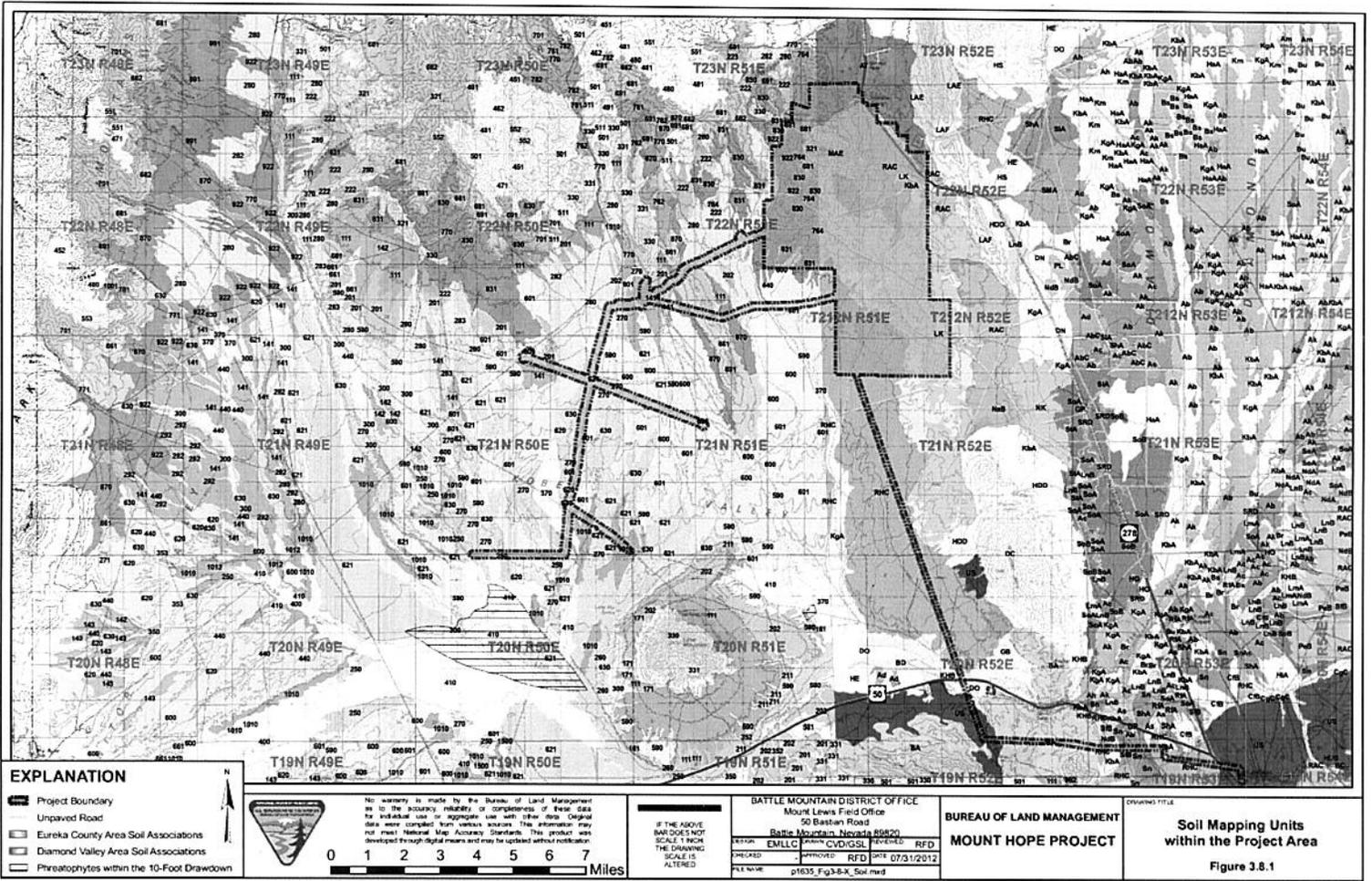


Soil Mapping Unit Symbol	Soil Association or Complex Name	Acreage within the Project Area
RAC	Ratto gravelly fine sandy loam	3,054.6
RHC	Rubyhill fine sandy loam	3,138.1
SfB	Shipley fine sandy loam	22.5
ShA	Shipley silt loam	10.9
Sn	Shipley complex	18.0
US	Umil association	194.0
141	Pedoli-Poorcal association	320.6
201	Umil loam	49.2
202	Umil-Hayeston association	19.3
250	Diane v silt loam	105.4
270	Poorcal loam	340.8
280	Coils loam	544.7
321	Mau-Shagnasty-Eightmile association	159.9
330	Hopeka-Solak-Ados association	1.1
370	Kobeh gravelly loam	72.1
410	Beanflat silt loam	29.7
440	Akercan loam	133.0
590	Hayeston sandy loam	239.5
600	Rubyhill sandy loam	307.9
601	Rubyhill-Barrier association	909.2
620	Silverado sandy loam	23.2
621	Silverado sandy loam	316.5
630	Jesse Camp silt loam	144.3
661	Akerue-Simpark-Robson association	174.7
681	Chad-Cleavage-Softscrabble association	269.8
764	Shagnasty-Ravenswood-Rock outcrop association	326.5
830	Atrypa gravelly loam	1,526.4
831	Atrypa-Mau association	857.8
870	Fortank very stony loam	113.8
922	Handy loam	354.1
1010	Bubus loam	164.7
Total		22,885.6

Shaded rows denote mapping units that occur in the Diamond Valley Area, including portions of Eureka, Elko, and White Pine Counties. All other mapping units occur in the Eureka County Area.



EXPLANATION

- Project Boundary
- Unpaved Road
- Eureka County Area Soil Associations
- Diamond Valley Area Soil Associations
- Pteratophytes within the 10-Foot Drawdown



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

EMLLC CMV/GSL RFD

PREPARED BY: CMV/GSL APPROVED BY: RFD DATE: 07/31/2012

FILE NAME: p1635_Fig3.8-X_Soil.mxd

BUREAU OF LAND MANAGEMENT
 MOUNT HOPE PROJECT

Soil Mapping Units within the Project Area
 Figure 3.8.1

The soils in the mountainous central part of the Project Area are typically very stony to very gravelly loams found on eight to 50 percent slopes intermixed with rocky outcrops. These soils are shallow to moderately deep over lithic and paralithic bedrock and derive from residuum and colluvium from mixed igneous, metamorphic, and volcanic rocks. Soils found in the hilly terrain surrounding Mount Hope are on slopes ranging from four to 30 percent and derive from volcanic rocks and limestone.

The Project Area extends south and southwest as the topography transitions into the Kobeh Valley. Soils are found on alluvial fans, inset fans, fan pediments, skirts, and remnants as the terrain becomes more gentle and slopes decrease to eight percent or less. These soils are moderately deep to deep over duripan and derive from alluvium from mixed igneous, sedimentary, and volcanic rocks and ash. Soil texture becomes more fine as gravelly loams give way to fine sandy and silty loams. Soils found in the basins and basin floors within the Project Area are deep and derive from alluvium from mixed rocks and volcanic ash.

Soil unit composition and physical characteristics are detailed in Table 3.8-2. The NRCS surface soil erodibility ratings for the soils within the Project Area are shown on Figure 3.8.2 and the NRCS ratings for soil use potential as reclamation fill material and topsoil are portrayed in Figure 3.8.3. These erodibility hazard ratings and soil use ratings were derived from the analysis of various physical soil properties and characteristics that promote ease of use, stability, and revegetative success described in Section 3.8.2.1.

Approximately 93.1 percent of the soils within the Project Area are rated “moderate” to “slight / moderate” for both wind and water driven erosion potential. A small percentage of the soils within the Project Area (approximately 4.3 percent) have a “severe” soil erodibility hazard rating for water caused erosion. These soils are located in the northern, western, and southern segments of the well field development area and the southern portion of the powerline corridor. Soils that have “slight” erodibility ratings are found on the western and southwestern slopes of Mount Hope and the eastern segments of the well field development area. These soils make up approximately 2.6 percent of the Project Area (Figure 3.8.2).

The majority of the Project Area is centered on Mount Hope and the surrounding foothills and pediments. The soils in these areas, making up approximately 72 percent of the Project Area, are considered “poor” for use as either reclamation fill material or topsoil. Scattered portions of the powerline corridor and well field areas extending south and southwest into the Kobeh Valley consist of soils that are rated “fair” for use as fill material. Soils in the powerline corridor are also considered “fair” for use as topsoil; however, only two percent of the Project Area, located in the northern and western segments of the well field area, contain soils that are rated “good” for use as topsoil (Figure 3.8.3).

