1169003M00	Underground	Approved		Not Specified	0	0	US AIR FORCE	Non-Production Well: Monitor	3.4	6.00	Possible	Major
963	1169003M00	Underground	Approved		Not Specified	0	0	US AIR FORCE	Non-Production Well: Monitor	5.1	4.50	Possible	Major
977	1169003M00	Underground	Approved		Not Specified	0	0	US AIR FORCE	Non-Production Well: Monitor	5.9	4.00	Possible	Major
899	1169002M00	Underground	Approved		Not Specified	0	0	CH2M HILL FOR PEAK MINERALS, INC.	Non-Production Well: Monitor	6.0	4.00	Possible	Major
890	0869001M00	Underground	Approved		Not Specified	0	0	CASCADE WATER RESOURCES	Non-Production Well: Monitor	6.3	3.75	Possible	Major
992	69-25	Underground	Perfected	01/10/1905	Stock	0.046	0	USA BUREAU OF LAND MANAGEMENT	Underground Water Well	7.0	3.25	Possible	Major
1015	71-2503	Underground	Perfected	1905	Stock	0	0	USA BUREAU OF LAND MANAGEMENT	Underground Water Well	9.6	2.25	Possible	Moderate
835	1369001M00	Underground	Approved		Not Specified	0	0	CH2M HILL FOR PEAK MINERALS INC.	Non-Production Well: Monitor	10.2	2.00	Possible	Moderate
1187	71-5017	Abandoned Well	Approved	01/08/1905	Domestic, Irrigation, Stock	0	1.73	DAVID C. AND SHERRILL L. JONES	Underground Water Well	10.3	2.00	Possible	Moderate
1163	71-2278	Underground	Perfected	1905	Stock	0	0	USA BUREAU OF LAND MANAGEMENT	Underground Water Well	10.4	2.00	Possible	Moderate
1165	71-2278	Abandoned Well	Perfected	1905	Stock	0	0	USA BUREAU OF LAND MANAGEMENT	Underground Water Well	10.4	2.00	Possible	Moderate
1189	71-5017	Underground	Approved	01/11/1905	Domestic, Irrigation, Stock	0	1.73	DAVID C. AND SHERRILL L. JONES	Underground Water Well	10.4	2.00	Possible	Moderate
1190	71-5017	Underground	Approved	01/08/1905	Domestic, Irrigation, Stock	0	1.73	DAVID C. AND SHERRILL L. JONES	Underground Water Well	10.4	2.00	Possible	Moderate
1191	71-5017	Underground	Approved	01/11/1905	Domestic, Irrigation, Stock	0	1.73	DAVID C. AND SHERRILL L. JONES	Underground Water Well	10.5	2.00	Possible	Moderate
1192	71-5017	Underground	Approved	01/08/1905	Domestic, Irrigation, Stock	0	1.73	DAVID C. AND SHERRILL L. JONES	Underground Water Well	10.5	2.00	Possible	Moderate
837	1369001M00	Underground	Approved		Not Specified	0	0	CH2M HILL FOR PEAK MINERALS INC.	Non-Production Well: Monitor	10.6	2.00	Possible	Moderate
828	1169005M00	Underground	Approved		Not Specified	0	0	CH2M HILL FOR PEAK MINERALS, INC.	Non-Production Well: Monitor	10.7	2.00	Possible	Moderate
973	71-2501	Underground	Perfected	01/02/1905	Stock	0	0	USA BUREAU OF LAND MANAGEMENT	Underground Water Well	10.9	2.00	Possible	Moderate
821	69-21	Underground	Perfected	01/10/1905	Stock	0.05	0	USA BUREAU OF LAND MANAGEMENT	Underground Water Well	11.1	1.75	Possible	Minor
960	71-2439	Underground	Perfected	01/07/1905	Stock	0.223	0	EARL C. HAY	Underground Water Well	11.2	1.75	Possible	Minor
817	1269001M00	Underground	Approved		Not Specified	0	0	PEAK MINERALS	Non-Production Well: Monitor	11.3	1.75	Possible	Minor
1203	71-5362	Spring	Approved	01/06/1905	Domestic, Irrigation	0	1.73	WILLIAM B. WRAY	Underground well and spring	11.8	1.75	Possible	Minor
1204	71-5362	Underground	Approved	01/06/1905	Domestic, Irrigation	0	1.73	WILLIAM B. WRAY	Underground well and spring	11.8	1.75	Possible	Minor
985	71-2649	Point to Point	Perfected	1905	Stock	0.013	0	VICTOR A. AND DOROTHEA KAUFMAN	Alkali Spring	12.1	1.50	Possible	n/a
975	71-2648	Point to Point	Perfected	1905	Stock	0.013	0	VICTOR A. AND DOROTHEA KAUFMAN	Kaufman Spring	12.1	1.50	Possible	n/a
981	71-2565	Surface	Perfected	1905	Domestic, Irrigation, Stock	1.213	0	KAUFMAN AND SONS	Big Spring Area	12.1	1.50	Possible	n/a
979	71-2566	Surface	Perfected	1905	Domestic, Irrigation, Stock	0.047	0	KAUFMAN AND SONS	House Spring	12.1	1.50	Possible	n/a
976	71-2682	Surface	Perfected	1905	Domestic, Irrigation, Stock	0.066	0	KAUFMAN AND SONS	Tie house Spring (Farmhouse Spring)	12.1	1.50	Possible	n/a
978	71-2723	Surface	Perfected	1905	Domestic, Irrigation, Stock	0.012	0	KAUFMAN AND SONS	Cottage Spring	12.1	1.50	Possible	n/a
1186	71-443	Underground	Perfected	1905	Stock	0	0	RALPH W. PEARSON FAMILY LIVING TRUST	Underground Water Well	12.2	1.50	Possible	Minor
1193	71-452	Underground	Perfected	1905	Stock	0	0	JETTA PEARSON ROBINSON AND SETH C. DAVIE	Underground Water Well	12.6	1.50	Possible	Minor
1072	71-2970	Underground	Perfected	01/08/1905	Stock	0	0	KAUFMAN AND SONS	Underground Water Well	12.8	1.50	Possible	Minor
1194	71-451	Underground	Perfected	1905	Stock	0	0	JETTA PEARSON ROBINSON AND SETH C. DAVIE	Underground Water Well	12.8	1.50	Possible	Minor
1195	71-450	Underground	Perfected	1905	Stock	0	0	JETTA PEARSON ROBINSON AND SETH C. DAVIE	Underground Water Well	12.8	1.50	Possible	Minor
1213	0871002M00	Underground	Approved		Not Specified	0	0	WESTERN UTAH COPPER COMPANY	Non-Production Well: Monitor	12.9	1.50	Possible	Minor
1214	71-4396	Underground	Approved	01/09/1905	Other, Mining	0.754	0	CS MINING, LLC	Underground Water Well	12.9	1.50	Possible	Minor

Table 4.1.13-8 Potential Effects to Water Rights

Map ID #	Water Right Number	Type of Right	Status of Application	Priority Date	Uses	Permitted Flow (cfs)	Permitted Volume (ac-ft)	Owner	Source	Distance from Well Field Center (miles)	Modeled Drawdown at 30 Years (feet)	Measurable Effect	Potential Magnitude
1215	71-4773	Underground	Approved	01/05/1905	Other, Mining	0	1.73	CS MINING, LLC	Underground Water Well	12.9	1.50	Possible	Minor
1216	71-5327	Underground	Approved	01/06/1905	Mining	0	50	C. S. MINING, LLC	Underground Water Wells (4)	12.9	1.50	Possible	Minor
1217	71-5052	Underground	Approved	01/01/1905	Mining	0	50	CS MINING, LLC	Underground Water Wells (4)	12.9	1.50	Possible	Minor
1218	71-4773	Underground	Approved	01/06/1905	Other, Mining	0	1.73	CS MINING, LLC	Underground Water Wells (4)	12.9	1.50	Possible	Minor
1219	71-4783	Underground	Approved	01/05/1905	Other, Mining	0.35	50	CS MINING, LLC	3 Existing and 2 proposed Underground Wells	12.9	1.50	Possible	Minor
1220	71-4396	Underground	Approved	01/10/1905	Other, Mining	0.754	546.23	CS MINING, LLC	Underground Water Well	12.9	1.50	Possible	Minor
1185	71-3530	Underground	Perfected	01/06/1905	Irrigation, Stock	0	7.5	JACK NELSON UNION PACIFIC RAILROAD COMPANY	Underground Water Well	13.1	1.50	Possible	Minor
1188	71-448	Underground	Perfected	1905	Stock	0	0	JETTA PEARSON ROBINSON AND SETH C. DAVIE	Underground Water Well	13.2	1.25	Possible	Minor
1025	71-2454	Underground	Perfected	01/02/1905	Stock	0	0	USA BUREAU OF LAND MANAGEMENT	Underground Water Well	13.3	1.25	Possible	Minor
1205	71-2540	Underground	Perfected	1905	Stock	0.011	0	RUPERT E. KEMPF	Underground Water Well	13.4	1.25	Possible	Minor
1207	71-469	Underground	Perfected	1905	Stock	0	0	RUPERT E. KEMPF	Underground Water Well	13.5	1.25	Possible	Minor
1199	71-465	Underground	Perfected	1905	Stock	0	0	JETTA PEARSON ROBINSON AND SETH C. DAVIE	Underground Water Well	13.5	1.25	Possible	Minor
1198	71-467	Underground	Perfected	1905	Stock	0	0	JETTA PEARSON ROBINSON AND SETH C. DAVIE	Underground Water Well	13.5	1.25	Possible	Minor
1197	71-446	Underground	Perfected	1905	Stock	0	0	JETTA PEARSON ROBINSON AND SETH C. DAVIE	Underground Water Well	13.5	1.25	Possible	Minor
1196	71-447	Underground	Perfected	1905	Stock	0	0	JETTA PEARSON ROBINSON AND SETH C. DAVIE	Underground Water Well	13.6	1.25	Possible	Minor
1200	71-2546	Underground	Perfected	01/04/1905	Domestic, Stock	0	4.65	JETTA PEARSON ROBINSON AND SETH C. DAVIE	Underground Water Well	13.6	1.25	Possible	Minor
1224	71-5052	Underground	Approved	01/05/1905	Mining	4.456	50	CS MINING, LLC	Underground Water Well (existing)	13.9	1.25	Possible	Minor
1225	71-4763	Underground	Approved	01/04/1905	Other, Mining	0.35	50	CS MINING, LLC	Underground Water Well	13.9	1.25	Possible	Minor
1226	71-4763	Underground	Approved	01/11/1905	Other, Mining	0.35	0	CS MINING, LLC	Underground Water Well	13.9	1.25	Possible	Minor
1227	71-4763	Underground	Approved	01/06/1905	Other, Mining	0.35	0	CS MINING, LLC	Underground Water Well	13.9	1.25	Possible	Minor
1228	71-4396	Underground	Approved	01/09/1905	Other, Mining	0.754	0	CS MINING, LLC	Underground Water Well	14.1	1.25	Possible	Minor
1229	71-4773	Underground	Approved	01/05/1905	Other, Mining	0	1.73	CS MINING, LLC	Underground Water Well	14.1	1.25	Possible	Minor
1230	71-5327	Underground	Approved	01/06/1905	Mining	0	50	C. S. MINING, LLC	Underground Water Wells (4)	14.1	1.25	Possible	Minor
1231	71-5052	Underground	Approved	01/01/1905	Mining	0	50	CS MINING, LLC	Underground Water Wells (4)	14.1	1.25	Possible	Minor
1232	71-4773	Underground	Approved	01/06/1905	Other, Mining	0	1.73	CS MINING, LLC	Underground Water Wells (4)	14.1	1.25	Possible	Minor
1233	71-4783	Underground	Approved	01/11/1905	Other, Mining	0.35	0	CS MINING, LLC	Underground Water Well	14.1	1.25	Possible	Minor
1234	71-4396	Underground	Approved	01/10/1905	Other, Mining	0.754	546.23	CS MINING, LLC	Underground Water Well	14.1	1.25	Possible	Minor
1235	71-4783	Underground	Approved	01/05/1905	Other, Mining	0.35	50	CS MINING, LLC	Underground Water Well	14.1	1.25	Possible	Minor
1209	71-468	Underground	Perfected	1905	Stock	0	0	JETTA PEARSON ROBINSON AND SETH C. DAVIE	Underground Water Well	14.3	1.25	Possible	Minor
1238	71-4783	Underground	Approved	01/11/1905	Other, Mining	0.35	0	CS MINING, LLC	Underground Water Well	14.4	1.25	Possible	Minor
1239	71-4783	Underground	Approved	01/05/1905	Other, Mining	0.35	50	CS MINING, LLC	Underground Water Well	14.4	1.25	Possible	Minor
1240	1571005M00	Underground	Approved		Not Specified	0	0	CS MINING, LLC	Non-Production Well: Monitor	14.5	1.25	Possible	Minor
1242	71-4783	Underground	Approved	01/11/1905	Other, Mining	0.35	0	CS MINING, LLC	Underground Water Well	14.5	1.25	Possible	Minor
1243	71-4783	Underground	Approved	01/05/1905	Other, Mining	0.35	50	CS MINING, LLC	Underground Water Well	14.5	1.25	Possible	Minor
1241	1571003M00	Underground	Approved		Not Specified	0	0	CS MINING, LLC	Non-Production Well: Monitor	14.6	1	Possible	Minor
1237	71-4301	Underground	Perfected	01/10/1905	Other, Stock	0.011	0	USA BUREAU OF LAND MANAGEMENT	Underground Water Well	14.7	1	Possible	Minor
1236	71-5327	Underground	Approved	01/06/1905	Mining	0	50	C. S. MINING, LLC	Underground Water Wells (4)	14.7	1	Possible	Minor
1212	71-2411	Underground	Perfected	01/12/1905	Irrigation	0	320	JETTA PEARSON ROBINSON AND SETH C. DAVIE	Underground Water Well	14.8	1	Possible	Minor

4.1.13.7 *Alternative 5 - Sevier River Diversion*

Potential effects to water resources under Alternative 5 would be the same as for the proposed action with the exception that the disturbance associated with the diversion structure would be displaced from the Sevier River channel onto the playa.

4.1.13.8 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Conditions affecting groundwater, surface water, and water rights would be unchanged. No Project-related effects would occur to water availability or water quality. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2 Cumulative Effects

The NEPA requires federal agencies to consider the cumulative effects of proposals under their review. Cumulative effects are defined by the CEQ as "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 individually minor but collectively significant actions taking place over a period of time" (40 CFR § 1508.7).

- Past actions are those actions where the majority of effects have occurred in the past, although residual and especially indirect effects continue into the present. In general, the effects of past actions form part of the environmental baseline.
- Present actions are those actions that are ongoing at the time of the analysis. As with past actions, the effects of present actions generally form part of the environmental baseline.
- Reasonably foreseeable future actions include activities that are approved but not yet implemented, as well as activities that are not yet approved but for which the proposed action has been sufficiently defined that their potential effects are reasonably clear and not subject to speculation. The environmental baseline does not include reasonably foreseeable future actions.

By definition, for an action to contribute to cumulative effects, its direct or indirect effects must overlap with the direct or indirect effects of other past, present, or reasonably foreseeable actions in space and time. If an action would have no direct or indirect effects on a resource, it would have no cumulative effects on that resource.