In general, the soils within the Project Area would require moderate to substantial improvements for use as either fill material or topsoil that would promote optimal vegetative productivity. The consequences of weather and climate change on soils can be subtle and complex. The projected changes in climate – increases in temperature, reductions in soil moisture, and more intense rainfall events – may affect erosion, ability of soils to sequester carbon, impacts to soil moisture, and fugitive dust concentrations.

3.8.3 Environmental Consequences and Mitigation Measures

Potential issues related to soil resources within the Project Area as a result of the Proposed Action and alternatives include the following:

- Potential erosional impacts or loss of physical soil stability;
- Availability of suitable soils and growth media for reclamation;
- Potential for alteration in soil chemical stability; and
- Potential for successfully reclaiming mine-related disturbance.

3.8.3.1 Significance Criteria

Environmental impacts to soils would be significant if the Proposed Action or other alternatives resulted in any of the following:

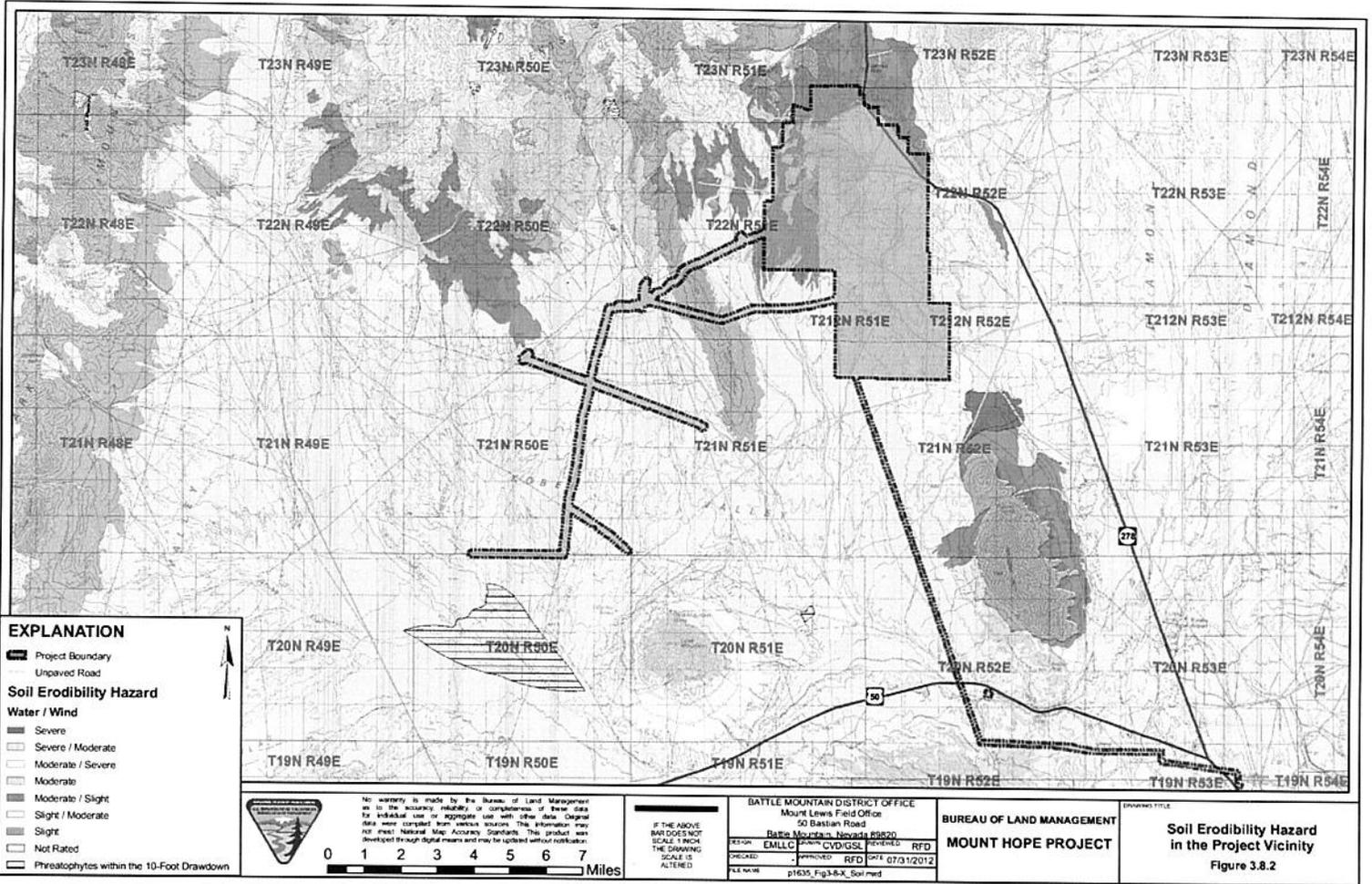
- Accelerated erosion in excess of soil loss tolerances on waste rock, pit slope, or stockpile facilities or other sloped surfaces;
- Substantial decrease in downstream water resource quality from erosion and sedimentation;
- Substantial decrease in the amount of overall site productivity from pre-mining to post-mining land uses;
- Compromised public safety through mass instabilities on slopes or fills, or inadequate closure procedures; and
- Loss of growth media during stockpiling or reclamation that would limit revegetation success.

3.8.3.2 Assessment Methodology

Soils were assessed for erosion potential and for potential use as reclamation fill material and topsoil based on the NRCS ratings provided in the SSURGO database or a change in the vegetation community due to a decline in the water table. The analysis criteria that were used to determine these ratings are described above in Study Methods, Section 3.8.2.1. The environmental consequences and impacts described in the following sections are based on these ratings.

3.8.3.3 Proposed Action

Direct impacts to soil resources within the Project Area would result from the disturbance of 8,355 acres under the Proposed Action. Many of the proposed facilities, such as the open pit, WRDFs, LGO stockpile, TSFs, and interpit area, would become permanent topographical features within the Project Area upon completion of the Project. Reclamation activities would include replacing growth media over the stabilized surface of these features prior to revegetation efforts. Growth media would be provided by salvaging and stockpiling the existing soil resources within the Project Area prior to the construction of Project facilities.



EXPLANATION

Project Boundary
 Unpaved Road

Soil Erodibility Hazard

Water / Wind

- Severe
- Severe / Moderate
- Moderate / Severe
- Moderate
- Moderates / Slight
- Slight / Moderate
- Slight
- Not Rated
- Preatophytes within the 10-Foot Drawdown