4.2.1 Past, Present and Reasonably Foreseeable Future Actions

Appendix M lists the past, present, and reasonably foreseeable future actions that may contribute to cumulative effects. These include other BLM actions, other federal actions, and non-federal (including state, local, and private) actions. **Appendix M** also lists other projects that were considered, but that are not reasonably foreseeable; as a result, these projects are not part of the analysis of cumulative effects. The need to include various actions in the cumulative effects analysis for each resource depends on the extent of the analysis area for that resource, as well as the potential for its effects to overlap with those of the proposed action or alternatives in space and time. The introductory section for each resource describes, in general terms, which past, present, and reasonably foreseeable actions are considered as part of the cumulative effects analysis for that resource.

4.2.2 Air Quality and Climate

The primary past, present, and reasonably foreseeable future actions (cumulative sources) that would contribute to cumulative effects on air quality and climate in conjunction with the direct and indirect effects of the Project include:

- Graymont / Cricket Mountain Mine/Quarry, approximately 5 miles east of the Sevier Playa
- Graymont / Cricket Mountain Lime Plant, approximately 13 miles east of the Sevier Playa

Two other cumulative sources were included in the modeling (Ramboll 2018) to be conservative, even though they are located outside the analysis area. These sources are:

- IPP, approximately 47 miles northeast of the Sevier Playa
- Kern River Gas Transmission System (Fillmore Compressor Station) (listed by EPA [2018a] as MidAmerican Energy), approximately 35 miles east-southeast of the Sevier Playa

Three additional cumulative sources were identified as potentially contributing to the cumulative effects; however, information on these sources is insufficient for air dispersion modeling purposes. These sources were not included in the model and potential effects from these three sources could not be quantified. These sources include the following:

- Graymont 1,956 acres, limestone quarry, approximately 12 miles east of the Sevier Playa, pending operations, current plan incomplete
- Smithfield Hog Farms, first phase in Beaver County and second phase in Millard County, approximately 15 miles southeast of the Sevier Playa
- Frontier Observatory for Research into Geothermal Energy (FORGE) Project, located on state and private lands in Beaver County, about 10 miles north of Milford and 20 miles southeast of the Sevier Playa

4.2.2.1 *Proposed Action*

4.2.2.1.1 Fugitive Dust Emissions

The cumulative sources do not emit enough fugitive dust to be considered additive to the fugitive dust emissions of the Project. Fugitive dust tends to be localized to the immediate area of the activities generating the dust, as seen in Figure 7 in the Air Report. Thus, no cumulative effect from fugitive dust is anticipated if the Project were implemented, especially on the ambient air boundary where the Project's effects would be highest.

4.2.2.1.2 Other Emissions

The cumulative sources emit CO and NO_X at high enough levels t to be considered additive to the emissions of the Project. These are evaluated further in **Section 4.2.2.1.3**. For SO_2, VOCs, and process-related PM_{10} and $PM_{2.5}$, the amount of emissions is small enough that no cumulative effects are anticipated.

4.2.2.1.3 National Ambient Air Quality Standards

The analysis for cumulative effects is limited to CO and NO_2, because these are the only two pollutants from the cumulative sources that are emitted at high enough levels to potentially combine with the direct and indirect effects of the Project and affect air quality in the analysis area. The other air pollutants of PM_{10}, $PM_{2.5}$, and SO_2 are emitted by the cumulative sources at levels that are too low to cause measurable cumulative effects.

To assess the cumulative effects for CO and NO_2, the modeled concentrations from the Project and nearby regional sources were added to the respective background concentrations and the totals were compared against the applicable NAAQS (**Table 4.2.2-1)**. For each pollutant and averaging period, the cumulative source concentrations represent the maximum modeled emissions over all of the receptors for the respective rank. The Project-only concentration is the Project's contribution to the total concentration, (that is, the Project concentration that occurred at the same time and same receptor as the total concentration). The cumulative nearby sources concentration is the nearby sources' contributions at the same time and receptor as the total concentration. The background concentration represents the existing air quality for the analysis area (Section 5.5 in the Air Report). The total concentration is the sum of the Project-only concentrations, the concentrations from the cumulative sources, and the background concentration. This sum is the value that is compared against the NAAQS. Each pollutant analyzed is discussed in the subsections below.

Table 4.2.2-1 Comparison of Total Cumulative Concentrations to the NAAQS

Pollutant	Averaging Period	Model Rank (1)	Project-Only Conc.(2) (µg/m³)	Cumulative Nearby Sources Conc. (3) (µg/m³)	Background Conc. (4) (µg/m³)	Total Conc. (5) (µg/m³)	NAAQS (µg/m³)	Exceeds NAAQS?
CO	1-hour	2nd	3,431	0.22	3,435	6,866	40,000	No
	8-hour	2nd	482.3	0.093	2,748	3,230	10,000	No
NO_2	1-hour	8th	323.4	0.08	23.9(5)	347.4	188	Yes
	Annual	1st	23.8	0.098	3.8	27.7	100	No

(1) Rank of the modeled concentration used when modeling for the NAAQS.
(2) This concentration is the Project's portion (contribution) to the total concentration.
(3) This concentration is the portion (contribution) from the cumulative nearby sources to the total concentration.
(4) Background concentration represents the existing air quality for the assessment area. See **Section 5.5**.
(5) This is the seasonal hour background concentration for the same hour and season when the total concentration occurred. See **Section 5.5**.
(6) Total concentration is the sum of the concentrations from the Project, cumulative sources, and background. This concentration is compared to the NAAQS.

4.2.2.1.3.1 Carbon Monoxide

The modeled concentrations of emissions from the Project-only and cumulative nearby sources for both the 1-hour and 8-hour averaging periods for CO represent the highest of the second-high concentrations for all receptors. The cumulative concentration from the nearby sources at the Project-only maximum is very small for both 1-hour and 8-hour averaging periods. The total concentrations for the two averaging periods are well below the NAAQS (**Table 4.2.2-1)**. If the Project were implemented, the cumulative CO emissions in the analysis area would be relatively minimal.

4.2.2.1.3.2 Nitrogen Dioxide

The modeled concentration of emissions from Project-only and cumulative nearby sources for 1-hour NO_2 represents the highest of the 8th high concentrations for all receptors. This concentration is much greater than the background air quality, and exceeds the NAAQS (**Table 4.2.2-1**). The cumulative concentration from the nearby sources at the Project-only maximum is very small. The background concentration shown in **Table 4.2.2-1** is the representative concentration for the season and hour during which the highest 8th-high concentration occurred (Section 5.5.4 in the Air Report). The total concentration exceeds the NAAQS.

Figure 11 in the Air Report depicts the areal coverage of the total cumulative 1-hour NO_2 concentrations across the analysis area. Several isolated pockets of high 1-hour NO_2 concentrations are shown with concentrations higher than the 1-hour NAAQS. In addition to the high concentration areas near the Project, several additional exceedances are shown east of the Project. These specific areas are caused by the cumulative concentrations from the nearby sources. Analyzing these eastern areas in more detail, AERMOD predicted 78 hour and receptor combinations for which the total concentration exceeded the NAAQS. The average Project-only concentrations paired in time with the same receptor for these exceedances was 0.008 µg/m³, with the maximum contribution at 0.0637 µg/m³.

Table 4.2.2-2 lists the top ten Project-only concentrations paired in time and receptor with the total emissions. In each case, the Project-only concentration is less than 0.04 percent of the total concentration. In addition, all Project-only concentrations are less than 7.5 µg/m³, which is the concentration level for 1-hour average that EPA would consider a source to be contributing to an exceedance.

Table 4.2.2-2 Comparison of Highest 10 Project-Only Concentrations (1-hour NO_2) with Total Cumulative Emissions above the NAAQS

Project-Only Concentration (1) (µg/m³)	Cumulative Source Concentration (2) (µg/m³)	Background Concentration (3) (µg/m³)	Total Concentration (4) (µg/m³)
0.06370	169.4	23.1	192.6
0.06150	195.0	23.1	218.2
0.06090	212.5	26.9	239.5
0.05070	171.3	26.9	198.3
0.05030	226.7	33.8	260.6
0.05020	174.3	26.9	201.2
0.04140	202.9	26.9	229.8
0.03270	177.4	25.0	202.5
0.01670	180.5	33.8	214.4
0.01380	204.4	19.4	223.8

(1) Project-only emissions paired in time and space with the equivalent cumulative source concentrations.
(2) Maximum modeled concentration from the cumulative nearby sources modeled over all receptors for the respective model rank
(3) Background concentration represents the existing air quality for the analysis area. See **Section 5.5**.
(4) Total concentration is the sum of Project-only concentrations, cumulative nearby source concentration, and background concentration. This concentration is compared to the NAAQS.

A more detailed analysis would have to be performed on the 78 exceedances of the 1-hour NO_2 NAAQS in these eastern areas to better understand if exceedances are still shown. However, this level of effort is beyond the scope of the EIS analysis. In addition, modeled exceedances do not necessarily translate to actual monitored exceedances because of the conservative nature of the model and the modeling analysis (Section 5.3.8 in the Air Report). The BLM is not responsible for determining if an actual NAAQS exceedance exists; in Utah, this task falls to the regulatory agencies of UDAQ and EPA. Regardless of whether an actual exceedance exists or not, if the Project were implemented, the contribution from its sources at these eastern locations would be well below the 7.5 µg/m³ concentration level that EPA considers contributing to an exceedance. Thus, EPA and UDAQ would likely not identify the Project as contributing to these modeled exceedances, and the BLM would concur. All Project-only concentrations at these eastern locations and periods would have minimal effects on the total concentration.

The modeled concentration for annual NO_2 for the cumulative sources represents the maximum concentration for all receptors. The cumulative concentration from the nearby sources at the Project-only maximum is very small. The total concentration is well below the NAAQS (**Table 4.2.2-1**). If the Project were implemented, the cumulative effects of annual NO_2 emissions on the analysis area would be relatively minimal

4.2.2.1.4 PSD Increments

No cumulative analysis was performed for PSD increments because the Project would not be a PSD source.

4.2.2.1.5 Class I and Class II Area AQRV Impacts

No cumulative analysis was performed for effects to AQRVs for Class I and Class II areas of interest because analysis of AQRVs is project-specific. Separate analyses could be run for cumulative projects, but the results would not be comparable in the same way that emissions of pollutants from different sources can be added to provide cumulative emissions.

4.2.2.1.6 Greenhouse Gas Emissions

If the Project were implemented, the maximum annual emissions of GHGs in the form of CO_2e would be 26,893 metric tons (0.03 mmt) (29,644 tons) (**Section 7.2.1.6**). The only facility with reportable emissions in the analysis area is Graymont, with 0.77 mmt (844,625 tons) reported in 2016 (EPA 2018b). The three facilities in Millard County with reportable emissions, Graymont, IPP, and the Kern River Gas Transmission System (Fillmore Compressor Station), had total CO_2e emissions of 8.7 mmt (9.6 million tons) reported in 2016 (EPA 2018b); therefore, at maximum emissions, the Project CO_2e emissions would be 0.31 percent of the total CO_2e emissions from Millard County. The Project's maximum CO_2e emissions represent about 0.05 percent of Utah's 2016 CO_2e emissions of 63.2 mmt (69.7 million tons) and about 0.0005 percent of the 2016 U.S. CO_2e emissions of 6,511.3 mmt (Table 35 in the Air Report) (7.2 billion tons). The Project would be a minor source of GHG emissions, and the addition of Project CO_2e emissions would not cause noticeable cumulative effects to the Utah and national GHG emission inventories. The design features listed in **Appendix K** would be used as applicable to minimize emissions from Project sources, including Tier 4 engines and employing rail to transport the vast majority of product to market.

4.2.2.1.7 Climate Change

The IPCC (2014) concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations." See **Section 4.1.1.3.7** for a more detailed discussion on this topic.

Based on the Central Basin and Range Rapid Ecoregional Assessment (NatureServe 2013), increased warming and precipitation changes are projected to occur for the analysis area because of climate change. The July maximum temperature for the 2020's decade is projected to increase 1.73 to 2.29ºF, while by 2060, the July maximum temperatures are expected to increase by more than 5ºF. Precipitation is expected to vary by two standard deviations from the 20th century mean. However, potential effects to air quality caused by climate change are likely to be varied. For example, if climate change results in a warmer and drier climate, particulate matter emissions could increase because of increased windblown dust from drier and less stable soils. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened/endangered plants may be accelerated. The population of some animal species may be reduced because of loss of habitat or competition from other species whose ranges may shift northward. Less snow at lower elevations would be likely to affect the timing and quantity of snowmelt, which, in turn, could affect aquatic species. The Project does have GHG emissions and would contribute to climate change; however, because it is a minor source, its effects alone would be negligible and not discernible from broader regional and global trends.

4.2.2.2 *Action Alternatives*

Alternatives 1, 2, 3, 4, or 5 would be implemented during the initial construction portion of the Project. Since no measurable differences in any pollutant emissions are expected from any of the alternatives, there would be no difference in cumulative emissions compared to the proposed action.

Alternatives 1 through 5 would not affect the operation phase of the Project, and the production level would remain the same as in the proposed action. All sources in the Operation / Concurrent Construction Phase (2024-2053) would be the same as in the proposed action, with no alterations to the Mining Plan. As a result, the maximum emission years for the Project would not be affected, nor would the location of sources be altered. The predicted cumulative emissions of all pollutants and averaging periods under Alternatives 1, 2, 3, 4 or 5 would be identical to those for the proposed action.

4.2.2.3 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as described in the proposed action and there would be no new emissions or effects to air quality or climate; therefore, there would be no cumulative effects to air quality or climate. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and

POD, as well as completion of a new NEPA process, including a new analysis of potential cumulative effects to air quality and climate.

4.2.3 Biological Resources

The primary past, present, and reasonably foreseeable future actions that would contribute to cumulative effects to biological resources in conjunction with the direct and indirect effects of the Project include: the Telescope Array Project (including expansions); wind energy projects; a solar project; transmission and distribution lines; Black Rock Substation; pipelines; fiber optic lines; the UPRR; federal and state highways; county and BLM roads; off-highway vehicle (OHV) areas; range allotments and improvements; and water development (such as water withdrawals for agriculture and industry).

4.2.3.1 *Proposed Action*

4.2.3.1.1 Vegetation Excluding Special Status Species

The analysis area for cumulative effects to vegetation (excluding special status species) includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes a 0.25-mile buffer around the off-lease lands. Past actions that may have affected vegetation in the analysis area include grazing, road construction, power line developments, water development, and wildfire. Present actions include grazing, recreational activities, water development, and road maintenance. Reasonably foreseeable future actions include continued road maintenance, grazing, water development, and recreation. Compared to the other past, present, and reasonably foreseeable actions in the analysis area, the Project would have by far the largest disturbance footprint; however, the vast majority of this disturbance would be within the Sevier Playa, which is relatively void of vegetation, and no other projects are present.

The off-playa Project components (for example, Processing Facility, Rail Loadout Facility, power and communication lines, Natural Gas Pipeline, water supply facilities, and access roads) would contribute to an expanding network of temporary and permanent disturbance of vegetation types including mixed salt desert scrub, semi-desert shrub steppe, and greasewood flat. Some of these Project components would be developed at locations within or near areas that are currently or have previously been disturbed and would not create substantial new disturbance. Other facilities would be located in areas where the vegetation is not currently disturbed. **Table 4.2.3-1** shows an estimate of the extent and proportion of the off-playa analysis area that has been disturbed by past and present projects, the estimated off-playa disturbance that would be caused by Project facilities, and the total (cumulative) disturbance to vegetation.

Cumulative disturbance from the proposed action combined with past, present, and reasonably foreseeable future actions would affect a relatively small proportion of the analysis area. Implementation of design features (**Appendix K**) would minimize and mitigate both temporary and permanent effects to vegetation. A Reclamation Plan (CPM 2019h) has been developed to guide interim and final reclamation, which would also reduce long-term effects to vegetation. Overall, cumulative effects to vegetation would be minimal.

Table 4.2.3-1 Existing and Proposed Disturbance to Vegetation

Disturbance Category	Acres	Percent of Analysis Area (off-playa)
Existing (past and present projects) disturbance	720	1.2%
Proposed (Project) disturbance	1,428	2.9%
Total	2,148	4.2%

4.2.3.1.2 Wetlands and Riparian Areas

The analysis area for cumulative effects to wetlands and riparian areas includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the

analysis area includes both a 0.25-mile buffer around the off-lease lands and the floodplain of the Sevier River from Conks Dam downstream to the Sevier Playa. Past actions that may have affected wetlands and riparian areas in the analysis area include grazing, road construction, power line developments, and water development. Present actions include grazing, recreation activities (for example, OHV use), road maintenance, and water development. Although not quantified, it is likely that these actions, particularly water withdrawals, have substantially reduced the extent and quality of wetlands and riparian areas along the Sevier River below Conks Dam. Reasonably foreseeable future actions include continued road maintenance, grazing, recreation, and water development.

The proposed action would have minor direct and indirect effects to wetlands and riparian areas during construction of the Perimeter Road and spur, Drop Structure, recharge canals, and other features associated with the Sevier River diversion. These effects would be localized around the diversion and would only affect a small area of wetlands or riparian areas (in the case of the Drop Structure).

There could be temporary beneficial effects to wetlands and riparian areas from implementation of the Project. The acquisition of recharge water would increase the consistency and volume of water flows in the Sevier River. Increased flows are likely to cause wetlands and riparian areas along the floodplain to expand and may improve water quality and habitat for fish and other aquatic species. However, the additional recharge water would only be maintained for the life of the Project. After decommissioning of the Project, flows would likely return to their current, intermittent nature. Riparian and aquatic habitats that were improved by the increased flows would most likely diminish and return to their current state.

4.2.3.1.3 Invasive Species / Noxious Weeds

The analysis area for cumulative effects to invasive species and noxious weeds includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes a 0.25-mile buffer around the off-lease lands. Past actions within the analysis area include road construction, power line and pipeline developments, water development, grazing, and wildfires. Present actions include recreational activities, grazing, water development, and road maintenance. Reasonably foreseeable future actions include transmission line construction, road maintenance, grazing, water development, and recreation.

Quantitative data on the acres affected by noxious weeds from past and current actions within and near the analysis area are not available. Disturbance of soils and native vegetation by past and present actions likely increased the potential for invasive and noxious weeds to inhabit the area and promoted the current distribution of invasive species and noxious weeds. The proposed action would increase the potential for invasive and noxious weeds to colonize disturbed areas during construction. However, with the implementation of design features listed in **Appendix K**, cumulative effects of the introduction or spread of existing invasive or noxious species would be mitigated and minimal.

4.2.3.1.4 Wildlife and Fish Excluding Special Status Species

4.2.3.1.4.1 Amphibians and Reptiles

The analysis area for cumulative effects to amphibians includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes both a 0.5-mile buffer around the off-lease lands and the floodplain of the Sevier River from Conks Dam downstream to the Sevier Playa. The analysis area for cumulative effects to reptiles includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes a 0.5-mile buffer around the off-lease lands. Past actions within the analysis area include grazing, road construction, power line developments, water development, and wildfire. Present actions include grazing, recreation activities, water development, and road maintenance. Reasonably foreseeable actions include continued road maintenance, grazing, water development, and recreation.

Potential direct and indirect effects to amphibians from the proposed action are limited only to the Sevier River diversion and the river channel upstream to Conks Dam. Quality of amphibian habitat could increase during the life of the Project due to increased water flows from the proposed action. Past, present, or reasonably foreseeable projects that are located within or near the Sevier River include water diversions for industry and agriculture, as well as transmission lines. Water diversion has likely caused substantial loss or degradation of amphibian habitats. Acquisition of recharge water and its conveyance down the Sevier River would likely improve habitat for amphibians between Conks Dam and the playa; however, the additional recharge water would only be maintained for the life of the Project. After decommissioning of the Project, flows would likely return to their current, intermittent nature. Amphibian habitats that improved with the increased flows would most likely diminish and return to their current state.

Cumulative effects to reptilian habitat are not expected to be substantial as most existing permanent disturbances are linear in nature and there are large amounts of suitable habitat adjacent to these features. However, there would be minimal potential for injury, mortality, or displacement of reptiles from Project vehicle and equipment operation. The proposed action would also increase the availability of perch sites for predators (for example, transmission lines, and communication towers). The cumulative effects of increased predator perching sites on reptiles may include a slight increase in mortality of local reptiles but would not have population level effects.

Effects to amphibians and reptiles from Project activities such as ground clearing, increased traffic, and overland travel would be mitigated by the design features listed in **Appendix K**. Any incremental effects would largely be temporary in nature as habitat is restored post-construction and operational design features are implemented.

4.2.3.1.4.2 Fish

The analysis area for cumulative effects to fish includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes both a 0.5-mile buffer around the off-lease lands and the floodplain of the Sevier River from Conks Dam downstream to the Sevier Playa. Past actions that may have affected fish habitat in the analysis area include grazing, road construction, power line developments, water development, and wildfire. Present actions include water development, grazing, recreational activities, and road maintenance. Reasonably foreseeable actions include continued water development, road maintenance, grazing, and recreation.

The potential direct and indirect effects of the Project on aquatic habitat are limited to the Sevier River upstream of the playa and would be beneficial to fish for the life of the Project. The most notable element of the Project relative to cumulative effects to fish would be the acquisition of an average of 50,000 acre-feet of water per year from upstream owners on the Sevier River in dry years. Given the limitations of the natural environment, the other incremental effects of the proposed action to fish, when combined with ongoing and future actions, would not be any more limiting than they are currently. After decommissioning of the Project, flows would likely return to their current, intermittent nature. Fish habitats that improved with the increased flows would most likely diminish and return to their current state.

4.2.3.1.4.3 Bats

The analysis area for cumulative effects to bats includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes both a 5.0-mile buffer around the off-lease lands and the floodplain of the Sevier River from Conks Dam downstream to the Sevier Playa. Past actions within the analysis area include grazing, road construction, power line developments, water development, and wildfire. Present actions include grazing, recreational activities, water development, and road maintenance. Reasonably foreseeable actions include continued road maintenance, grazing, water development, and recreation. The rural nature of the analysis area has

influenced the type and intensity of past, present, and any future activities. Although past and present activities had the potential to cause mortality, injury, or displacement of bats, the magnitude and duration of these activities overall are limited and the effects are most likely not substantial. Any future actions in the region would likely be similar to those that have occurred in the past and are presently occurring.

Effects from past and present actions have likely been minimal as the analysis area provides very limited roosting and foraging habitat. Roosting habitat for bats are predominantly located outside of the analysis area (for example, within the Cricket Mountains and the House Range Mountains more than five miles from any proposed facilities). Solitary bats or small bat colonies may roost in rock crevices, caves, mine adits and juniper trees in or near the Cricket, House Range, and San Francisco Mountains and potentially within the analysis area. Proposed infrastructure would increase the miles of road, buildings, power lines, and gas lines as well as increasing the consistency of open water on the playa and in the Sevier River. Bats could be attracted to various light structures (for example, construction light towers or operating facility lights), which often attract insects at night. Cumulative effects to bats are expected to be minor and are unlikely to affect bats at the population level because of the lack of large roosting sites within and near the analysis area. Implementation of design features listed in **Appendix K**, including monitoring and adaptive management, would reduce potential risks to bats.

Potential effects from the proposed action that could contribute to cumulative effects would be development of additional power and communication lines that could increase collision risks to bats. In addition, the construction of hypersaline brine ponds and trenches could contribute to bat mortalities; however, the extent of effects is unknown. Although the effects of the development of hypersaline brine ponds and trenches to bats within the analysis area are unknown, monitoring requirements have been developed and are described in the AWMP (CPM 2019a). Potential mitigation measures that would reduce adverse effects to bats, if any are identified through monitoring, are also described in the AWMP. With the implementation of these measures, the proposed action would have minimal cumulative effects to bats.

4.2.3.1.4.4 Big Game

The analysis area for cumulative effects to big game includes the entirety of UDWR Game Management Unit 20 because of the large home range of pronghorn. Past, present, and reasonably foreseeable actions include a broad spectrum from grazing, fence construction, recreation, road construction, and wildfires to wind/solar facilities, multi-state transmission lines, hog farms, mining, and the Telescope Array Project. The proposed action would be an additive feature in the greater landscape and within the analysis area. Proposed infrastructure would increase the miles of roads, traffic, and human activity, and would generally increase structural development needed for collection, processing, and transporting of mined potash.

Past and present actions have contributed to loss of foraging habitat, habitat fragmentation, increased vehicle collisions, displacement from human presence, and structural developments. The primary difference between the Project and the past, present and future actions is that a majority of the Project would be developed on the barren playa that does not provide suitable habitat for pronghorn. However, the remaining Project components (for example, power lines, Natural Gas Pipeline, and water supply facilities) would contribute to an expanding network of temporary and permanent disturbance of foraging habitat (shrub-steppe vegetation).

Cumulatively, the incremental effects of the Project to pronghorn when combined with the identified past, present, and reasonably foreseeable future actions would contribute to mortality, injury, or displacement of individuals and herds within the analysis area. These effects would be minimal because design features have been developed and would be implemented to avoid, minimize, and mitigate effects to pronghorn and their habitats (**Appendix K**).

4.2.3.1.5 Migratory Birds

4.2.3.1.5.1 Waterfowl and Shorebirds

The analysis area for cumulative effects to waterfowl and shorebirds includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes both a 0.5-mile buffer around the off-lease lands and the floodplain of the Sevier River from Conks Dam downstream to the Sevier Playa. Past actions include grazing, road construction, power line developments, water development, and wildfire. Present actions include grazing, recreation activities, water development, and road maintenance. Reasonably foreseeable actions include continued road maintenance, water development, grazing, and recreation.

The development of the proposed action would contribute to existing disturbance in the analysis area and region. The proposed infrastructure would increase the length of the local road network, vehicle traffic, human activity, and structures including power lines, pipelines, railroads, etc. The proposed action could cause temporary displacement of waterfowl and shorebirds from the more productive habitat areas near the inlet of the Sevier River. The amount and distribution of water in this area is highly variable and weather dependent, the water has elevated dissolved solids, and the low-quality riparian areas currently provide minimal habitat components for waterfowl and shorebird nesting and foraging. Acquisition of an average of 50,000-acre feet of recharge water per year is a unique element of this Project that would deliver consistent and predictable flows of water to the Sevier River channel, which would likely improve habitat for waterfowl and shorebirds during the life of the Project.

The most notable effect from past and present actions is the control of the Sevier River. At one time, the Sevier River flowed with seasonal regularity and flooded large areas upstream of the playa, creating expansive wetlands. The Sevier River presently is highly managed by dams, diversions, and reservoirs, which include and have been influenced by agriculture and irrigation infrastructure; consequently, flows do not reach the playa except in wet years. Because of the rural nature of the analysis area, any future development would likely be small in size and purpose. The acquisition of an average of 50,000-acre feet of recharge water per year and its transmittal down the Sevier River channel would provide a yearlong source of water and likely increase waterfowl and shorebird use and habitat along the river. Cumulatively, the incremental effects of the acquisition of 50,000-acre feet of water per year when combined to past, present, and reasonably foreseeable future actions would largely be beneficial to individual waterfowl and shorebirds for the duration of the Project. However, once the Project is terminated, recharge water would no longer be provided and conditions would decline rather quickly to current conditions. No short-term or long-term cumulative changes to the regional populations of waterfowl or shorebirds are predicted.

4.2.3.1.5.2 Raptors

Golden eagles typically forage within 4.4 miles of their nest, but can forage up to 10 miles (McGrady et al 2002). For the purpose of this section, the analysis area for cumulative effects to raptors has been defined by the foraging distance of golden eagles and includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes a 10-mile buffer around the off-lease lands. Past, present, and reasonably foreseeable actions include a broad spectrum from grazing, recreation, road construction, and wildfires to wind/solar facilities, multi-state transmission lines, hog farms, mining, and the Telescope Array Project. The proposed action would be an additive feature in the greater landscape and within the analysis area. Proposed infrastructure would increase the miles of roads, traffic, human activity, and generally increase structural development, which would be needed for collection, processing, and transporting of mined potash.

Raptors potentially could be displaced from nest locations or territories, or subject to mortality and injury from collision with Project traffic, equipment, and power lines. Additional loss of habitat and use caused by increase in noise and human activity could occur. The analysis area was identified as high value habitat for golden eagles and other raptors. Large and small past and present actions have steadily been

pursued and developed over time and many are active presently. Reasonably foreseeable future actions include interests in wind/solar development, mining, transmission line development, hog farming, and requested expansion of the Telescope Array Project. Direct and indirect effects from past and present actions include loss of foraging habitat, increased disturbance from human presence, and increased risk of collisions with utility lines, structures, or wind turbines.

A majority of the Project development would occur on the Sevier Playa, which does not provide any habitat value for most raptors (with the exception of the peregrine falcon because of the potential occurrence of waterfowl and shorebirds). Other Project infrastructure (for example, the Natural Gas Pipeline, rail facilities, and Processing Facility) would be developed largely at locations within or near areas that are currently or have been previously disturbed and would not create any substantial new disturbance or loss of habitat. Other facilities would be located in areas where the vegetation is not currently disturbed. Existing and proposed power and communication lines present potential problems of electrocution and collision.

Cumulatively, the incremental effects of the Project to raptors, when combined with the identified past, present, and reasonably foreseeable future actions, could contribute to mortality, injury, or displacement of individuals; however, no cumulative changes to regional populations of raptors are predicted. Design features (**Appendix K**) have been developed and are intended to avoid or minimize cumulative effects to raptors and their habitat. With implementation of the measures, overall cumulative effects to raptors are expected to be minimal.

4.2.3.1.5.3 Passerines

The analysis area for cumulative effects to passerines (including black swift, brewer's sparrow, loggerhead shrike, sage sparrow, and sage thrasher) includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes a 0.5-mile buffer around the off-lease lands. Past actions include grazing, road construction, power line developments, water development, and wildfire. Present actions include grazing, recreation activities, water development, and road maintenance. Reasonably foreseeable actions include continued road maintenance, grazing, recreation, water development, and transmission line development.

The proposed action would be an additive feature in the greater landscape and within the analysis area. Proposed infrastructure would increase the miles of roads, traffic, human activity, and generally increase structural development needed for collection, processing, and transporting of mined potash. Mortalities and injuries could occur from collision with construction vehicles and power and communications lines. In addition, increased noise levels and human activity could cause temporary stress, nest abandonment, and displacement of individuals to other areas. Predominately, the effects discussed above are associated with linear features (for example, utility lines, roads, and pipelines) or small substations and structures.