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

DESIGN	EMLLC	DATE	07/01/2012
CHECKED	CVD/GSL	REVIEWED	RFD
APPROVED	RFD	DATE	07/01/2012
FILE NAME	p1635_Fig3.6-X_Soil med		

BUREAU OF LAND MANAGEMENT
MOUNT HOPE PROJECT

DRAWING TITLE
Soil Erodibility Hazard in the Project Vicinity
 Figure 3.8.2

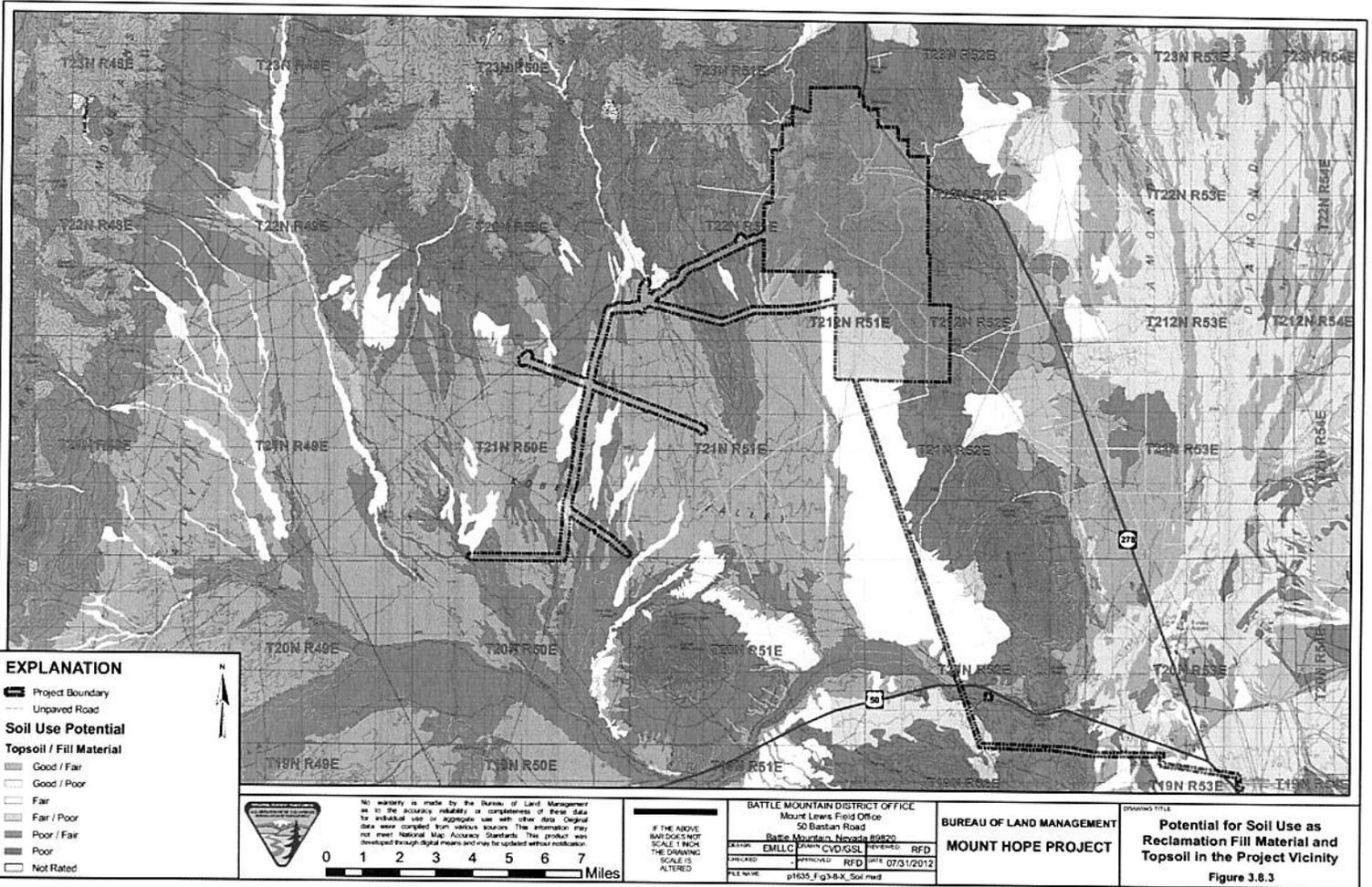


Table 3.8-2: Summary of Soil Mapping Units and Characteristics

Mapping Unit	Soil Series	Soil Depth in Inches (Restrictive Feature)	Hydrological Characteristics	Soil Erodibility Hazard	
				By Water	By Wind
Alhambra fine sandy loam (Ab)	Alhambra (100%)	60+ (unknown)	Well drained; high permeability; rarely flooded.	Moderate	Moderate
Atrypa association (AT)	Atrypa (60%)	10 - 20 (paralithic bedrock)	Well drained; moderately high permeability.	Moderate	Slight
	Atrypa (30%)	10 - 20 (paralithic bedrock)	Well drained; moderately high permeability.		
Bartine-Overland association (BA)	Bartine (40%)	20 - 40 (lithic bedrock)	Well drained; moderately high permeability.	Moderate	Moderate
	Overland (40%)	20 - 40 (lithic bedrock)	Well drained; moderately high permeability.		
Dianev silty clay loam (DO)	Dianev (95%)	60+ (unknown)	Somewhat poorly drained, moderately low permeability; rarely flooded; seasonal zone of water saturation March-June.	Severe	Moderate
Kobeh sandy loam (KbA)	Kobeh (100%)	60+ (unknown)	Somewhat excessively drained; high permeability.	Moderate	Moderate
Kobeh gravelly fine sandy loam (KHB)	Kobeh (100%)	60+ (unknown)	Somewhat excessively drained; high permeability.	Slight	Moderate
Labshaft-Rock outcrop complex (LK)	Labshaft (75%)	10 - 20 (lithic bedrock)	Well drained; moderately high permeability.	Slight	Moderate
	Rock outcrop (15%)	0	N/A		
Mau stony loam (MAE)	Mau (100%)	20 - 40 (lithic bedrock)	Well drained; moderately low permeability.	Moderate	Moderate
Nayped loam (NdB)	Nayped (100%)	60+	Well drained; moderately high permeability.	Severe	Moderate
Ratto gravelly fine sandy loam (RAC)	Ratto (100%)	12 - 20 (duripan)	Well drained; moderately low permeability.	Moderate	Moderate
Rubyhill fine sandy loam (RHC)	Rubyhill (100%)	20 - 30 (duripan)	Well drained; moderately high permeability.	Moderate	Moderate
Shipley fine sandy loam (SfB)	Shipley (100%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
Shipley silt loam (ShA)	Shipley (100%)	60+ (unknown)	Well drained; moderately high permeability; rarely flooded.	Severe	Moderate
Shipley complex (Sn)	Shipley variant (60%)	60+ (unknown)	Well drained; moderately high permeability; rarely flooded.	Severe	Moderate
	Shipley (30%)	60+ (unknown)	Well drained; moderately high permeability; rarely flooded.		

Mapping Unit	Soil Series	Soil Depth in Inches (Restrictive Feature)	Hydrological Characteristics	Soil Erodibility Hazard	
				By Water	By Wind
Umil association (US)	Umil (60%)	7 - 14 (duripan)	Well drained; moderately high permeability.	Severe	Moderate
	Umil (30%)	7 - 14 (duripan)	Well drained; moderately high permeability.		
Lien-Hayeston association (111)	Lien (40%)	6 - 14 (duripan)	Well drained, high permeability.	Slight	Moderate
	Lein (30%)	6 - 14 (duripan)	Well drained; high permeability.		
	Hayeston (15%)	60+ (unknown)	Well drained; high permeability; rarely flooded.		
Pedoli-Poorcal association (141)	Pedoli (65%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
	Poorcal (20%)	60+ (unknown)	Well drained; moderately high permeability.		
Pedoli-Shibley association (142)	Pedoli (80%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
	Shibley (15%)	60+ (unknown)	Well drained; moderately high permeability; occasionally flooded.		
Umil loam (201)	Umil (100%)	7 - 14 (duripan)	Well drained; moderately high permeability.	Severe	Moderate
Umil-Hayeston association (202)	Umil (70%)	7 - 14 (duripan)	Well drained; moderately high permeability.	Severe	Moderate
	Hayeston (20%)	60+ (unknown)	Well drained; high permeability; rarely flooded.		
Diane silt loam (250)	Diane (95%)	60+ (unknown)	Somewhat poorly drained; moderately low permeability; occasionally flooded; seasonal zone of water saturation March-June.	Severe	Moderate
Poorcal loam (270)	Poorcal (100%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
Coils loam (280)	Coils (100%)	20 - 40 (duripan)	Well drained; moderately low permeability.	Moderate	Moderate
Coils-Umil association (283)	Coils (50%)	20 - 40 (duripan)	Well drained; moderately low permeability.	Moderate	Moderate
	Umil (40%)	7 - 14 (duripan)	Well drained; moderately high permeability.		
Rutab loam (300)	Rutab (100%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
Mau-Shagnasty-Eightmile association (321)	Mau (45%)	20 - 40 (lithic bedrock)	Well drained; moderately low permeability.	Moderate	Moderate
	Shagnasty (30%)	50 - 60 (paralithic bedrock)	Well drained; moderately low permeability.		

Mapping Unit	Soil Series	Soil Depth in Inches (Restrictive Feature)	Hydrological Characteristics	Soil Erodibility Hazard	
				By Water	By Wind
	Eightmile (15%)	6 - 14 (paralithic bedrock)	Well drained; moderately high permeability.		
Hopeka-Solak-Ados association (330)	Hopeka (45%)	4 - 10 (lithic bedrock)	Well drained; moderately high permeability.	Moderate	Moderate
	Solak (25%)	10 - 20 (lithic bedrock)	Somewhat excessively drained; moderately high permeability.		
	Ados (15%)	30 - 40 (lithic bedrock)	Well drained; moderately high permeability.		
Hopeka-Solak-Rock outcrop association (331)	Hopeka (40%)	4 - 10 (lithic bedrock)	Well drained; moderately high permeability.	Moderate	Moderate
	Solak (35%)	10 - 20 (lithic bedrock)	Somewhat excessively drained; moderately high permeability.		
	Rock outcrop (10%)	0	N/A		
Kobeh gravelly loam (370)	Kobeh (100%)	60+ (unknown)	Somewhat excessively drained; moderately high permeability.	Moderate	Moderate
Beanflat silt loam (410)	Beanflat (100%)	60+ (unknown)	Somewhat poorly drained; moderately high permeability; occasionally flooded; seasonal zone of water saturation December-May.	Severe	Moderate
Akercan loam (440)	Akercan (100%)	60+ (unknown)	Well drained; moderately high permeability.	Moderate	Moderate
Hayeston sandy loam (590)	Hayeston (100%)	60+ (unknown)	Well drained; high permeability; rarely flooded.	Moderate	Moderate
Rubyhill sandy loam (600)	Rubyhill (100%)	20 - 30 (duripan)	Well drained; moderately high permeability.	Moderate	Moderate
Rubyhill-Barrier association (601)	Rubyhill (60%)	20 - 30 (duripan)	Well drained; moderately high permeability.	Moderate	Moderate
	Barrier (25%)	10 - 20 (duripan)	Well drained; moderately high permeability.		
Silverado sandy loam (620)	Silverado (100%)	60+ (unknown)	Well drained; high permeability.	Moderate	Moderate
Silverado sandy loam (621)	Silverado (100%)	60+ (unknown)	Well drained; high permeability.	Moderate	Moderate
Jesse Camp silt loam (630)	Jesse Camp (100%)	60+ (unknown)	Well drained; moderately high permeability; rarely flooded.	Severe	Moderate
Akerue-Simpark-Robson association (661)	Akerue (40%)	15 - 26 (lithic bedrock)	Well drained; moderately low permeability.	Slight	Slight
	Simpark (35%)	20 - 30 (lithic bedrock)	Well drained; moderately high permeability.		
	Robson (10%)	12 - 20 (lithic bedrock)	Well drained; moderately low permeability.		

Mapping Unit	Soil Series	Soil Depth in Inches (Restrictive Feature)	Hydrological Characteristics	Soil Erodibility Hazard	
				By Water	By Wind
Chad-Cleavage-Softscrabble association (681)	Chad (45%)	40 - 60 (paralithic bedrock)	Well drained; moderately low permeability.	Moderate	Moderate
	Cleavage (20%)	14 - 20 (lithic bedrock)	Well drained; moderately high permeability.		
	Softscrabble (20%)	60+ (unknown)	Well drained; moderately low permeability.		
Shagnasty-Ravenswood-Rock outcrop association (764)	Shagnasty (45%)	50 - 60 (paralithic bedrock)	Well drained; moderately low permeability.	Slight	Slight
	Ravenswood (25%)	30 - 40 (lithic bedrock)	Well drained; moderately low permeability.		
	Rock outcrop (15%)	0	N/A		
Welch loam (770)	Welch (95%)	60+ (unknown)	Well drained; moderately high permeability; occasionally flooded; seasonal zone of water saturation February-May.	Moderate	Moderate
Atrypa gravelly loam (830)	Atrypa (100%)	10 - 20 (paralithic bedrock)	Well drained; moderately high permeability.	Moderate	Slight
Atrypa-Mau association (831)	Atrypa (75%)	10 - 20 (paralithic bedrock)	Well drained; moderately high permeability.	Moderate	Slight
	Mau (15%)	20 - 40 (lithic bedrock)	Well drained; moderately low permeability.		
Fortank very stony loam (870)	Fortank (100%)	30 - 40 (paralithic bedrock)	Well drained; moderately low permeability.	Slight	Slight
Handy loam (922)	Handy (100%)	60+ (unknown)	Well drained; moderately low permeability.	Moderate	Moderate
Bubus loam (1010)	Bubus (100%)	60+ (unknown)	Well drained; moderately high permeability.	Severe	Moderate

Shaded rows denote mapping units that occur in the Diamond Valley Area, including portions of Eureka, Elko, and White Pine Counties. All other mapping units occur in the Eureka County Area.

Up to 21 million yd³ of soil material could be salvaged from the disturbance footprint of Project facilities and stockpiled for use as interim and final reclamation cover material and growth media. Soil would be stripped from targeted soil units based on analyses of the NRCS soil mapping database and previous and proposed field testing. Salvaged soils would be stockpiled and designated as strictly organic, inorganic, or a mixture of both. Organic soils would be used as growth media topsoils, while the inorganic material would be stockpiled for use as cover material. Organic and inorganic growth media may be mixed if sufficient amounts of inorganic material are stockpiled for use as engineered cover. Soil and growth media stockpiles would have a higher erosion potential than the natural environment due to the potential for decreased soil compaction, increased slope gradients, and the loss of stabilizing vegetation cover. Growth

media stockpiles would be stabilized and revegetated following the removal of material for the reclamation of other facilities during final reclamation activities.

Soil erosion potential for other areas of disturbance within the Project Area would also be higher than the natural environment. The construction of sloped facilities, such as the WRDFs, LGO Stockpile, TSFs, and open pit, would increase the erodibility hazard of soils until the completion of stabilization and revegetation activities during reclamation. The construction of other features, including the yards and processing facilities, haul, secondary, and exploration roads, pipeline and powerline corridors, sediment control structures, water supply facilities, other ancillary facilities, and mineral exploration, would also increase the erosion potential of soils within the Project Area. Final reclamation activities under the Proposed Action would include the stabilization and revegetation of all disturbed areas within the Project Area. An indirect effect **to soils could occur as a result of the decline in the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover of phreatophytic vegetation in Kobeh Valley (Cooper et al. 2006). This would result in a change in vegetation species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion.** An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

Potential increases in the soil erodibility hazard within the Project Area would be reduced by the implementation of **applicant committed practices** and BMPs by the applicant. Erosion and the sedimentation of precipitation runoff would be reduced through the diversion and routing of storm water around Project facilities and the construction of runoff controls (e.g., berms) and sediment collection ponds to protect downstream water quality. Potential wind and water erosion would be reduced by the placement of protective rock and gravel cover. Following construction, areas such as cut and fill embankments and growth media stockpiles would be seeded as soon as practicable and safe to provide vegetation cover that would also reduce wind and water erosion potential. Concurrent reclamation would be maximized to the extent practicable to accelerate the revegetation of disturbed areas. All sediment and erosion control measures would be inspected periodically and repairs or maintenance performed as necessary.

- **Impact 3.8.3.3-1:** Based on the 8,355 acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Proposed Action due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

Significance of the Impact: Based upon the implementation of **applicant committed practices**, BMPs, and reclamation activities, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Potential impacts to soil resources within the Project Area would also include the loss of suitable growth media necessary for the successful reclamation of areas disturbed under the Proposed

Action. Reclamation under the Proposed Action would require the re-establishment of vegetation communities consistent with the pre-mining environment. To achieve this, reclamation activities would include the replacement of growth media, of suitable quality, over disturbed areas prior to revegetation efforts. Table 2.1-8 shows that at least 14.3 million yd³ of material would be needed to reclaim the disturbed areas within the Project Area.

As described above, up to 21 million yd³ of growth media could be stripped and stockpiled under the Proposed Action. This estimate takes into consideration a predicted ten percent material loss during the salvaging and stockpiling process. Growth media would be stripped during the development of the mine open pit and during construction of the WRDFs and TSFs. The characterization, salvage technique, and stockpiling of growth media would be carried out under the GMMP included in Appendix 10 of the Plan. The GMMP would be a living document that would be implemented to ensure sufficient quantities of suitable growth media are salvaged during the development and operation of the Project. The GMMP includes discussions on proper salvage criteria and techniques, stockpile construction and management practices, storm water and erosion control measures, growth media inventory practices and record keeping, and safety considerations. Under the GMMP, alluvium is considered suitable growth media under the Proposed Action; however, this should not significantly affect growth media quality since the majority of the soils that exist within the Project Area are rated “poor” by the NRCS for use as reclamation topsoil.

- **Impact 3.8.3.3-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Proposed Action.

Significance of the Impact: Based upon the implementation of the GMMP, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Soil horizon formation is a function of a range of geological, chemical, and biological processes that occur over very long time periods. Surface layer soils typically have higher organic matter content and contain higher nutrient levels than subsurface soils. Project-related surface disturbance, including the stripping of growth media, as described above, would inherently include the unavoidable impact of mixing existing soil horizons as soil is removed, transported, and stockpiled for use during reclamation. Soil biological activity and nutrient cycling would be substantially reduced or eliminated during stockpiling as a result of anaerobic conditions created in deeper portions of the stockpiles; therefore, growth media and cover replaced on Project facilities may not exhibit the level of soil productivity that the naturally occurring soil horizon stratigraphy provides.

The NRCS has rated the majority of the soils within the Project Area as “poor” for use as topsoil. This indicates that the disruption of the naturally occurring soil horizons would not significantly impact the pre-existing soil productivity. Furthermore, previous successful mine reclamation projects utilizing growth media salvaging techniques similar to the Proposed Action have shown that the effectiveness of the soil material to function as growth media is not significantly diminished as a result of stockpiling (Imus 1992).

- **Impact 3.8.3.3-3:** Surface disturbance activities under the Proposed Action would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

Significance of the Impact: Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Proposed Action, this impact is considered less than significant, and no further mitigation measures are proposed.

3.8.3.3.1 Residual Adverse Impacts

Implementation of the Proposed Action would result in the unintentional and unavoidable loss of minor amounts of growth media during the salvaging process; however, this impact is mitigated by the ten percent loss consideration used to estimate the total amount of growth media that would be salvaged under the Proposed Action. Furthermore, minor degradation in soil stability and productivity may result from the physical processes of stripping, stockpiling, and replacing growth media over the course of the Project lifespan.