The proposed action would increase the number and extent of ROWs (for example, access roads, utility lines, and rail facilities) to an expanding network of linear disturbances. However, a majority of the development would occur on the playa, which does not provide habitat for passerines. The remaining Project infrastructure (for example, Natural Gas Pipeline, rail facilities, Processing Facility, and power lines) would be developed largely within or near areas that are currently or have been previously disturbed and would not create any substantial new disturbance or loss of habitat. Other facilities would be located in areas where the vegetation is not currently disturbed. Cumulatively, the incremental effects of the proposed action on passerines and their habitats, when combined with past, present, and reasonably foreseeable future actions, would be relatively minor and would not cause population level effects because of the limited extent of disturbance to upland habitat and the implementation of design features (**Appendix K**).

4.2.3.1.6 Special Status Species

The analysis area for cumulative effects to special status wildlife species includes all lands within the boundaries of the potassium leases controlled by CPM (on-lease lands), as well as all lands within the

proposed and alternative ROWs (off-lease lands). In addition to the on-lease and off-lease lands, the analysis area includes a 1.0-mile buffer around both the on-lease and off-lease lands. Past actions within this analysis area include grazing, road construction, power line developments, water development, and wildfire. Present actions include grazing, recreation activities, water development, and road maintenance. Reasonably foreseeable actions include continued road maintenance, grazing, transmission line construction, water development, and recreation.

4.2.3.1.6.1 Waterfowl and Shorebirds

American white pelicans are not expected to breed or forage within the analysis area due to lack of food resources and breeding habitat. However, they may stage for a short period during migration in the evaporation ponds and the Sevier River channel. The AWMP includes monitoring of the evaporation ponds, which is expected to identify any adverse effects of white pelicans staging in the ponds. Any adverse effects would be mitigated through adaptive measures in the AWMP. Although the Project is an added feature to the region, minimal incremental effects of the Project, when combined with other past, present, and reasonably foreseeable future actions, are anticipated.

4.2.3.1.6.2 Raptors

Burrowing owls and short-eared owls are ground-nesting raptors that can be found within the analysis area. Mortalities and injuries could occur from collision with construction vehicles and power and communications lines; nest destruction and abandonment; and displacement of individuals by increased and ongoing Project activities and human presence.

The proposed action would increase the number and extent of ROWs (for example, access roads, utility lines, and rail facilities) to an expanding network of linear disturbances. However, a majority of the development would occur on the playa, which does not provide habitat for these species. The remaining Project infrastructure (for example, the Natural Gas Pipeline, rail facilities, Processing Facility, and power lines) would be developed largely within or near areas that are currently or have been previously disturbed and would not create any substantial new disturbance or loss of habitat. Other facilities would be located in areas where the vegetation is not currently disturbed. Cumulatively, the incremental effects of the proposed action on burrowing owl and short-eared owl foraging and breeding habitat, when combined with past, present, and reasonably foreseeable future actions, would be relatively minor and would not cause population level effects because there is substantial habitat availability within and adjacent to the analysis area, and because design features (**Appendix K**) would be implement to avoid or minimize any adverse effects.

4.2.3.1.6.3 Bats

Cumulative effects to special status bats (including big free-tailed bat, fringed myotis, Townsend's big-eared bat, and western red bat) would be the same as those described in **Section 4.2.3.1.4.3**.

4.2.3.1.6.4 Kit Fox

Mortalities and injuries could occur from collision with construction vehicles; dens could be destroyed or abandoned; and individuals could be displaced by increased and ongoing Project activities and human presence. The proposed action would increase the number and extent of ROWs (for example, access roads, utility lines, and rail spurs) to an expanding network of linear disturbances. However, a majority of the development would occur on the playa, which does not provide habitat for the kit fox. The remaining Project infrastructure (for example, Natural Gas Pipeline, rail facilities, Processing Facility, and power lines) would be developed largely within or near areas that are currently or have been previously disturbed and would not create any substantial new disturbance or loss of habitat. Other facilities would be located in areas where the vegetation is not currently disturbed. Although the Project is an added feature in the landscape, the incremental effects of the proposed action on kit fox denning and foraging habitat, when combined with past, present, and reasonably foreseeable future actions, would be relatively minor and would not cause population level effects because there is substantial habitat availability within and adjacent to the analysis area and because design features (**Appendix K**) would be implemented to avoid or minimize any adverse effects.

4.2.3.1.7 Federally Listed Species

4.2.3.1.7.1 California Condor

Condors are capable of flying more than 100 miles a day in search of carrion (Finkelstein et al. 2015) but are considered rare visitors to Millard County. Therefore, because the issues and concerns are similar to those identified for other raptors, the analysis area for cumulative effects includes a 10-mile buffer around all on-lease and off-lease Project facilities. Past, present, and reasonably foreseeable actions in this area include a broad spectrum from grazing, recreation, road construction, and wildfires to wind/solar facilities, multi-state transmission lines, hog farms, mining, and the Telescope Array Project.

The development of the proposed action would add to other projects in the greater landscape of the analysis area. Proposed infrastructure would increase the miles of roads, traffic, human activity, and generally increase structural development. The analysis area is a largely rural area in west central Utah. Large and small past and present actions have developed over time and many are active presently. However, no condor mortalities or injuries associated with these actions have been documented. Reasonably foreseeable future actions include interests in wind/solar development, mining, transmission line development, hog farming, and expansion of the Telescope Array Project. Future projects associated with energy development are a moderate to high potential in the analysis area.

A majority of the Project development would occur on the Sevier Playa that does not provide any habitat value for condors. Cumulatively, the incremental effects of the Project to California condors, when combined with past, present, and reasonably foreseeable future actions in the analysis area are anticipated to be minimal. However, because a slight risk to carrion feeding condors has been identified as a concern, design features (**Appendix K**) have been developed and are intended to further reduce the probability of effects to condors that may forage within the analysis area.

4.2.3.2 *Alternative 1*

Alternative 1 would have slightly higher cumulative effects to vegetation and habitat loss, a slight increase in avian collision risk with power and communication lines, and a slight decrease in habitat fragmentation compared with the proposed action, because Segment T6 is slightly longer than Segment T3 but follows existing disturbance corridors.

4.2.3.3 *Alternative 2*

Alternative 2 would have slightly higher cumulative effects to vegetation and habitat loss, a slight increase in avian collision risk with power and communication lines, and a slight decrease in habitat fragmentation compared with the proposed action, because Segment T6 is slightly longer than Segment T3 but follows existing disturbance corridors.

4.2.3.4 *Alternative 3*

Alternative 3 would have essentially the same cumulative effects to biological resources as the proposed action.

4.2.3.5 *Alternative 4*

Alternative 4 would have slightly higher cumulative effects to vegetation and habitat loss, and a slight decrease in habitat fragmentation compared with the proposed action, because Segment G8 is slightly longer than Segment G5 but follows existing disturbance corridors.

4.2.3.6 *Alternative 5*

Alternative 5 would have essentially the same cumulative effects to biological resources as the proposed action.

4.2.3.7 *No-Action Alternative*

Under the No Action Alternative, there would be no direct or indirect effects to biological resources; therefore, the Project would not contribute to cumulative effects. Existing and other proposed projects would continue to disturb biological resources (for example, loss of vegetation and wildlife foraging

habitat). The no action alternative would prevent CPM from exercising its existing, valid lease rights to extract the potash resource at this time. Selection of the no action alternative would not preclude mining of the potash resource in the future, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2.4 Cultural Resources

The analysis area for cumulative effects to cultural resources includes both the direct and indirect APEs that were described in **Section 4.1.3**. Many of the projects listed in **Appendix M** fall within the analysis area for cumulative effects to cultural resources. In general, these include transmission lines, pipelines (natural gas, refined petroleum products, and water), fiber optic lines, transportation (roads, trails, and the railroad), range improvements, gravel pits and other mining operations, and the Telescope Array project. Reasonably foreseeable future projects in the analysis area include transmission lines, range improvements, gravel pits, other mining operations, and expansion of the Telescope Array project.

4.2.4.1 *Proposed Action*

Many past projects may have adversely affected cultural resources by directly damaging or destroying these resources; however, the extent of these effects is unknown. Some recent projects (for example, the Milford Wind Corridor Phase I and II wind farm and transmission line) employed measures to protect cultural resources that were similar to those proposed for the Project. For these projects, adverse effects were avoided or mitigated. Other, older projects likely did not employ similar measures. Of particular notes is the transportation network (roads and railroads), much of which was built before consideration of potential effects to cultural resources was required. Past projects may also have changed the existing setting or views from sensitive cultural properties and diminished their integrity.

Past effects to cultural resources near the mouth of the Sevier River have been minimal, limited to disturbance associated with a little-used two-track road that crosses the area, and any adverse effects that may have been caused by prior survey or excavation of the sites. Potential cumulative effects of the proposed action would be mitigated as described in the PA.

The rock art sites along the Beaver River near Black Rock were likely affected by past projects. Existing developments, including SR 257 and other roads, the Union Pacific Railroad, and several transmission lines are visible from these sites and have altered the existing setting and reduced their integrity. If the Natural Gas Pipeline were constructed aboveground in this area, it would further alter the setting and reduce the integrity of these sites. This would be considered an adverse effect, although it is not expected to eliminate the eligibility of these sites for listing on the NRHP. A landscape-level review and synthesis of known rock art localities along the Beaver River may be prepared as mitigation for adverse indirect or cumulative effects of the Project to these localities should the BLM determine that these effects are likely to occur. The need for this study would be based on the results of the Class III survey(s) for Project facilities that would be constructed in this area. If implemented, the final study would be prepared for publication in a local, regional, or national journal. The plans for this study would be detailed in the HPTP.

Implementation of Class III surveys and subsequent treatment of any potentially affected eligible cultural properties in accordance with the HPTP would lead to avoidance, minimization, or mitigation of adverse direct and indirect effects to these resources. The final HPTP would also consider the cumulative effects of Project actions to eligible properties and include specific mitigation measures, if applicable, to resolve any adverse cumulative effects. Further details regarding this process are described in the PA. Following implementation of the measures, unresolved adverse cumulative effects to eligible properties are not anticipated.

4.2.4.2 *Alternatives 1 through 4*

Alternatives 1 through 4 would not have measurably different cumulative effects on cultural resources, compared with the proposed action, because the potential direct and indirect effects of the proposed and alternatives segments are essentially the same.

4.2.4.3 *Alternative 5 - Sevier River Diversion*

The potential for Alternative 5 to cumulatively affect known cultural resources would be reduced compared to the proposed action because fewer known resources are present; however, the potential for cumulative effects to undocumented resources is not known but may be high. Regardless of the extent of undocumented resources that may be discovered during Class III surveys, the potential cumulative effects of Alternative 5 would be mitigated as described in the PA, such that they would be essentially the same as those for the proposed action. The potential for cumulative effects related to the indirect effects of the proposed action and Alternative 5 to cultural resources would be essentially the same.

4.2.4.4 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as currently proposed and there would be no direct or indirect effects to cultural resources; therefore, there would be no cumulative effects. The no action alternative would prevent CPM from exercising its existing, valid lease rights to extract the potash resource at this time. Selection of the no action alternative would not preclude mining of the potash resource in the future, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2.5 Geology and Minerals

The analysis area for cumulative effects to geology and minerals is defined in **Section 4.1.4.1**. The primary past, present, and reasonably foreseeable future actions that would contribute to cumulative effects in conjunction with the direct and indirect effects of the Project are several existing gravel pits used by Millard County as needed to supply gravel for road surfacing or other uses.

4.2.5.1 *Proposed Action*

No other past, present, or reasonably foreseeable projects in the analysis area involve extraction of potassium or associated minerals from the Sevier Playa; therefore, the Project would have no cumulative effect on this resource.

Millard County's existing gravel pit immediately west of the proposed Pass Federal Pit would not be directly affected by removal of gravel by CPM. The 12.47-kV Power and Communication Line and the Natural Gas Pipeline would be constructed between Crystal Peak Road and the County's pit. While these facilities would not directly affect the gravel resource, access to the pit may be temporarily blocked by construction, which would have a minimal, short-term cumulative effect on the County's ability to remove gravel from the pit. Access to the County's other two gravel pits near the analysis area would not be affected; therefore, there would be no cumulative effect. There would be no cumulative effects to any other mining claims because none exist in the analysis area.

Several roads exist in the area of sandy soils and dunes at the north end of the playa. The Project would increase the need for road maintenance to accommodate Project traffic in this area; however, no substantial change in the cumulative risk posed by sand dune migration is anticipated. No other cumulative effects to geologic hazards are anticipated.

4.2.5.2 *Alternatives 1 through 5*

Alternatives 1 through 5 would not have measurably different cumulative effects on geology and minerals, compared with the proposed action, because the direct and indirect effects of the proposed and alternatives facilities are essentially the same.

4.2.5.3 *No Action Alternative*

Under the No Action Alternative, the Project would not be implemented as currently proposed and there would be no direct or indirect effects to geology or minerals, including removal of mineral resources, geologic hazards, or active mining claims; therefore, there would be no cumulative effects. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2.6 Lands and Access

The analysis areas for cumulative effects to lands and access are defined in **Section 4.1.5.1**. The ROWs listed in **Table 4.1.5-1** are the primary past, present, and reasonably foreseeable future (for pending ROWs) projects that may contribute to cumulative effects to ROWs in conjunction with the direct and indirect effects of the Project. Similarly, the general and project road networks listed in Tables 6 and 7 in the Lands and Access Report, as well as the UPRR, are the primary past and present projects that may contribute to cumulative effects to access and traffic in conjunction with the direct and indirect effects of the Project.

4.2.6.1 *Proposed Action*

The proposed action would increase the number and extent of ROWs in the analysis area. No cumulative effects to existing or pending ROWs are expected, because CPM would work with the ROW holders to ensure that the Project's facilities are designed, constructed, and operated in a manner that would prevent conflicts with existing ROWs.

The existing road network provides access to public lands, for other land uses, and supports existing traffic levels. Access and land uses would not be affected other than during minimal short-term road closures needed to protect public safety during construction. The Project would contribute to increased traffic on some roads, particularly Crystal Peak Road, Crystal Peak Spur Road, and SR 257; however, current traffic levels are relatively low. The Project would construct at-grade railroad crossings to Headlight Canyon Road and SR 257. Use of these crossings for rail shipment of SOP and MOP may cause short delays to some users of these routes an average of less than one time per day. While individual users may be affected occasionally, Project traffic and at-grade crossings are not expected to cumulatively reduce travel speed or increase travel time between Delta and Milford for the majority of users.

4.2.6.2 *Alternative 1 - 69-kV Power and Communication Line, North End*

Alternative 1 would not have measurably different cumulative effects on lands and access, compared with the proposed action, because it would not change other land uses, access, traffic, or at-grade railroad crossings. The overall extent of BLM-administered, state, and private lands affected by ROWs would increase with Alternative 1, compared with the proposed action. In addition, the ROWs crossed by Segment T5 would be the same as those crossed by Segment T1, and even though the crossings would be in different locations, no change in cumulative effects is expected.

4.2.6.3 *Alternative 2 - 69-kV Power and Communication Line, South End*

Alternative 2 would not have measurably different cumulative effects on lands and access, compared with the proposed action, because it would not change other land uses, access, traffic, or at-grade railroad crossings. The overall extent of BLM-administered lands affected by ROWs would increase with Alternative 2, compared with the proposed action. In addition, Segment T6 is not expected to affect Millard County's ROW for Crystal Peak Road and Crystal Peak Spur Road; therefore, the cumulative effects to ROWs would also be the same.