3.8.3.4 No Action Alternative

Under the No Action Alternative, the Proposed Action would not take place; however, EML has **seven** Notices that authorize exploration activities to take place within the Project Area, allowing a total of **35** acres of surface disturbance. This disturbance would be isolated and scattered throughout the Project Area; therefore, under the No Action Alternative, impacts to soil resources caused by surface disturbance would be reduced from **8,355** acres to **35** acres. The impacts discussed under the Proposed Action, including soil erosion and stability impacts, availability of growth media for use during reclamation, and the mixing of existing soil horizons, would be significantly reduced, if not eliminated, under the No Action Alternative. The impact to soil productivity from potential PAG rock infiltration and metal leaching would be eliminated entirely under the No Action Alternative.

- **Impact 3.8.3.4-1:** Based on the **35** acres of direct effects to soils, accelerated soil erosion rates may occur under the No Action Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

Significance of the Impact: Based upon the implementation of **applicant committed practices**, BMPs, reclamation activities, and the insignificant amount of surface disturbance that would be caused by the No Action Alternative, this impact is considered less than significant, and no further mitigation measures are proposed.

- **Impact 3.8.3.4-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the No Action Alternative.

Significance of the Impact: Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the No Action Alternative, this impact is considered less than significant, and no further mitigation measures are proposed.

- **Impact 3.8.3.4-3:** Surface disturbing activities under the No Action Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

Significance of the Impact: Based upon the pre-existing soil conditions and the insignificant amount of surface disturbance that would be caused by the No Action Alternative, this impact is considered less than significant, and no further mitigation measures are proposed.

3.8.3.4.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the No Action Alternative would correspond to, but significantly less than, those described under the Proposed Action.

3.8.3.5 Partial Backfill Alternative

The impacts to soil resources under the Partial Backfill Alternative would be nearly identical to those described under the Proposed Action. Under the Partial Backfill Alternative, all Project operations would be carried out as described under the Proposed Action, creating the same amount of surface disturbance (8,355 acres) and associated direct and indirect effects; however, the Partial Backfill Alternative would create approximately 527 acres of surface disturbance that would require reclamation as the open pit is backfilled to a grade above the ground water level that would otherwise form a lake under the Proposed Action. Backfill material would be supplied from the Non-PAG WRDF such that all Non-PAG rock would be replaced into the open pit. The backfilled surface would then be reclaimed by replacing growth media prior to revegetation. Similar to the Proposed Action, an indirect effect to soils **could occur as a result of the decline in the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion.** An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

- **Impact 3.8.3.5-1:** Based on the 8,355 acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Partial Backfill Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

Significance of the Impact: Based upon the implementation of **applicant committed practices, BMPs, and reclamation activities**, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The Partial Backfill Alternative would alter the amount of growth media required for reclamation activities such that the 527-acre, backfilled, open pit bottom would be covered and reclaimed in a manner consistent with the rest of the Project facilities described under the Proposed Action; therefore, an additional 1.7 million yd³ of growth media would be required to complete the reclamation process under the Partial Backfill Alternative. Growth media would still be required to cover the foundation of the PAG disposal facility and the remaining Non-PAG waste rock at the completion of the backfilling process.

The same amount of growth media (21 million yd³) would be salvaged and stockpiled under the Partial Backfill Alternative as under the Proposed Action. This amount of material would be sufficient to provide cover for the reclamation of the facilities described under the Proposed Action with an estimated six million yd³ of growth media remaining. Since it would only require 1.7 million yd³ of material to cover the additional 527 acres of the backfilled mine pit bottom, there would be no significant impact to growth media availability for use during reclamation under the Partial Backfill Alternative.

- **Impact 3.8.3.5-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Partial Backfill Alternative.

Significance of the Impact: Based upon the implementation of the GMMP, which would provide sufficient growth media for use during reclamation of the additional 527 acres required under the Partial Backfill Alternative, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Surface disturbance and the construction of Project facilities would be identical under the Partial Backfill Alternative and the Proposed Action; therefore, the impacts to soil resources within the Project Area regarding soil horizon mixing would be the same under the Partial Backfill Alternative as those under the Proposed Action.

- **Impact 3.8.3.5-3:** Surface disturbing activities under the Partial Backfill Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

Significance of the Impact: Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Partial Backfill Alternative, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.8.3.5.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the Partial Backfill Alternative would be identical to those described under the Proposed Action.

3.8.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

The impacts to soil resources, both direct and indirect, within and adjacent to the Project Area would be the same under the Off-Site Transfer of Ore Concentrate for Processing Alternative as those described under the Proposed Action. Surface disturbance and the construction of Project facilities would be identical under both alternatives with the exception of 20 acres of surface disturbance associated with the TMO and FeMo processing facilities. These facilities would not be constructed under the Off-Site Transfer of Ore Concentrate for Processing Alternative, thereby reducing the total Project-related surface disturbance to approximately **8,315** acres; therefore, under the Off-Site Transfer of Ore Concentrate for Processing Alternative, the potential impacts to soil resources would be approximately 20 acres less than those under the Proposed Action. Similar to the Proposed Action, an indirect effect to soils **could occur as a result of the decline in the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion.** An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

- **Impact 3.8.3.6-1:** Based on the **8,315** acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Off-Site Transfer of Ore Concentrate for Processing Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

Significance of the Impact: Based upon the implementation of **applicant committed practices**, BMPs, and reclamation activities, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.8.3.6-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Off-Site Transfer of Ore Concentrate for Processing Alternative.

Significance of the Impact: Based upon the implementation of the GMMP, this impact is not considered.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.8.3.6-3:** Surface disturbance activities under the Off-Site Transfer of Ore Concentrate for Processing Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

Significance of the Impact: Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Off-Site Transfer of Ore Concentrate for Processing Alternative, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.8.3.6.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be identical to those described under the Proposed Action.

3.8.3.7 Slower, Longer Project Alternative

Impacts to soils from the Slower, Longer Project Alternative are expected to be similar to impacts from the Proposed Action at the end of the Project; however, impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action. **Similar to the Proposed Action, an indirect effect to soils could occur as a result of the decline in the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion.** An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

- **Impact 3.8.3.7-1:** Based on the 8,355 acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Slower, Longer Project Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

Significance of the Impact: Based upon the implementation of **applicant committed practices**, BMPs, and reclamation activities, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.8.3.7-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Slower, Longer Project Alternative.

Significance of the Impact: Based upon the implementation of the GMMP, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.8.3.7-3:** Surface disturbance activities under the Slower, Longer Project Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

Significance of the Impact: Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Slower, Longer Project Alternative, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.8.3.7.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the Slower, Longer Project Alternative would be similar to those described under the Proposed Action. However, accelerated soil erosion rates may occur under the Slower, Longer Project Alternative for a longer duration of proposed activities relative to the Proposed Action.

3.9 Vegetation Resources

This section addresses vegetation resources in and near the Project Area including information on plant communities. Wetland and riparian areas are discussed in Section 3.11.

3.9.1 Regulatory Framework

3.9.1.1 Endangered Species Act

The Federal ESA of 1973, as amended, safeguards the continued existence of any species classified as “endangered” or “threatened,” as well as habitat that is determined by the Secretary of the Interior to be critical to such species. The ESA is administered by the USFWS, in consultation with other federal and state agencies. The ESA defines the following terms:

- **Endangered species:** “... any species which is in danger of extinction throughout all or a significant portion of its range...”
- **Threatened species:** “... any species which is likely to become an endangered species within the foreseeable future...”
- **Critical habitat:** “... the specific areas within the geographical area occupied by the species... on which are found those physical or biological features (i) essential to the conservation of the species, and (ii) which may require special management considerations or protection...”

The ESA prohibits the “take” (i.e., killing, harming, or harassment) of listed threatened or endangered species without special exemptions. Candidate species are species for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Analogous to the ESA,

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.8.3.7-3:** Surface disturbance activities under the Slower, Longer Project Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

Significance of the Impact: Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Slower, Longer Project Alternative, this impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.8.3.7.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the Slower, Longer Project Alternative would be similar to those described under the Proposed Action. However, accelerated soil erosion rates may occur under the Slower, Longer Project Alternative for a longer duration of proposed activities relative to the Proposed Action.

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NRS 527.270 prohibits removal or destruction of species listed as “threatened with extinction” except by special permit from the Nevada Division of Forestry (NDF).

In addition to listed threatened, endangered, and candidate species, the USFWS identifies another group of species known as species of concern (formerly candidate, category 2 species). Species of concern are not specifically afforded the same protection under the ESA as threatened and endangered species, but federal agencies are required to afford them consideration in planning and decision-making processes. The BLM evaluates species of concern in a manner analogous to threatened and endangered species. On May 1, 1996, the NSO incorporated all former USFWS-designated category 2 candidate species into the Nevada Special Status Species List and classified them as sensitive. Sensitive species are protected by BLM policy, which requires that actions authorized, funded, or carried out by the agency do not contribute to the listing of any candidate or sensitive species as threatened or endangered under the ESA. A list of **BMDO** BLM sensitive species is included as Appendix G.

3.9.1.2 Nevada Natural Heritage Program

The Nevada Natural Heritage Program (NNHP) maintains a computerized inventory of information on the general location and status of Nevada’s sensitive plants, animals, and natural biological communities. The NNHP tracks state and federally protected species as well as species that the scientific community considers deserving of official listing. The information is derived from reported sightings only, and does not cover every project location.

3.9.1.3 Nevada Native Plant Society

The Nevada Native Plant Society (NNPS) is a non-profit organization that functions in an advisory capacity to state and federal agencies regarding Nevada native plants and their distributions. The NNPS has created six categorical designations of plants to identify their respective concern for these species. These designations do not afford legal status or protection for the species, but the lists produced by NNPS are utilized by agencies in their planning processes for activities that may impact the species or habitat. The listing categories include the following:

- Endangered: Believed to meet the ESA definition of endangered.
- Threatened: Believed to meet the ESA definition of threatened.
- Watch-list: Potentially vulnerable to becoming threatened or endangered.
- Possibly Extirpated: Historically native to Nevada, but may no longer survive in the wild.
- Absent: Currently and historically absent from Nevada, listed in the past but not now of concern.
- Delisted: Dropped from consideration, no longer of concern to NNPS.

3.9.2 **Affected Environment**

3.9.2.1 Study Methods

The NRCS soil surveys were reviewed to obtain existing vegetation data for the area and potential natural vegetation and ecological site descriptions (SRK 2007b). A gross scale mapping effort of the vegetation in the majority of the Project was conducted by aerial survey (helicopter) on April 28, 2006, and ground surveys (SRK 2007b). Figure 3.9.1 shows the vegetation types in

the Project Area. An additional survey for biological resources, including vegetation, was conducted on July 1 and 2, 2008 (Great Basin Ecology 2008). Phreatophytic vegetation was mapped in the Project Area and vicinity and is shown on Figures 3.2.20 and 3.9.2.

Baseline survey information for special status species in the Project Area was requested from the NNHP and the USFWS. The lists provided by the NNHP and the USFWS identified the following plant species with potential to occur within the region: Beatley buckwheat (*Eriogonum beatleyae*), an imperiled species; and least phacelia (*Phacelia minutissima*), a BLM sensitive species. Additionally, windloving buckwheat (*Eriogonum anemophilum*), a BLM sensitive species, was identified as potentially occurring in the Kobeh Valley portion of the Project Area. The Monte Neva Indian paintbrush (*Castilleja salsuginosa*), a BLM sensitive species, is located approximately two miles southwest of the southern extent of the ten-foot drawdown.

Special status plant surveys were conducted in the majority of the Project Area by SRK on June 30, 2005, and during the bloom period in 2006 (SRK 2007b). Field surveys were also conducted in the well field, powerline, and transmission line areas in mid-July and August 2007 (SRK 2007c). A final special status plant survey in the Kobeh Valley portion of the Project Area was conducted on July 1 and 2, 2008 (Great Basin Ecology 2008). Vegetation in the powerline portion of the Project Area was obtained from the Southwest Regional Gap Analysis Project database maintained by the EPA (<http://www.epa.gov/nerlesd1/land-sci/gap.htm>).