4.2.6.4 *Alternative 3 - Natural Gas Pipeline, Black Rock*

Alternative 3 would not have measurably different cumulative effects on lands and access, compared with the proposed action, because it would not change the ROWs crossed, other land uses, access, traffic, or at-grade railroad crossings. The overall extent of BLM-administered lands affected by ROWs would increase with Alternative 3, while the overall extent of private lands affected by ROWs would decrease, compared with the proposed action. It would slightly increase the extent of new ROW and total ROWs on BLM-managed lands, and reduce the extent of ROWs on private lands in the analysis area.

4.2.6.5 *Alternative 4 - Natural Gas Pipeline, West End*

Alternative 4 would not have measurably different cumulative effects on lands and access, compared with the proposed action, because it would not change other land uses, access, traffic, or at-grade railroad crossings. The overall extent of BLM-administered lands affected by ROWs would increase with

Alternative 4, compared with the proposed action. In addition, Segment G8 is not expected to affect Millard County's ROW for Crystal Peak Road and Crystal Peak Spur Road; therefore, the cumulative effects to ROWs would also be the same.

4.2.6.6 *Alternative 5 - Sevier River Diversion*

Alternative 5 would not have measurably different cumulative effects on lands and access, compared with the proposed action, because it would not change the ROWs crossed, other land uses, access, traffic, or at-grade railroad crossings. The overall extent of BLM-administered lands affected by Alternative 5 would be greater, compared with the proposed action.

4.2.6.7 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as described in the proposed action. Existing ROWs, other land uses, access to public lands, and traffic would remain the same. New-at-grade railroad crossings would not be constructed and would not affect traffic. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2.7 Native American Religious Concerns

The analysis area for cumulative effects to Native American religious concerns is defined in **Section 4.1.6.1**. Since no TCPs or other concerns have been identified at this time, the proposed action would have no cumulative effects on TCPs or other Native American religious concerns because there would be no direct or indirect effects. If TCPs or other concerns are identified through continuing consultation or as a result of the Class III surveys, cumulative effects to these areas of concern would be evaluated and addressed in accordance with the PA.

4.2.7.1 *Proposed Action and Action Alternatives 1 through 5*

The proposed action and action alternatives (1 through 5) would have no cumulative effects on TCPs or other Native American religious concerns because there would be no direct or indirect effects.

4.2.7.2 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as currently proposed and there would be no direct or indirect effects to TCPs or other Native American religious concerns; therefore, there would be no cumulative effects. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2.8 Paleontology

The analysis area for cumulative effects to paleontology is defined in **Section 4.1.7.1**. The primary past, present, and reasonably foreseeable future actions that would contribute to cumulative effects in conjunction with the direct and indirect effects of the Project include all projects with subsurface disturbance. By its nature, a given paleontological resource can only be affected once by its discovery and collection. Cumulative effects would only occur if multiple actions negatively affect separate resources, collectively reducing advancement of the scientific field.

4.2.8.1 *Proposed Action*

The potential for an activity to affect paleontological resources depends on the location of the disturbance more than its nature and extent. For the proposed Project, although its footprint is large, it would not encounter formations with a known PFYC greater than Low. In addition, several design features (**Appendix K**) would be implemented, further reducing the risk of adverse effects; therefore, the Project is not expected to contribute to cumulative effects to paleontological resources.

4.2.8.2 *Alternatives 1 through 5*

Alternatives 1 through 5 would have the same cumulative effects as the proposed action because the direct and indirect effects would be essentially the same.

4.2.8.3 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as currently proposed and there would be no direct or indirect effects to paleontological resources; therefore, there would be no cumulative effects. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2.9 Range Management

The analysis area for cumulative effects to range management is defined in **Section 4.1.8.1**. The primary past, present, and reasonably foreseeable future actions that would contribute to cumulative effects in conjunction with the direct and indirect effects of the Project include many utility projects (fiber optic lines, electrical transmission lines, and pipelines) and existing roads that would cumulatively affect grazing allotments. Other projects such as stock watering, fences, and other range improvement projects have had beneficial cumulative effects to range management.

4.2.9.1 *Proposed Action*

The Project would contribute to the long-term conversion of small areas of rangelands to an industrial use. Cumulative effects to rangelands would primarily occur from additional ROWs crossing allotments around the playa. Given that Project effects would be small compared to the overall size of any given allotment, cumulative effects would be minimal. The BLM FFO manages lands for multiple compatible uses, and the Project, in conjunction with other projects in the analysis area, would not affect the BLM's ability to continue to manage the analysis area for livestock grazing.

4.2.9.2 *Alternatives 1 through 5*

Alternatives 1 through 5 would not have measurably different cumulative effects on range resources, compared with the proposed action, because the direct and indirect effects of the proposed and alternatives segments are essentially the same.

4.2.9.3 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as currently proposed and there would be no cumulative effects to rangeland resources. Existing ROWs and facilities would be maintained, and future projects may be proposed that could affect grazing. Allotments would continue to be managed by the state or the BLM. At its discretion, CPM may retain control if its mineral leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2.10 Recreation

The analysis area for cumulative effects to recreation is defined in **Section 4.1.9.1**. Several existing features of the analysis area, including roads and trails (such as the Cricket Mountain ATV Trail System and Millard County ATV Trail System), provide recreation opportunities. Other features, such as the Telescope Array Project, pipelines (natural gas, refined petroleum products, and water), a wind farm, a solar project, transmission lines, and range improvements, make up the setting for recreation in the analysis area. Reasonably foreseeable projects, such as the TWE transmission line and planned range improvements, would alter this setting, but would not affect the availability of recreation opportunities.

4.2.10.1 *Proposed Action*

The proposed action would have minimal, generally short-term, direct and indirect effects on recreation (**Section 4.1.9.3**). Considering the limited nature of ongoing and reasonably foreseeable effects to recreation, the minimal cumulative effects of the proposed action would not substantially change recreation opportunities in the analysis area or the ability of the public to use those opportunities.

4.2.10.2 *Alternatives 1 through 5*

Alternatives 1 through 5 would not have measurably different cumulative effects on recreation, compared with the proposed action, because the direct and indirect effects of the proposed action and alternatives are essentially the same.

4.2.10.3 *No Action Alternative*

Under the No Action Alternative, the Project would not be implemented as currently proposed and there would be no direct or indirect effects to recreation; therefore, there would be no cumulative effects. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2.11 Socioeconomics

The analysis area for cumulative effects to socioeconomics is defined in **Section 4.1.10.1**. All of the projects listed in Appendix M fall within the analysis area for cumulative effects to socioeconomics; however, many of them have relatively small socioeconomic effects. For example, several small gravel pits or quarries are only used sporadically and do not contribute measurably to employment or demand for housing or services. Even some larger projects, such as the Telescope Array, have relatively small socioeconomic effects, despite their importance for other reasons, such as scientific inquiry. Some projects have substantial socioeconomic effects during one phase, but relative few during other phases. For example, demand for temporary housing could be high during construction of a transmission line, but low to non-existent once the line is in operation. The past, present, and reasonably foreseeable future projects that may cause measurable cumulative effects in conjunction with the Project would include those with substantial employment requirements (whether short-term or long-term) that would overlap with those of the Project, as well as projects that use (or anticipate using) a substantial amount of water from the lower Sevier River system. These projects include: IPP (including its proposed conversion to a natural gas-fired power plant); Cricket Mountain Lime Plant (including any near-term potential expansion); TWE Transmission Line; ECG Utah Solar 1; Telescope Array Expansion (TAx4); Magnum Gas Storage Project; and ongoing and future agriculture.

4.2.11.1 *Proposed Action*

The Project would add a new long-term industry to the local economy, which would supply about 175 long-term jobs and an additional 100 short-term jobs during peak construction. Initial construction of the Project would take place at about the same time as several other projects that are likely to affect employment in the analysis area. The IPP will cease operation as a coal-fired power plant by 2025; however, it is expected to be converted to a smaller, gas-fired facility starting in 2019 or 2020. This change will likely create some short-term construction jobs, but may lead to reduced employment in the long-term. On a similar schedule, ECG Utah Solar 1, Magnum Gas Storage, and the TWE transmission line may be constructed, creating a number of short-term jobs and relatively fewer long-terms jobs.

Cumulatively, a substantial increase in short-term employment, along with an increase in spending for goods and services by those workers, seems likely. The net cumulative effect on long-term employment and other economic benefits is less clear and depends on unknown factors, such as the number of local workers hired compared with the number that move to the area, and the number of IPP workers that retire compared with the number that transition to other long-term jobs.

Increased employment would likely create additional demands for housing and services. Workers that are hired locally already participate in the local housing market and use local services; therefore, increased demands would be primarily related to the number of workers relocating to the area. As noted previously, it seems likely that there would be an increase in short-term employment. While the timing and non-local hiring rates of the various projects considered in this analysis are not known, it appears that the number of vacant housing units (Table 7 in the Socioeconomic Report), along with other short-term options (motels, trailer parks, etc.) would be sufficient for both the short-term and long-term workforce.

The cumulative effects of the acquisition of recharge water by CPM are unknown. Depending on the amount required in any particular year and its current use, there may be less water available for ongoing industrial or agricultural applications. Employment, revenue, and other benefits from the current use may be reduced; however, recharge water would contribute to production of SOP, which would provide economic benefits that may offset losses from other uses. The net cumulative effect of water acquisition may be either positive or negative, but cannot be determined without additional information, which is not currently available.

4.2.11.2 *Alternatives 1 through 5*

Alternatives 1 through 5 would not have measurably different cumulative effects on socioeconomics, compared with the proposed action, because the direct and indirect effects of the proposed and alternatives segments on employment, housing, services, and water acquisition are essentially the same.

4.2.11.3 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as currently proposed. No short-term or long-term jobs would be created. In the short-term, other projects may provide equivalent or greater employment compared with the current situation. In the long-term, employment from other projects may be reduced, particularly with the pending closure of the coal-fired power plant at IPP. The potential exists for reduced employment in the analysis area, would could lead to a decrease in demand for housing and community services. Recharge water would not be acquired by CPM; however, uses of that water would likely remain the same, contributing as they currently do to the local economy. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2.12 Soils

The analysis area for cumulative effects to soils is defined in **Section 4.1.11.1**. The primary past, present, and reasonably foreseeable future actions that would contribute to cumulative effects in conjunction with the direct and indirect effects of the Project include all projects within the analysis area that have disturbed soils. These include transmission and distribution lines (particularly the Milford Wind Corridor 345-kV transmission line, IPP and TWE 500-kV transmission lines), the Black Rock substation, the Kern River and UNEV pipelines, several fiber optic lines, livestock grazing and range improvements, gravel pits, and the extensive network of highways, roads, and trails.

4.2.12.1 *Proposed Action*

Compared to the other past, present, and reasonably foreseeable projects in the analysis area, the Project would have by far the largest disturbance footprint; however, the vast majority of this disturbance would be within the playa where no other projects are present. Components of the Project such as access roads and utility lines (for example, the Natural Gas Pipeline, power and communication lines, and water supply pipelines) would contribute to an expanding network of linear disturbances, removing soils from production and contributing to erosion through continued disturbance (for example, through use and maintenance of access roads). On the landscape scale, cumulative effects from these features would not combine to create a substantial loss or degradation of soil resources.

4.2.12.2 *Alternatives 1, 2, and 4*

The segments that make up Alternatives 1, 2, and 4 would have slightly higher cumulative effects on soils because of their increased length, compared with the equivalent segments of the proposed action, even though the alternatives would parallel areas of existing disturbance. At the scale of the analysis area, and considering other existing and proposed disturbances to soils, these differences would be minimal.

4.2.12.3 *Alternatives 3 and 5*

Alternatives 3 and 5 would not have measurably different cumulative effects on soils, compared with the proposed action, because the direct and indirect effects of the proposed and alternative segments are essentially the same.

4.2.12.4 *No Action Alternative*

Under the No Action alternative, there would be no direct or indirect effects to soils; therefore, the Project would not contribute to cumulative effects. Existing and other proposed projects would continue to disturb soils. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2.13 Visual Resources

The analysis area for cumulative effects to visual resources is defined in **Section 4.1.12.1**. The primary past, present, and reasonably foreseeable future actions that would contribute to cumulative effects to visual resources in conjunction with the direct and indirect effects of the Project include: The Telescope Array Project; wind power generation facilities; transmission and distribution lines; the Kern River and UNEV pipelines; the Cricket Mountain Lime Plant; communication towers; fiber optic communication lines; highways, roads, and trails; the Milford Flat wildfire; range improvements; and gravel pits and quarries.

4.2.13.1 *Proposed Action*

The existing visual landscape in the analysis area is predominantly natural, but with noticeable intrusions of the built human environment, such as transmission and distribution lines, roads, fences, and other features that do not substantially detract from its rural appearance. In discrete parts of the analysis area, such as the developed areas around Delta, Hinckley, Deseret, and Oasis; the area around the Cricket Mountain Lime Plant; and the area around Milford Wind Corridor Phase I and II Project, human developments become prominent features of the landscape.

The predicted minimal cumulative effects of the Project on fugitive dust are described in the Air Report. In summary, the Project would contribute to dust emissions in the region, which would be produced primarily during high wind events from a combination of natural sources and human activity. Measures contained in the FDCP (CPM 2019f) would be employed to avoid, minimize, and mitigate dust emissions from the Project. Despite use of these measures, there would likely be occasions when visible fugitive dust from a combination of existing and Project sources is present in the analysis area. These events would be infrequent and short-lived, such that no substantial impairment of visual quality would occur.

Some Project facilities would be similar to existing developments, such that they would not substantially change the visual landscape. For example, the power and communication lines, communication towers, natural gas facilities, water supply facilities, roads, and gravel pits would add slightly to the perception of the built, human environment; however, they would be generally similar in form, color, line, and contrast with existing development. Other Project features, such as the Processing Facility and Rail Loadout Facility, would add small, but distinct areas of development that would noticeably change the appearance of the landscape for nearby viewers. Finally, the trenches, canals, evaporation ponds, solar panels, and other features of the Mining Project would substantially alter the visual appearance of the playa surface. The current smooth, expansive, light-colored surface of the playa would be divided into several pond areas with visible water, while the remainder would be dissected with the linear features of the trenches, canals, and spoils piles. The extraction well solar panels would add distinct black dots and lines to the playa surface. To viewers of the area who are accustomed to the playa's natural appearance, the features of the Mining Project would represent a substantial alteration, from a rural landscape to one more similar to areas of agricultural or industrial development.

4.2.13.2 *Action Alternatives*

None of the alternatives would have measurably different cumulative effects on the generation of fugitive dust, compared with the proposed action. Other cumulative visual effects of each alternative are described in the following sections.

4.2.13.2.1 Alternative 1 - 69-kV Power and Communication Line, North End

Alternative 1 would have slightly higher cumulative effects on visual resources, compared with the proposed action, because Segment T5 would be in the foreground of viewers on SR 257 and the SR 257 Cutoff Road. Its location would add to the alteration of views caused by other transmission and distribution lines in the area more than Segment T1 would.

4.2.13.2.2 Alternative 2 - 69-kV Power and Communication Line, South End

Alternative 2 would have slightly higher cumulative effects on visual resources, compared with the proposed action, because Segment T6 would be in the foreground of viewers on Crystal Peak Road. Its location would add to the alteration of views caused by other transmission and distribution lines in the area more than Segment T3 would.

4.2.13.2.3 Alternative 3 - Natural Gas Pipeline, Black Rock

Alternative 3 would not have cumulative effects on visual resources because it is not expected to have any direct or indirect effects.