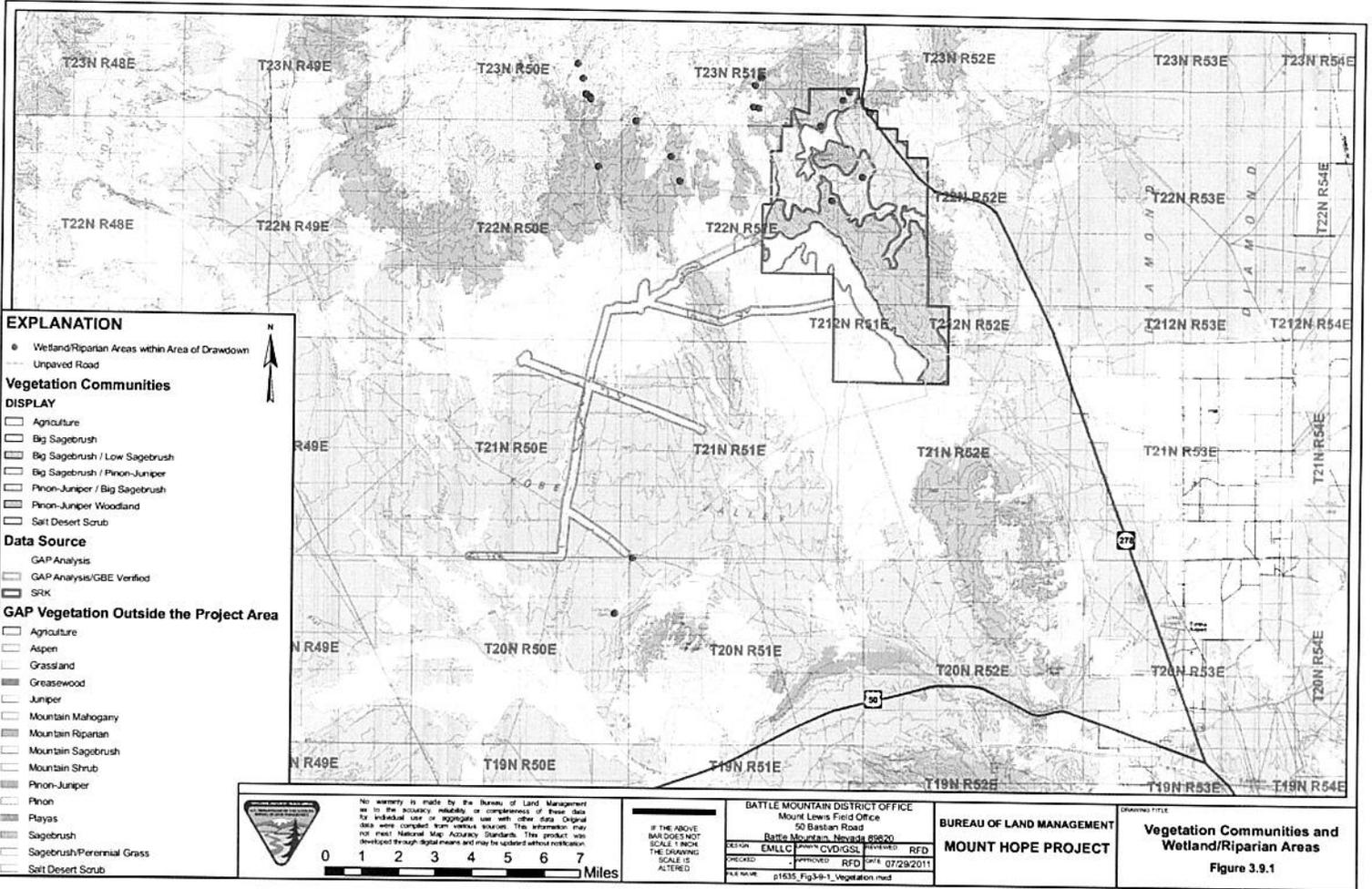
3.9.2.2 Existing Conditions

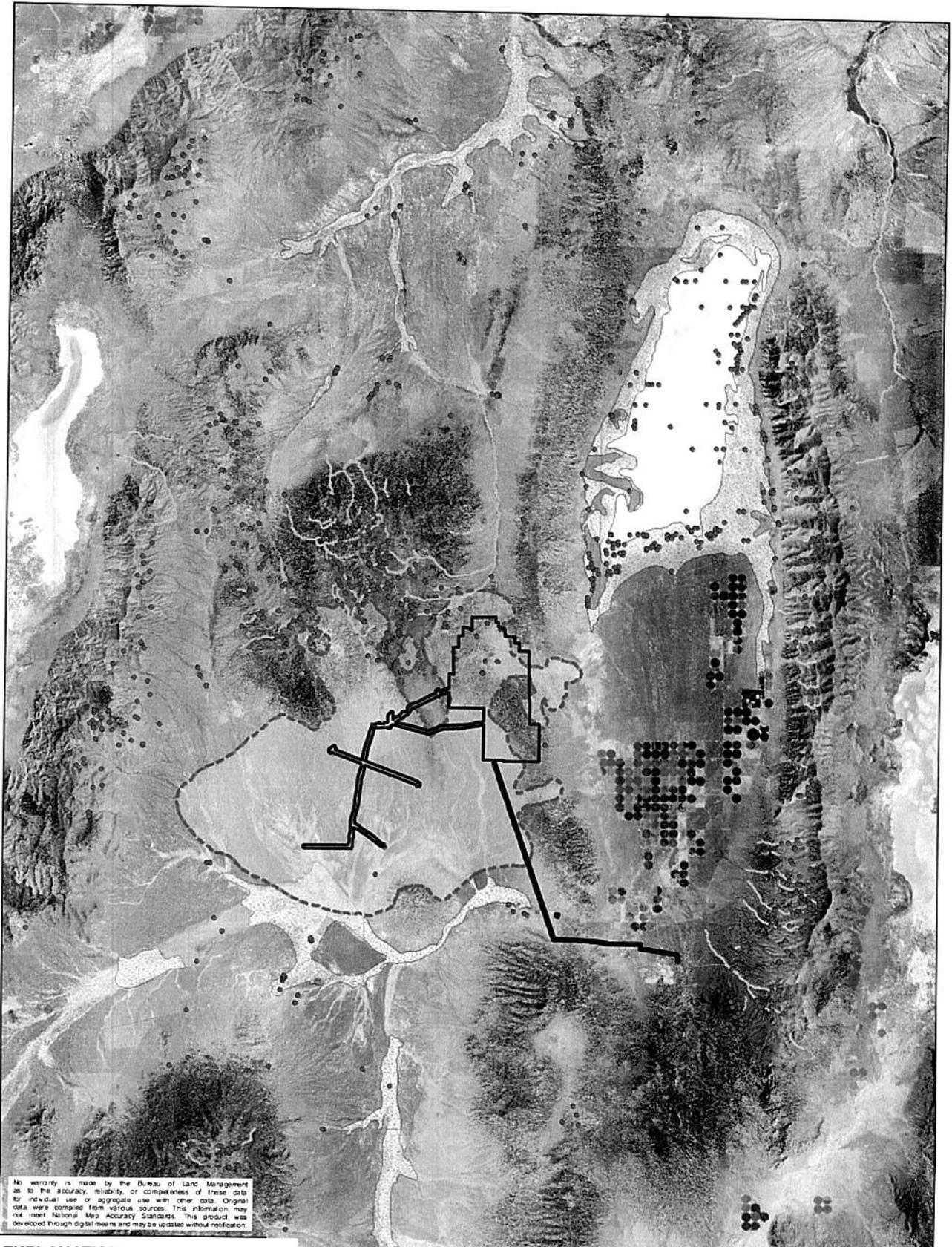
3.9.2.2.1 Vegetation Community Types

Vegetation community types identified within the Project Area include the following: big sagebrush; piñon-juniper woodland; big sagebrush/piñon-juniper; piñon-juniper/big sagebrush; big sagebrush/low sagebrush; salt desert scrub; juniper; and agricultural lands (Figure 3.9.1). Table 3.9-1 summarizes the vegetation community types located within the Project Area. **The Project Area is located within the Central Nevada Basin and Range (NRCS 028B) MLRA.**

Table 3.9-1: Vegetation Community Types within the Project Area

Vegetation Community	Elevational Range (feet amsl)	Acres within the Project Area	Percent within the Project Area
Piñon-Juniper	6,200-8,600	6,896.8	30.1
Big sagebrush	5,700-8,600	7,115.3	31.1
Big Sagebrush/Piñon-Juniper	5,500-7,500	2,996.1	13.1
Piñon-Juniper/Big Sagebrush	6,200-7,000	2,902.3	12.7
Big Sagebrush/Low Sagebrush	5,900-6,800	2,643.2	11.5
Salt Desert Scrub	5,900-6,200	261.4	1.1
Agricultural Land	6,014-6,043	70.4	0.3
Total	NA	22,885.6	100





No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

EXPLANATION

Phreatophytes

-  Mainly Greasewood and Rabbitbrush
-  Mainly Saltgrass and Meadow Grasses
-  Playa
-  Springs
-  Perennial Streams
-  10-Foot Drawdown Maximum Extent
-  Project Area Boundary



0 1 2 3 4 5 Miles			
DESIGN	EMLLC	DRAWN	GSL
REVIEWED	RFD	DATE	07/31/2012
CHECKED		APPROVED	
FILE NAME: p1635_Fig3-9-2_Phreatophytes.mxd			

BUREAU OF LAND MANAGEMENT
MOUNT HOPE PROJECT



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

DRAWING TITLE:
**Existing Phreatophyte
 Vegetation**
 Figure 3.9.2

According to the NRCS, this MLRA 028B supports saltbush-greasewood, big sagebrush, and piñon-juniper woodland vegetation in the progression from low to high ranges in elevation. Shadscale saltbush (*Atriplex confertifolia*), in association with bud sagebrush (*Artemisia spinescens*), spiny hopsage (*Grayia spinosa*), ephedra (*Ephedra* sp.), winterfat, (*Krascheninnikovia lanata*), fourwing saltbush (*Atriplex canescens*), Indian ricegrass (*Achnatherum hymenoides*), bottlebrush squirreltail (*Elymus elymoides*), and galleta (*Pleuraphis* sp.), characterize the saltbush-greasewood type (NRCS 2012b). As moisture increases, plants associated with shadscale are replaced by needlegrass, bluegrass, bluebunch or beardless wheatgrass (*Pseudoroegneria spicata*), basin wildrye (*Leymus cinereus*), and forbs. Black greasewood (*Sarcobatus vermiculatus*) and Nuttall saltbush (*Atriplex nuttallii*) are noted to be important on some sites. Big sagebrush and black sagebrush (*Artemisia nova*), which grow on soils that are shallow to an indurated pan or to bedrock, are potentially dominant. In the piñon-juniper woodland, bitterbrush (*Purshia tridentata*), serviceberry (*Amelanchier* sp.), and snowberry (*Symphoricarpos* sp.) grow in association with Utah juniper and singleleaf piñon. The highest elevations support thickets of curl-leaf mountain mahogany (*Cercocarpus ledifolius*) and small amounts of mixed conifer forest with limber, bristlecone (*Pinus aristata*), or ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), or white fir (*Abies concolor*). On bottom lands, basin wildrye, creeping wildrye (*Leymus triticoides*), alkali sacaton (*Sporobolus airoides*), wheatgrasses, bluegrasses, sedges (*Carex* spp.), and rushes (*Juncus* spp.) are typical. Black greasewood, rubber rabbitbrush (*Ericameria nauseosa*), and big sagebrush grow on the drier sites. Inland saltgrass, alkali sacaton, black greasewood, rubber rabbitbrush, and saltbush typify the vegetation on strongly saline-alkali soils (NRCS 2012b).

Table 3.9-2 includes a list of ecological sites by vegetation community types within the Project Area. Table 3.9-3 includes the potential native vegetation including percent composition by growth habit for the ecological sites located in the Project Area.

Table 3.9-2: Ecological Sites by Vegetation Community Type within the Project Area

Ecological Site	Ecological Site Numbers	Vegetation Community Type in the Project Area						
		Piñon-Juniper	Big Sagebrush	Big Sagebrush/ Piñon-Juniper	Piñon-Juniper/ Big Sagebrush	Big Sagebrush/ Low Sagebrush	Salt Desert Scrub	Agricultural Land
Loamy (8-10" P.Z.)	R028BY010 NV	X	X	X	X	X	X	X
Loamy (10-12" P.Z.)	R028BY007 NV	X		X	X			
Loamy bottom (10-14" P.Z.)	R028BY003 NV		X				X	
Saline bottom	R028BY004 NV		X				X	
Sodic terrace (6-8" P.Z.)	R024XY003 NV						X	
Sodic flat	R028BY020		X					

Ecological Site	Ecological Site Numbers	Vegetation Community Type in the Project Area						
		Piñon-Juniper	Big Sagebrush	Big Sagebrush/ Piñon-Juniper	Piñon-Juniper/ Big Sagebrush	Big Sagebrush/ Low Sagebrush	Salt Desert Scrub	Agricultural Land
(5-8" P.Z.)	NV							
Silty (8-10" P.Z.)	R028BY013 NV							X
Shallow calcareous loam (8-10" P.Z.)	R028BY011 NV		X					
Shallow calcareous slope (8-10" P.Z.)	R028BY016 NV	X	X					
Shallow calcareous slope (14"+ P.Z.)	R028BY027 NV	X	X	X	X			