4.2.13.2.4 Alternative 4 - Natural Gas Pipeline, West End

Alternative 4 would have slightly higher cumulative effects on visual resources, compared with the proposed action, because Segment G8 would be in the foreground of viewers on Crystal Peak Road for a longer distance that Segment G5. Its location would add slightly to the alteration of views caused by other actions that have disturbed vegetation along the road.

4.2.13.2.5 Alternative 5 - Sevier River Diversion

Alternative 5 would not have measurably different cumulative effects on visual resources, compared with the proposed action, because their direct and indirect effects would not be measurably different and because none of the past, present, or reasonably foreseeable future actions contribute to the visual landscape in the area of the Sevier River Diversion.

4.2.13.3 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as described in the proposed action or action alternatives. There would be no cumulative effects to visual resources because there would be no direct or indirect effects. The existing visual landscape would not change. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process.

4.2.14 Water Resources

The analysis area for cumulative effects to water resources is defined in **Section 4.1.13.1**. Past, present, or reasonably foreseeable activities that may have cumulative effects on water resources include the West Desert Water Supply and Conservation Project, existing stock watering reservoirs and wells that are located on BLM-administered land in the analysis area and the development of the Cricket Bench and Sage Valley pipelines from the existing Mudhole Well. The potential for cumulative effects from the Smithfield Hog Farms was considered; however, no cumulative effects are expected because of the distance of this project from the analysis area. The potential for cumulative effects from the Southern Nevada Water Authority project was considered; however, this project is not reasonably foreseeable (**Appendix M**).

4.2.14.1 *Proposed Action*

4.2.14.1.1 West Desert Water Supply and Conservation Project

The West Desert Water Supply and Conservation Project (West Desert Project) is located about 30 to 35 miles southwest of the Sevier Playa and proposes to develop a groundwater supply for the Central Iron County Water Conservancy District with a pipeline from the Pine and Wah Wah Valleys to Cedar City (**Appendix M**). The West Desert Project has approved water rights in the Pine and Wah Wah Valleys. A draft POD has been submitted and preparation of an EIS have been initiated for a portion of the West

Desert Project that would include development only in Pine Valley. This is called the Pine Valley Water Supply and Conservation Project. The West Desert Project would withdraw up to 15,000 ac-ft/yr of groundwater from the regional aquifer in Pine Valley and 6,525 ac-ft/yr from the Wah Wah Valley at full development. Groundwater drawdown of about one to 50 feet is predicted in the southern and western portions of the analysis area for the Sevier Playa Potash Project after 62 years of pumping by the West Desert Project, based on numerical modeling by the USGS (Brooks 2017). The drawdown from the West Desert Project would be in addition to the 1 to 12 feet of groundwater drawdown that is predicted from groundwater pumping for the Sevier Playa Potash Project. Groundwater pumping for the Sevier Playa Potash Project would stop at the end of mining (35 years), but water levels in the analysis area and surrounding region would continue to decline into the foreseeable future because of pumping from the West Desert Project. The USGS model predicts that the West Desert Project would reduce flows at Wah Wah Spring by about 10 percent after 33 years of pumping and 100 percent after 1,000 years of pumping. Drawdown effects are not predicted at springs in the Black Rock area during the first 62 years of pumping for the West Desert Project, but are modeled to be between 5 and 50 feet after 1,000 years of pumping. The Sevier Playa Potash Project has the potential to change the timing of cumulative drawdown in some portions of the analysis area, but the cumulative effects would be moderate and short term.

4.2.14.1.2 Stock Watering Reservoirs

A total of 18 stock watering reservoirs are located on BLM-administered land near the Project (Figure 11 and Table 16 in the Water Report). These reservoirs collect and impound ephemeral surface water flow in drainages and are not in direct connection with the regional aquifer. Because they are not connected to the regional aquifer, groundwater pumping for freshwater supply under the proposed action would not affect water levels in the reservoirs. However, the proposed action would have the cumulative effect of increasing surface water availability for livestock and wildlife near the playa by establishing perennial flow in the Sevier River below Conks Dam. This effect would occur during operation and would be moderate, short-term, negligible, and local in extent. Surplus flows in the river would be discontinued at the end of the Project and the availability of surface water for livestock and wildlife would be the same as before development of the proposed action.

4.2.14.1.3 Cricket Bench and Sage Valley Pipelines

Two pipelines are planned by BLM to provide groundwater for livestock watering from the existing Mudhole Well. The Cricket Bench Pipeline would extend about 3.5 miles southwest from the wellhead to a stock tank or trough. The Sage Valley Pipeline would extend about 3 miles southeast from the wellhead to a stock tank or trough. The project is pending funding and the completion of an analysis under NEPA but is considered reasonably foreseeable. The Mudhole Well accesses groundwater from alluvium that is part of the regional aquifer system. Development of the pipelines and stock watering tanks would result in a small increase in the total amount of water withdrawn from the aquifer that is proposed as the freshwater supply for the Project. The cumulative effects to groundwater, including drawdown of water levels in the regional aquifer and a reduction in the amount of groundwater that is available for other purposes, would be negligible and limited in extent.

4.2.14.2 *Alternatives 1 through 5*

Alternatives 1 through 5 would not change the direct and indirect effects that would occur under the proposed action. Therefore, the cumulative effects for the action alternatives would be the same as for the proposed action.

4.2.14.3 *No Action Alternative*

Under the No Action alternative, the Project would not be implemented as currently proposed and there would be no effects to water resources in addition to those that occur from past, present, or reasonably foreseeable future activities. At its discretion, CPM may retain control of its leases and the right to extract minerals from those leases, which would require submittal of a new Mining Plan and POD, as well as completion of a new NEPA process, including a new analysis of potential cumulative effects to water resources.

4.3 Conformance with Applicable Land Use Plans, Policies, and Controls

Applicable land use plans, policies, and controls, including applicable laws, regulations, and policies, are listed in the Regulatory Framework section for each resource in their respective resource reports. The following sections summarize how the Project would conform to these requirements.

4.3.1 Air Quality and Climate

4.3.1.1 *NAAQS*

The air dispersion modeling analysis for Project-only emissions in the analysis area predicted that the Project would meet the NAAQS for $PM_{2.5}$, CO, SO_2, and O_3 for all applicable averaging periods, as well as the NAAQS for annual PM_{10} and annual NO_2. For 24-hour PM_{10}, the modeling for Project-only emissions predicted that the Project would meet the NAAQS when seasonal background concentrations are used, while the Project would exceed the NAAQS when the highest second-high modeled concentration is combined with the second highest monitored concentration. For the 1-hour NO_2, the modeling for Project-only emissions predicted that the Project would exceed the NAAQS. The model predicted that these exceedances would occur in small, isolated areas and concentrations would drop below the NAAQS within 500 meters (1,640 feet) of these areas.

The modeling analysis for the cumulative effects of the Project predicted that the 1-hour CO, 8-hour CO and annual NO_2 standards would be met, while the 1-hour NO_2 standard would be exceeded. Beyond the exceedances from the Project-only emissions described above, several areas of exceedance were predicted east of the Project in proximity to nearby cumulative sources. The predicted emissions from the Project at the same time and location of these eastern exceedances would be very small (less than 0.07 $\mu g/m^3$), and as such would not contribute to these exceedances caused by emissions from cumulative sources.

The cumulative source emissions of PM_{10}, $PM_{2.5}$, and SO_2 were small given their distance from the Project, and thus would not combine with the Project's emissions.

4.3.1.2 *New Source Review / Prevention of Significant Deterioration*

The Project would have maximum annual stationary source emissions of 56.9 tpy of PM_{10}, 38.1 tpy of $PM_{2.5}$, 5.4 tpy of NO_X, 34.0 tpy of CO, and <0.1 tpy of SO_2. The Project would have fugitive source emissions of 530.7 tpy of PM_{10}, 69.2 tpy of $PM_{2.5}$, 151.6 tpy of NO_X, 315.0 tpy of CO and 0.3 tpy of SO_2. The Project would not be required to include fugitive emissions towards major source thresholds because it is not one of the sources listed in 40 CFR Part 52.21(b)(1)(i)(a) or 40 CFR Part 52.21(b)(1)(iii). The Project would be a minor source because the sum of the non-fugitive emissions would be less than 250 tpy for each criteria pollutant. Before it is constructed, the Project would be required to go through minor NSR and obtain an Approval Order from the UDAQ. As part of the application, the Project would be required to demonstrate compliance with all applicable state requirements.

Even though the Project is not a PSD major source, modeled Project-only emissions were compared to PSD increments as a full public disclosure measure. The pollutants predicted to be above increment were 24-hour and annual PM_{10} and 24-hour and annual $PM_{2.5}$. The concentration of these pollutants dropped below increment levels within about 50 m (164 feet) from the maximum areas. Project-only emissions were modeled for the Fishlake National Forest and compared against PSD Class I and Class II increments. The predicted concentrations were all below 4 percent of the Class II values for all applicable pollutants and averaging periods and below 32 percent of the Class I values for all applicable pollutants and averaging periods.

4.3.1.3 New Source Performance Standards / National Emission Standards for Hazardous Air Pollutants

For NSPS, the Project would have sources at the Processing Facility that have potentially applicable requirements under 40 CFR Part 60 Subpart OOO (EPA 2017d) and 40 CFR Part 60 Subpart UUU (EPA 2017e). The Project would have to meet the applicable requirements specified in these subparts, which would be addressed in the Approval Order from UDAQ. Any other Project sources that would be covered under 40 CFR Part 60 would be addressed in the same manner. For NESHAP, the Project as proposed would not have sources covered under this regulation.

4.3.1.4 Federal Operating Permit

The Project would have maximum annual stationary source emissions of 56.9 tpy of PM_{10}, 38.1 tpy of $PM_{2.5}$, 5.4 tpy of NO_X, 34.0 tpy of CO, and <0.1 tpy of SO_2. The Project would have fugitive source emissions of 530.7 tpy of PM_{10}, 69.2 tpy of $PM_{2.5}$, 151.6 tpy of NO_X, 315.0 tpy of CO and 0.3 tpy of SO_2. The Project would not be required to include fugitive emissions towards major source thresholds because it is not one of the sources listed in 40 CFR Part 52.21(b)(1)(i)(a) or 40 CFR Part 52.21(b)(1)(iii). The Project would be a minor source under this regulation because the sum of the non-fugitive emissions would be less than 100 tpy for each criteria pollutant. As a minor source, it would not be subject to operating permit requirements.

4.3.1.5 *Air Quality Related Values*

AQRV analyses for Class I and Class II areas of interest are typically performed only for major PSD sources. However, as a full public disclosure measure, potential effects to AQRVs were reviewed for the Project, using a screening level analysis. The Project would have a Q/D ratio less than or equal to 10 for all Class I areas and as such would be considered to have a minimal effect on these areas.

The Level 2 visibility screening analysis for the two Class II areas of interest of Great Basin National Park and Fishlake National Forest predicted that the Project-only emissions would meet visibility criteria inside each Class II area of interest. Outside both Class II areas of interest, the screening model showed that the visibility criteria would be exceeded for some criteria at certain locations, while other locations passed all criteria.

4.3.2 Biological Resources

The WSRA RMP guides management related to (1) habitat and waters on public lands to sustain or enhance wildlife populations; (2) populations and status of sensitive and T&E species; (3) riparian habitat; and (4) big game population numbers. The Project would conform to the RMP by implementation of design features that avoid and minimize potential mortalities and disturbance (**Appendix K**). These design features would help limit habitat loss, degradation, and removal of species.

The Project has complied with CWA regulations and EO 11990 through consultation with the USACE. A jurisdictional delineation of the analysis area was conducted to identify the limits of waters subject to the USACE jurisdiction under Section 404 of the CWA. An approved jurisdictional determination dated September 19, 2018 (reference number SPK-2013-00295) (USACE 2018) concluded that delineated waters within the analysis area are not currently regulated by the USACE. Additional CWA regulations would be met with implementation of the Project's SWPPP (CPM 2019l).

In order to comply with the ESA, biological surveys and evaluations were conducted for listed endangered or threatened species that had a potential to be affected by the proposed or alternative actions. To provide some assurance that proactive steps are being taken to further reduce the risk to California condors, the BLM completed Section 7 consultation with the USFWS. The BA (BLM and ENValue 2018) determined that the Project may affect but would not be likely to adversely affect the California condor. The USFWS (2018b) concurred with this determination. After completion of the DEIS and BA, CPM completed detailed engineering for several Project components that resulted in some changes to the Project description. The BLM considered these changes and conducted informal discussions of these changes with the USFWS, with the conclusion that a revised BA did not need to be prepared and that the findings of the BA remained valid, including USFWS's concurrence with those findings. The BLM has and will continue to consult with the USFWS as needed throughout the life of the Project.

CPM has consulted with the BLM, USFWS, and UDWR to develop and refine Project-specific design features (**Appendix K**) in order to avoid and minimize adverse effects to sensitive and special status species, including migratory birds, from the Project. The Project's AWMP (CPM 2019a), including the Brine Pond Stepped Mitigation and Monitoring Plan, provides additional design features for biological species. Project conformance with policies, regulations, and controls would be met by implementation of the design features.

The Project would conform to the state conservation and maintenance requirements because the Project has and would continue to consult with UDWR as needed and through implementation of design features that would minimize effects to big game (**Appendix K**).

The Utah Noxious Weed Control Act (UAC R68.9) and county weed control regulations would be met by the implementation of the Project's Noxious and Invasive Weed Management Plan (CPM 2019g) and Reclamation Plan (CPM 2019h).

The ECIP (CPM 2019e) would ensure that the Project complies with the terms and conditions of BLM approvals intended to protect environmental resources. This would apply to all activities and facilities located on BLM-administered lands during the life of the Project. The ECIP was developed to address compliance with BLM regulations and does not address compliance with state and local regulations; however, the ECIP would reinforce implementation of design features described in **Appendix K**.

4.3.3 Cultural Resources

The Project would conform to the Antiquities Act and the Archaeological Resources Protection Act because the PA includes requirements for avoidance, minimization, and mitigation of cultural resources that may be affected. Appropriate federal and state permits would be required for all Class III surveys conducted for the Project.

The Project would conform to the NHPA because implementation of the PA would meet the BLM's responsibilities under Section 106 of the NHPA.

The Project would conform to the NAGPRA because the PA includes plans and actions related to survey and potential discovery of cultural items.

The Project would conform to the American Indian Religious Freedom Act (AIRFA) because the PA includes measures to prevent unnecessary interference with Native American religious practices.

The Project would conform to EO 13007 because the PA includes measures to avoid adverse effects to the physical integrity of Native American sacred sites.

The Project would conform to EO 13175 because the BLM has conducted, and will continue to conduct, consultation with Native American tribes, throughout development and implementation of the Project.

The Project would conform to UCA 9-8-404 because the PA is applicable to state and private lands and because the SITLA is a signatory to the PA. The PLPCO participated in development of the PA, but did not sign the final document and is not, therefore, a concurring party. The SITLA, as an invited signatory, would continue to participate in implementation of the PA. The PLPCO would participate in implementation of the PA only as applicable to their oversight responsibilities pursuant to UCA 9-8-404 and their permitting responsibilities for archaeological investigations conducted on state lands pursuant to UCA 9-8-305.

4.3.4 Geology and Minerals

The Project would be consistent with the WSRA RMP (BLM 1987) because the Sevier Playa is designated for mineral extraction. The Leasing Environmental Assessment (BLM 2011a) found the underlying leasing action, including subsequent exploration and development, to be consistent with other plans, programs, and policies of affiliated Tribes, other federal agencies, and state and local governments. Authorization of the Project would also be consistent with the provisions of the MLA and FLPMA.

Through submittal of a Mining Plan (including the supplemental Reclamation Plan) by CPM, and its approval by BLM and State of Utah, the Project would conform with federal requirements at 43 CFR Part 3590, Solid Minerals (Other than Coal) Exploration and Mining Operations and State of Utah requirements in UCA Title 40 Chapter 8, Utah Mined Land Reclamation Act. Sale of mineral materials would be consistent with WSRA RMP (BLM 1987), specifically pages 48 and 49, that provide for such sales, as wells as the relevant governing regulations at 43 CFR Part 3600.

4.3.5 Lands and Access

The FLPMA, MLA, and WSRA RMP all provide for multiple uses of BLM-managed lands, and are compatible with the proposed action and alternatives. The proposed ROWs would comply with the requirements of the FLPMA and MLA. The ROW grants would contain sufficient terms and conditions (for example, **Appendix K**) as needed to protect resources, other land uses, and existing ROWs.

The WSRA RMP directs that existing major ROWs are designated as corridors and that new ROWs should be restricted to these corridors wherever feasible. Several off-lease segments of the proposed action do not fall within existing, designated corridors (for example, 69-kV Power and Communication Line Segments T1 and T3, Natural Gas Pipeline Segments G2 and G5). Some alternative segments share this situation, either entirely (Natural Gas Pipeline Segment G7) or in part (Natural Gas Pipeline Segment G8). During development of the proposed action and alternatives, the use of existing, designated corridors was considered, but not analyzed in detail (**Appendix J**). In summary, BLM determined that options for utility lines to follow existing corridors did not need to be developed into complete alternatives or carried forward for detailed analysis because they would substantially increase the length of the utility lines and substantially increase overall disturbance, while only minimally decreasing the extent of new disturbance corridors. Based on this determination, the proposed action and alternatives would conform to the WSRA RMP.

The Project would comply with all U. S. Department of Transportation and UDOT requirements regarding shipment of hazardous materials, encroachment permits, and load limits, as described in the Transportation and Traffic Management Plan (CPM 2019m). CPM would collaborate with Millard County on encroachment permits and maintenance agreements as needed to support construction, operation, maintenance, and decommissioning of the Project. Permits and approvals that would be required from Millard County may include Construction Permits, CUPs, Road Use and Maintenance Agreements, and Wastewater System Permits.

The Project would not affect the goals of the Great Basin National Heritage Area management plan. The Project would not interfere with the ability of the public to access the diverse resources in the heritage area.

4.3.6 Native American Religious Concerns

The Project would conform with the NHPA because the BLM has conducted, and will continue to conduct, consultation with Native American tribes, including inquiries regarding TCPs and consideration of effects to TCPs.

The Project would conform with the NAGPRA because the BLM has conducted, and will continue to conduct, consultation with Native American tribes, related to survey and potential discovery of cultural items as described in the PA.

The Project would conform with the AIRFA because the BLM has conducted, and will continue to conduct, consultation with Native American tribes, including inquiries regarding TCPs and consideration of effects to TCPs, which may support traditional religious beliefs or practices.

The Project would conform with EO 13007 because the BLM has conducted, and will continue to conduct, consultation with Native American tribes, including inquiries regarding TCPs and consideration of effects to TCPs, which may support traditional religious practices.

The Project would conform with EO 13175 because the BLM has conducted, and will continue to conduct, consultation with Native American tribes, throughout development and implementation of the Project.

4.3.7 Paleontology

The Project would conform to the applicable laws, policies, and regulations because the Paleontology Report follows BLM (2008b, 2016) instructions on evaluating effects to paleontological resources, as well as the standards set by the other federal and state guidelines. Design features have been integrated

into the proposed action and action alternatives that would serve to avoid, minimize, or mitigate adverse effects to paleontological resources (**Appendix K**).

4.3.8 Range Management

The Project would not conflict with applicable laws, policies, and regulations. Project effects would minimally reduce the overall productivity of rangelands in the analysis area. Rangeland health goals and projects designed to achieve those objectives would continue while considering the Project's effects.

4.3.9 Recreation

The WSRA RMP states that recreation resources should be evaluated during project-level planning. No over-arching recreation plan covers the analysis area. To that end, the Project complies with the direction of the WSRA RMP.

Although CPM was not able to avoid proposing the use of guy wires on power and communication line structures, it has met the intent of IM UTW000-2015-02 (BLM 2015b) because it completed detailed engineering studies to minimize the number of guyed structures and would implement design features to minimize the risk of collision by OHV users.

The Project would not conflict with the recreation goals of the management plan for the Great Basin National Heritage Area because the Project would not interfere with the ability of the public to experience the diverse resources in the heritage area, including recreational opportunities.

The Project would not conflict with UDWR's management of game species, nor with strategies designed to manage big game species.

The Project would not conflict with the Millard County General Plan because access for recreation would generally be maintained. Specifically, access to the Cricket Mountain ATV Trail System and Millard County ATV Trail System would be maintained, except for short-term closures as needed to protect public health and safety.

4.3.10 Socioeconomics

Though no specific regulations exist with respect to the socioeconomic factors analyzed, processes are in place to ensure the Project would not negatively affect the local economy. Public outreach regarding the Project dates back to 2010 with scoping for the Leasing Environmental Assessment (BLM 2011a) and continued with scoping for this EIS. Beaver and Millard Counties are continuing to participate in the NEPA process as Cooperating Agencies. Additionally, the CUP process within Millard County would afford local agencies the opportunity to evaluate the Project's socioeconomic effects and recommend any measures deemed appropriate to minimize negative effects.

4.3.11 Soils

The WSRA RMP directs management to evaluate effects to soil productivity and soil erosion. To that end, this analysis conforms to the RMP. Federal and state mining lease and permit requirements would be met by the Project's Reclamation Plan (CPM 2019h). When implemented, the Project would conform to these requirements.

4.3.12 Visual Resources

All facilities that would be part of the proposed action or action alternatives for the Project would be located in areas designated as VRM Class IV, which allows major modification and dominance of the view by management activities. The facilities that would be visible from each of the KOPs would meet the designated VRM class. This would remain the case for all Project facilities that are not encompassed by the views from the KOPs.

The Project would not conflict with the goals of the management plan for the Great Basin National Heritage Area as they relate to visual resources because the plan did not amend the WSRA RMP, including its VRM classifications.

4.3.13 Water Resources

4.3.13.1 *Applicable Water Quality Standards*

The direct effects analysis indicates that the Project is not expected to cause measurable changes to the quality of surface water or groundwater outside of the footprint of the Sevier Playa. The Project would therefore comply with state water quality standards listed in UAC R317-2 and R317-6 in off-playa areas. Monitoring of surface water and groundwater would be conducted to assess compliance in the off-playa areas during operation and after reclamation of the Project. Production of the potash brine would have variable effects to the chemistry of the groundwater in the playa sediments and would either reduce or increase the concentrations of major ions in groundwater depending on location. Playa groundwater is a Class IV Saline Groundwater with TDS concentrations greater than 10,000 mg/l. Protection levels for Class IV groundwaters are established to protect human health and the environment. The anticipated changes to the chemistry of playa groundwater would not cause potential adverse effects to human health or the environment and would therefore comply with applicable state groundwater quality standards. Monitoring of playa groundwater would be conducted to assess compliance during operation and after reclamation of the Project.

4.3.13.2 *Federal Potassium Lease Stipulations*

Stipulations of the Federal Potassium Leases require that:

- The lessee replace water resources with TDS concentrations of less than 10,000 mg/l that are lost or adversely affected by the Project (Special Lease Stipulation #8 – see **Appendix E**).
- All data collected from wells and borings be provided to BLM within 30 days of the completion of the well or boring (Special Lease Stipulation #12 – see **Appendix E**).
- A Study Plan be developed to collect adequate baseline data prior to conducting any surface disturbing activity (Special Lease Stipulation #13 – see **Appendix E**).

CPM has committed to meeting these requirements. CPM would monitor groundwater levels and water quality in accordance with procedures outlined in the Water Monitoring Plan (CPM 2019n) to ensure that the Project meets the lease stipulations.

4.3.13.3 *State Well Regulations*

Brine extraction wells, monitoring wells, and production wells for the Project would be constructed and abandoned in compliance with State of Utah regulations in R655-4 of the UAC. UDWRi has approved a variance request from CPM to abandon the extraction wells by placing a nonmetallic plug at a minimum depth of five feet below the existing grade, cutting the well casing off at a depth of about two feet below ground surface and backfilling the well above the plug with natural clay.

4.3.13.4 *Water Rights*

CPM has or would secure the water rights to produce groundwater brine from the Sevier Playa, freshwater for operation of the Project, and surface water to recharge playa groundwater levels during operation. CPM would therefore be in conformance with applicable UDWRi requirements pertaining to the acquisition and use of surface water and groundwater.

4.4 Additional Mitigation Measures

During the analysis of effects, the BLM identified several mitigation measures in addition to the applicant committed design features in **Appendix K** and the supplemental plans that would reduce the adverse effects of the Project. The BLM will include these measures in the ROD, should the proposed action or action alternatives be selected for implementation. These measures are listed as follows.

4.4.1 Air Quality and Climate

- CPM shall use equipment that at a minimum meets the pollution controls for equivalent equipment to that included in the Final Air Dispersion Modeling Report for NEPA Analysis

(Ramboll 2019a). [Note: This measure applies to all construction, operation, maintenance, and decommissioning activities that take place on or off the playa].

4.4.2 Lands and Access

- CPM shall coordinate its use of radio frequencies with the TA project and UTTR to avoid the potential for conflicts. [Note: This measure applies to all construction, operation, maintenance, and decommissioning activities that take place on or off the playa].
- CPM shall coordinate with UTTR to develop procedures for work stoppages, which may be needed if the potential for conflict is identified between UTTR's mission and CPM's operations. [Note: This measure applies to all construction, operation, maintenance, and decommissioning activities that take place on or off the playa].
- CPM shall coordinate with UTTR to develop a "Hold Harmless Agreement", which may be needed if the potential for conflict is identified between UTTR's mission and CPM's operations. [Note: This measure applies to all construction, operation, maintenance, and decommissioning activities that take place on or off the playa].

4.4.3 Range Management

- Construction, operation, maintenance, and decommissioning of the Project shall avoid limiting or preventing access by livestock to existing water sources to the extent feasible. If a Project activity would limit or prevent access by livestock to existing water sources, CPM shall provide alternative water sources until access is restored to pre-activity conditions. [Note: This measure applies to all construction, operation, maintenance, and decommissioning activities that take place off the playa].
- CPM shall implement adaptive measures to address unacceptable conflicts that may develop between livestock and Project activities. This may include temporary or permanent fencing at the playa boundary or elsewhere, constructing barriers around standing water created by the Project, installation of cattle guards on access roads, or other similar measures, all of which shall be constructed and maintained by CPM, in coordination with the BLM and the grazing permittees. [Note: This measure applies to all construction, operation, maintenance, and decommissioning activities that take place on or off the playa].

4.4.4 Water Resources

- All stream crossing structures shall be designed to carry the peak flow from the 25-year, 6-hour precipitation event. Road-side ditches shall be similarly designed to convey the runoff from both the road and run-on from adjacent areas laterally along the road to an adequately sized culvert. [Note: This measure applies to all road construction activities that take place off the playa.]
- Roads shall be designed to minimize hydrologic connection between any segment of the road prism and a natural stream channel during a design runoff event. [Note: This measure applies to all road construction activities that take place off the playa.]

4.5 Unavoidable Adverse Effects

The following adverse effects, listed by resource, would be unavoidable despite implementation of the applicant committed design features (**Appendix K**), additional design features in the supplemental plans, and the additional mitigation measures identified in **Section 4.4**. In general, the unavoidable adverse effects of each of the action alternatives would be equivalent to those of the proposed action; any instances where they would be different are identified below. Implementation of the No Action alternative would have no unavoidable adverse effects.

4.5.1 Air Quality and Climate

The Project would increase emissions of fugitive dust and criteria pollutants above background levels. The Project may exceed the NAAQS for 24-hour PM_{10}, depending on how conservative a method is used to calculate emissions; however, the more realistic methods predict the NAAQS for 24-hour PM_{10} would not be exceeded. The Project would exceed the NAAQS for 1-hour NO_2. Cumulative emissions would

exceed the NAAQS for 1-hour NO_2; however, the Project contribution to the cumulative exceedance would be small. Even though the Project is not a PSD major source, 24-hour and annual PM_{10} and 24-hour and annual $PM_{2.5}$ are predicted to be above the PSD increments. The Project would not affect AQRVs in Class I areas or inside Class II areas of interest. The Project may affect visibility outside some locations associated with Class II areas of interest. The Project would contribute minimally to the production of GHGs at the county, state, and national levels.

4.5.2 Biological Resources

Construction, and to a more limited extent, operation, maintenance, and decommissioning of the Project, would disturb (degrade or destroy) substantial areas of vegetation. Despite the use of design features to minimize adverse effects, disturbance would reduce productivity of vegetation and the wildlife habitat it supports. Disturbance would also increase the potential for invasion or expansion of existing occurrences of noxious weeds. Interim and final reclamation, as applicable, would reduce adverse effects to vegetation and wildlife habitat. Other design features would minimize the risk of invasion or expansion of noxious weeds. Small amounts of low quality wetlands and riparian areas would be lost at the location of the proposed diversion; however, the addition of recharge water to the Sevier River would likely increase wetlands and riparian areas, offsetting this loss for the duration of the Project. Alternative 5 would reduce adverse effects to wetlands and riparian areas, compared to the proposed action. In addition to habitat loss or degradation, the Project has the potential to cause injury or mortality to wildlife, including amphibians, reptiles, bats, big game, waterfowl, shorebirds, raptors, other migratory birds, and special status wildlife species. The primary risks of adverse effects to wildlife include injury or mortality caused by equipment during construction, vehicle collision, electrocution or collision with power lines (including guy wires), and hypersaline brines in extraction features and evaporation ponds. Despite implementation of design features in **Appendix K** and the AWMP, including adaptive management actions, some risk of these adverse effects would remain.

4.5.3 Cultural Resources

Although the measures in the PA would be implemented to avoid, minimize, or mitigate adverse effects, the potential would remain for damage or loss of eligible cultural resources in the unlikely case that they are not identified during Class III surveys. Data recovery would take place for any known eligible sites subject to damage or loss; however, the sites may still be damaged or destroyed after mitigation. The existing setting or views from sensitive cultural properties could be altered, potentially diminishing their integrity. Ineligible resources may also be damaged or destroyed.

4.5.4 Geology and Minerals

The Project would produce approximately 10 million tons of SOP over the life of the Project, which would no longer be present in the brines of the Sevier Playa. Despite the beneficial use of this resource, its removal from the playa would be adverse in terms of mineral reserves. The Project would also redistribute other minerals within the playa. For example, $MgCl_2$ would be concentrated in the area of the Purge Brine Storage Pond and NaCl would be concentrated in the area of the preconcentration ponds. Whether these would be considered adverse effects would depend on potential future uses of these resources; if sale of these minerals were commercially viable, their concentration could be considered beneficial.

4.5.5 Lands and Access

No unavoidable adverse effects are expected to existing ROW holders because CPM would work with these ROW holders to avoid conflicts. Users of lands in the analysis area may experience short-term road or trail closures or restrictions, primarily during construction. Project traffic is not expected to have any adverse effects on public use of roads, except for short periods of delay when trains are crossing Headlight Canyon Road or SR 257.

4.5.6 Native American Religious Concerns

The Project would not cause any unavoidable adverse effects to Native American religious concerns because no potentially affected TCPs or other concerns have yet been identified. If TCPs or other Native American religious concerns are identified as a result of the Class III surveys, measures in the PA would be implemented to avoid, minimize, or mitigate adverse effects in consultation with affected Tribes.

4.5.7 Paleontology

Although several design features would be implemented to avoid, minimize, or mitigate adverse effects, the potential would remain for damage or loss of paleontological resources in the unlikely case that they are not identified prior to ground disturbance.

4.5.8 Range Management

The degradation or loss of grazing lands, along with potential losses of AUMs, would be unavoidable and adverse, despite interim reclamation that would partially mitigate these effects. Despite implementation of the design features and additional mitigation, some potential for livestock collision with Project vehicles, or other adverse conflicts between livestock and Project activities, would remain.

4.5.9 Recreation

Project facilities and activities would remove a small fraction of the lands in the analysis area from use for recreation. During Project construction, roads or trails could be closed to recreational use for short periods to protect public safety. Despite implementation of design features, the use of guy wires would increase the potential risk of collision by OHV users. While minimal in terms of area affected and duration, these effects would be adverse and unavoidable.

4.5.10 Socioeconomics

While the Project may have some adverse socioeconomic effects, it would likely also have beneficial effects. The magnitude of any potential adverse effects on housing or services is largely dependent on the timing of construction of the Project in relation to construction and closure of other projects in Millard and Beaver counties, which is currently unknown. Similarly, the socioeconomic effects of acquisition of recharge water depend on the current uses of that water, which are unknown. Also unknown are how the jobs, revenues, and other benefits of the Project would balance these adverse effects.

4.5.11 Soils

Construction, and to a more limited extent operation, maintenance, and decommissioning of the Project, would disturb substantial areas of soils. Despite the use of design features to minimize adverse effects, disturbance may compact or loosen soils, remove vegetation, increase the potential for spread of noxious weeds, increase the risk of wind or water erosion, and otherwise reduce soil productivity. Interim and final reclamation, as applicable, would reduce adverse effects to soils.

4.5.12 Visual Resources

Although the Project would meet the adopted VRM classification, its facilities and disturbance patterns would substantially change the views and appearance of the landscape from some parts of the analysis area. Mitigation measures, such as the use of paint colors that blend with the surrounding landscape and interim reclamation of ground disturbance, would reduce adverse visual effects. Nevertheless, the Project would create moderate to strong visual contrasts in some areas and for some viewers. Adverse visual effects would be more noticeable for Alternatives 1, 2, and 4, compared with the proposed action, because the alternative facilities would be adjacent to roads and would be more visible to travelers on these roads.

4.5.13 Water Resources

Groundwater in the playa sediments would be altered through increases or decreases in major ions, depending on location. Seepage of high TDS brine including purge brine is predicted to be minimal and no adverse effects are expected to the regional aquifer. Water quality would be monitored to ensure that unacceptable adverse effects do not occur, and CPM would be required to respond to any adverse effects in accordance with the lease stipulations. Conveyance of acquired recharge water down the Sevier River

channel is expected to be generally beneficial to local aquifers, wetlands, and riparian areas over the life of the Project; no adverse effects are expected. Operation of the water supply wells would reduce water levels in the regional aquifer. Effects of drawdown on wells and springs is generally predicted to be minimal; however, the effects to some water rights may be more substantial. Water levels would be monitored to ensure that unacceptable adverse effects do not occur, and CPM would be required to respond to any adverse effects in accordance with the lease stipulations. Project construction, and to a lesser extent operation, maintenance, and decommissioning, have the potential to increase sediment production through disturbance of vegetation and soils, leading to increased wind and water erosion. While the potential for these effects would be largely mitigated through application of design features, there would be some remaining risk that the design features would not be entirely effective.

4.6 The Relationship between Short-term Use and Long-term Productivity

Short-term use refers to the use of a resource during the life of the Project in a manner that may affect other resources, reducing their value or utility. Long-term productivity refers to the capability of a resource to provide the same values or services once the Project is decommissioned that it provided before the Project was implemented. In general, each of the action alternatives would involve the same trade-offs between short-term use and long-term productivity as the proposed action; any instances where they would be different are identified below. Implementation of the No Action alternative would maintain current productivity of all resources in the long-term; however, it would defer short-term use of the mineral resource.

4.6.1 Air Quality and Climate

In the short-term, air quality would be degraded by fugitive dust and other Project emissions. Once the Project ceases operations and decommissioning is complete, emissions would end; therefore, air quality would not be affected in the long-term.

4.6.2 Biological Resources

Disturbance in the short-term would reduce long-term productivity of vegetation communities. Successful interim and final reclamation would substantially mitigate the loss of long-term productivity caused by short-term use of the mineral resources on the playa. Riparian areas and wetlands are likely to increase in the short-term because of the addition of recharge water to the Sevier River. In the long-term, once recharge water is no longer added to the system, the extent and quality of wetlands and riparian areas is expected to be similar to current conditions. The loss of productivity of vegetation communities would reduce the quality of wildlife habitat in the long-term, until reclamation is successful and the vegetation communities have returned to their current productivity. The potential injury or mortality of individuals of some wildlife species is not expected to alter the long-term viability of wildlife populations because of implementation of the applicant committed design features, mitigation measures, and other requirements that would avoid, minimize, or mitigate adverse effects, as well as the large amount of undisturbed habitat within the analysis area and in the adjacent landscape.

4.6.3 Cultural Resources

While data recovery would help ensure important information is preserved for future study, eligible and ineligible cultural resources that are damaged or lost through short-term use (data recovery) would lose the potential to produce new data, which would reduce their long-term productivity (that is, their ability to provide further information). Changes to the setting of cultural resources caused by short-term use (mining and associated activities) may reduce the short-term value of the sites; however, their long-term productivity may not be affected, pending decommissioning of the Project.

4.6.4 Geology and Minerals

The short-term use (removal) of approximately 10 million tons of SOP over the life of the Project would preclude the long-term productivity of the playa for similar mining use at any scale shorter than geologic time. However, as non-renewable resources, long-term productivity of minerals is not generally a

consideration. Removal of SOP from the playa in the short-term would not preclude future use (long-term productivity) of other minerals that may be present in the playa brines.

4.6.5 Lands and Access

Short-term use of the analysis area for the Project would not preclude its long-term availability for other uses. Existing ROW holders would continue to use their ROWs as permitted. Access would be maintained on existing roads and trails.

4.6.6 Native American Religious Concerns

The Project would not involve any trade-offs between short-term use and long-term productivity for Native American religious concerns because no potentially affected TCPs or other concerns have yet been identified. If TCPs or other concerns are identified during the course of the Project, any damage or loss to TCPs or sites of religious or cultural importance would reduce their long term productivity since they may no longer be available for traditional religious or cultural practices.

4.6.7 Paleontology

Any paleontological resources that are damaged or lost during ground-disturbing activities would no longer be available for study, which would reduce their long-term productivity (that is, their ability to provide information).

4.6.8 Range Management

Short-term use of the lands surrounding the Sevier Playa for Project facilities would reduce the productivity of affected rangelands. In the long-term, the Project would be decommissioned and disturbed areas would be reclaimed, replacing lost productivity of the rangelands and eliminating any conflict between short-term use and long-term productivity.

4.6.9 Recreation

The vast majority of BLM lands outside the playa would remain available for recreational use in both the short-term and long-term.

4.6.10 Socioeconomics

In the short-term, the Project would provide benefits in terms of jobs and revenue, while causing effects such as increased demand for housing and services. The Project would also acquire recharge water, which may benefit the current water right holders financially, at the cost of decreased agricultural or industrial productivity (and associated jobs, revenue, etc.). In the long-term, and in the absence of any other new industrial development, these costs and benefits would be reversed.

4.6.11 Soils

Disturbance of soils in the short-term has the potential to reduce their long-term productivity through loss of vegetation, increased presence of noxious weeds, increased wind or water erosion, or other factors. Successful interim and final reclamation would substantially reduce the risk to long-term productivity of soils posed by short-term use of the mineral resources on the playa.

4.6.12 Visual Resources

Implementation of the Project involves a trade-off between short-term use of mineral resources and short-term adverse effects to visual resources. After the Project is decommissioned, the contrast between the Project and the surrounding landscape would decrease over time, so that it would approximate current conditions in the long-term, with the exception of certain facilities, such as the accumulated salt that would remain in the preconcentration ponds and the tailings in the Tailings Storage Area.

4.6.13 Water Resources

Changes in quality (TDS, major ion distribution) of groundwater in playa sediments would be a direct effect of the short-term extraction of potassium from playa brine. These changes would not preclude future (long-term) use of the brine for other purposes. Short-term acquisition and conveyance of recharge

water down the Sevier River channel would not preclude long-term use of that water for other purposes. The short-term use of water from the regional aquifer to support freshwater needs of the Project would only minimally affect the long-term availability of water in the aquifer to support other uses because drawdown is expected to be relatively minor and short-lived once pumping ceases. Increased sediment production in the short-term is not expected to preclude long-term water quality because of the application of design features.

4.7 Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of resources refers to the use or commitment of a resource that cannot be reversed. An irretrievable commitment is the short-term loss of resources, resource production, or the use of a renewable resource because of a land use allocation or management decision. In general, each of the action alternatives would have the same irreversible and irretrievable commitments of resources as those of the proposed action; any instances where they would be different are identified below. Implementation of the No Action alternative would not make any irreversible or irretrievable commitments of resources.

4.7.1 Air Quality and Climate

The degradation of air quality by fugitive dust and other emissions over the life of the Project would be an irretrievable commitment. Once the Project ceases operations and decommissioning is complete, emissions would end; therefore, any degradation of air quality would not be an irreversible commitment.

4.7.2 Biological Resources

Loss and degradation of vegetation, wetlands, riparian areas, and wildlife habitat, along with invasion or expansion of noxious weed occurrences would be irretrievable commitments, generally over the life of the Project, until reclamation is deemed successful and design features to control noxious weeds are implemented. None of these effects would be irreversible because of the implementation of reclamation and other design features to restore the long-term productivity of the area. Mortality of individuals of some wildlife species would be irreversible for those individuals; however, this is not expected to affect the short-term or long-term viability of any species at the population level.

4.7.3 Cultural Resources

Any damage or loss of eligible or ineligible cultural resources, even those subject to mitigation by data recovery, would represent an irreversible commitment of the resource. The potential loss of integrity of sites would be an irretrievable commitment because this effect would only last for the lifetime of the Project, pending decommissioning.

4.7.4 Geology and Minerals

Removal and sale of SOP and associated minerals from the brines of the Sevier Playa would be irreversible. Other minerals that are not removed and sold would remain on the playa, although they may be redistributed incidental to mining of SOP. For example, $MgCl_2$ would be concentrated in the area of the Purge Brine Storage Pond and NaCl would be concentrated in the area of the preconcentration ponds. This movement of minerals would be irretrievable over the life of the Project; however, at the scale of the playa, it would not be irreversible. Once the Project is decommissioned and reclaimed, and CPM's leases have been relinquished, any minerals in the playa brines would be available for other uses

4.7.5 Lands and Access

The loss of public access to the playa during Project construction, operation, maintenance, and decommissioning would be an irretrievable commitment of resources. No other irreversible or irretrievable commitments of resources related to lands or access are anticipated.

4.7.6 Native American Religious Concerns

The Project would not involve any irreversible or irretrievable commitments of resources relative to Native American religious concerns because no potentially affected TCPs or other concerns have yet been identified. Any damage or loss to TCPs or other areas of concern identified through implementation of the

PA during the course of the Project would represent irreversible and irretrievable commitments of the resource.

4.7.7 Paleontology

Any damage or loss of paleontological resources would represent an irreversible commitment of the resource.

4.7.8 Range Management

Loss of forage for livestock would be an irretrievable commitment for the life of the Project, until the Project is decommissioned and reclamation returns disturbed areas to productive rangeland. Loss of livestock from collision with Project vehicles or other adverse interactions with Project facilities would be the only irreversible effect relative to range management.

4.7.9 Recreation

The small fraction of BLM lands that are directly occupied by facilities would be irretrievably precluded from use for recreation during the life of the Project. After decommissioning, these lands would once again be available for recreational use; therefore, this would not be an irreversible commitment.

4.7.10 Socioeconomics

The Project would contribute to jobs, revenue, and other benefits through the irreversible removal of SOP from the playa brine, after which the SOP would no longer be available to provide these benefits. Leaving this resource in place would not produce any economic benefits. The acquisition of recharge water would be an irretrievable commitment because it would no longer be needed for recharge once the Project ceases operation and could be returned to its previous use.

4.7.11 Soils

The productivity of soils disturbed during construction, operation, maintenance, and decommissioning of the Project would be irretrievably reduced until interim and final reclamation are successful.

4.7.12 Visual Resources

No irreversible commitments to visual resources are anticipated because the Project would be decommissioned and reclaimed at the end of its useful life. Contrasts between the surrounding landscape and Project facilities and disturbed areas would fade over time. These contrasts would be considered an irretrievable commitment for the life of the Project, until reclamation is complete and successful.

4.7.13 Water Resources

Changes in quality (TDS, major ion distribution) of groundwater in playa sediments would be an irreversible commitment locally; however, when the playa is viewed as a whole, only the removal of potassium and related ions from the playa aquifer system would be irreversible. Acquisition and conveyance of recharge water down the Sevier River channel would cause irretrievable, though generally beneficial, commitments to groundwater, surface water, wetlands, and riparian areas between Conks Dam and the playa. Once acquisition of recharge water ceases at the end of the Project's life, the river would return to its current condition; thus, these changes would not be irreversible. In an arid environment, withdrawal of regional groundwater to meet the Project's freshwater needs could be considered an irreversible commitment. While the majority of drawdown would recover within a few decades of the end of the Project (making this part of the effect irretrievable), the last fraction of drawdown may not recover for a substantially longer time (making this part of the effect irreversible). Any increase in sediment production from ground disturbance would be an irretrievable commitment until reclamation measures are successful.

5.0 Consultation and Coordination

5.1 Scoping and Public Involvement

Scoping and related public involvement for the Project is summarized in **Section 1.6** and described in detail in the Scoping Report (**Appendix F**.) The Scoping Report also contains a copy of the mailing list used during scoping (**Appendix F-3**).

Review and comment on the DEIS by the public and Cooperating Agencies and related public involvement is summarized in **Section 1.7** and described in detail in the Comments on the DEIS and Responses (**Appendix G)**. **Appendix G** contains copies of the DEIS notification mailing (**Appendix G-4**), DEIS notification mailing list (**Appendix G-5**), and DEIS news release (**Appendix G-6**).

5.2 Intergovernmental, Interagency, and Tribal Relationships

Consultation with other state and local governments, agencies (including Cooperating Agencies), and Native American tribes is summarized in **Section 1.8.3**.

5.3 List of Preparers and Reviewers

This EIS was prepared by the BLM FFO, with assistance from the BLM West Desert District (WDD), BLM Utah State Office (USO), BLM National Operations Center (NOC), and ENValue (BLM's third-party contractor). **Appendix N** contains lists of the BLM staff that prepared, reviewed, or otherwise contributed to the EIS and the members of the third-party contractor team that assisted the BLM in preparing the EIS.

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