Table 3.9-3: Ecological Site within the Project Area

Ecological Site	Potential Native Vegetation Species	Percent Composition by Growth Habit
Loamy (8-10" P.Z.)	Wyoming big sagebrush, Indian ricegrass, and needleandthread	50 percent grasses, 5 percent forbs, and 45 percent shrubs and trees
Loamy (10-12" P.Z.)	Thurber's needlegrass, bluebunch wheatgrass, and big sagebrush	65 percent grasses, 10 percent forbs, and 25 percent shrubs and trees
Loamy bottom (10-14" P.Z.)	Basin wildrye	85 percent grasses, 5 percent forbs, and 10 percent shrubs
Saline bottom	Basin wildrye and alkali sacaton	80 percent grasses, 5 percent forbs, and 15 percent shrubs
Sodic terrace (6-8" P.Z.)	Shadscale, black greasewood, and bottlebrush squirreltail	10 percent grasses, 5 percent forbs, and 85 percent shrubs
Sodic flat (5-8" P.Z.)	Black greasewood, alkali sacaton, and inland saltgrass	15 percent grasses, 5 percent forbs, and 80 percent shrubs
Silty (8-10" P.Z.)	Winterfat and Indian ricegrass	30 percent grasses, 5 percent forbs, and 65 percent shrubs
Shallow calcareous loam (8-10" P.Z.)	Black sagebrush, Indian ricegrass, and needleandthread	40 percent grasses, 5 percent forbs, and 55 percent shrubs and trees
Shallow calcareous slope (8-10" P.Z.)	Black sagebrush, Indian ricegrass, and needleandthread	40 percent grasses, 5 percent forbs, and 55 percent shrubs
Shallow calcareous slope (14"+ P.Z.)	Bluebunch wheatgrass and black sagebrush	65 percent grasses, 10 percent forbs, and 25 percent shrubs

Big Sagebrush Vegetation Type

The big sagebrush vegetation type is present on alluvial fans, hillsides, and ephemeral drainages and occurs in Akercan (440), Coils (280), Labshaft-Rock, and Rubyhill-Barrier (601) associations found within the Project Area. All soil associations within the Project Area are described in Section 3.8. This vegetation type occurs at elevations between 5,700 and 8,600 feet amsl. The existing dominant overstory vegetation, depending on the location, could be either basin big sagebrush (*Artemisia tridentata* spp. *tridentata*), Wyoming big sagebrush, or mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*). Understory species commonly associated with basin big sagebrush includes bottlebrush squirreltail (*Elymus elymoides*), rabbitbrush (*Ericameria nauseosa* and *Chrysothamnus* spp.), and Sandberg bluegrass (*Poa secunda*).

Rabbitbrush, Indian ricegrass, green ephedra (*Ephedra viridis*), and cheatgrass occur with Wyoming big sagebrush. Species occurring with mountain big sagebrush include bluebunch wheatgrass, Sandberg bluegrass, cheatgrass, bottlebrush squirreltail, lupine (*Lupinus* spp.), and scattered rabbitbrush and antelope bitterbrush (*Purshia tridentata*). The big sagebrush type is a prevalent vegetation type accounting for 7,115.3 acres (31.1 percent) of the Project Area and generally dominates the lower to mid-elevation zones in the Kobeh Valley and along Garden Pass Road.

Based on the NRCS soil surveys and ecological site descriptions for upland vegetation communities, the current vegetation type is more shrub dominated than the potential natural vegetation described in the ecological site description (SRK 2007b). For most ecological sites in this type, grass species have the potential to comprise over 50 percent of vegetative composition with shrubs being at or below 50 percent of the total composition. Species composition is extremely similar to the potential natural vegetation species; however, percentages of composition are skewed toward shrub dominance. Big sagebrush, antelope bitterbrush, rabbitbrush, bluebunch wheatgrass, Indian ricegrass, Thurber's needlegrass (*Achnatherum thurberianum*), bottlebrush squirreltail, black sagebrush, bud sagebrush, and winterfat are potential natural vegetation species occurring on the four soil associations mentioned above.

Piñon-Juniper Vegetation Type

Piñon-juniper woodlands generally occur on steep hillsides and mountains at all aspects, between 6,200 and 8,600 feet amsl. This vegetation type generally occurs on shallow, loamy soils with high percentages of coarse fragments. Singleleaf piñon and Utah juniper dominate the overstory in this type. The understory is often nothing more than barren soil in dense stands of this vegetation type. Piñon-juniper woodlands occur in Mau-Shagnasty-Eightmile (321), Labshaft-Rock outcrop complex, and Ratto soil associations. Shrubs present include mountain big sagebrush, basin big sagebrush, Wyoming big sagebrush, antelope bitterbrush, black sagebrush, and rabbitbrush. Grasses including Sandberg bluegrass, bottlebrush squirreltail, Thurber's needlegrass, Idaho fescue (*Festuca idahoensis*), basin wildrye, and bluebunch wheatgrass are present in the generally sparse understory. These woodlands typically occur along the north south trending mountains above elevations of 6,700 feet amsl and were present in approximately 6,896.8 acres (30.1 percent) of the Project Area.

According to the NRCS ecological site description for the Mau-Shagnasty-Eightmile association, the potential natural vegetation for the sites currently vegetated by piñon-juniper woodlands includes Thurber's needlegrass, bluebunch wheatgrass, and big sagebrush. No potential native

vegetation was documented for Ratto and Labshaft-Rock outcrop complex associations. For the Mau-Shagnasty-Eightmile association, the potential natural vegetation has been largely replaced with piñon-juniper woodlands. This encroachment by piñon-juniper woodlands implies a lack of fire in the area. Since the advent of fire suppression, there has been a migration of piñon-juniper habitat into sagebrush steppe communities.

Big Sagebrush/Piñon-Juniper Vegetation Type

The big sagebrush/piñon-juniper vegetation type occurs within and surrounding the Project Area. This vegetation type constitutes up to 13.1 percent (2,996.1 acres) of the vegetation within the Project Area and is located just north of the proposed open pit location and along the bench of the Whistler Range on the Kobeh Valley side. Islands of piñon-juniper woodlands and scattered trees occur throughout the big sagebrush in this vegetation type and indicate an encroachment of piñon-juniper woodlands into the big sagebrush type. This vegetation type comprises the following soil associations: Chad-Cleavage-Softscrabble (681), Mau-Shagnasty-Eightmile, and Labshaft-Rock outcrop complex. The elevation for this vegetation type ranges from 5,500 to 7,500 feet amsl. The big sagebrush/piñon-juniper vegetation type is typically found on hillsides, alluvial fans, and benches. Understory vegetation found within this existing type include bluebunch wheatgrass, Sandberg bluegrass, bottlebrush squirreltail, basin wildrye, Idaho fescue, and Thurber's needlegrass. Shrub and overstory species include big sagebrush, Nevada ephedra (*Ephedra nevadensis*), and serviceberry.

The soil associations found in the area of this vegetation indicates that the potential natural vegetation was historically a grass dominated vegetation type with sagebrush and other shrubs in percentages of no more than 25 percent; however, no data are available for the potential natural vegetation for the Labshaft-Rock outcrop association to compare to the existing vegetation type.

Piñon-Juniper/Big Sagebrush Vegetation Type

The piñon-juniper/big sagebrush vegetation type is commonly found in the north and central portions of the Project Area and makes up approximately 12.7 percent (approximately 2,902.3 acres) of the Project Area. This vegetation type is typically found at elevations between 6,200 and 7,000 feet amsl, and is dominated by piñon-juniper woodlands with many inclusions of big sagebrush located throughout. Existing understory vegetation includes Nevada ephedra, Sandberg bluegrass, bluebunch wheatgrass, bottlebrush squirreltail, Idaho fescue, basin wildrye, cheatgrass, and Indian ricegrass. Overstory species including rabbitbrush and low sagebrush (*Artemisia arbuscula*) are also present but not dominant.

Grasses are a large percentage of the potential natural vegetation occurring within the Labshaft-Rock outcrop complex, Handy (922), Atrypa (830), Shagnasty-Ravenswood-Rock outcrop (764), and Chad-Cleavage-Softscrabble (681) associations where the existing piñon-juniper/black sagebrush vegetation type occurs. The potential natural vegetation for the Atrypa association includes piñon, juniper, and big sagebrush. This potential natural vegetation is similar to the existing vegetation type of all the soil associations present. Soil map unit 681 should have 45 percent grass and 45 percent shrub composition for the potential natural vegetation, whereas the other associations have a grass composition up to 65 percent and no lower than 55 percent. The existing vegetative community (woodland/shrub community) has transitioned to a later seral stage from that of a grass-dominated area. Potential native vegetation understory and overstory species at these sites include bluebunch wheatgrass, Thurber's needlegrass, low sagebrush, black

sagebrush, goldenweed (*Haplopappus acaulis*), big sagebrush, Utah juniper, singleleaf piñon, Indian ricegrass, needle and thread grass (*Hesperostipa comata*), Nevada bluegrass (*Poa nevadensis*), bottlebrush squirreltail, and black greasewood.

Big Sagebrush/Low Sagebrush Vegetation Type

A substantial portion (2,643.2 acres and 11.5 percent) of the Project Area is vegetated by the big sagebrush/low sagebrush type. This type occurs on the alluvial fans, hillsides, and bottom areas in the northeastern section of the Project Area and extends beyond the Project boundary to the east toward Diamond Valley where the type is bound by Garden Pass Creek. This type occurs at lower to mid-elevations, which range from 5,900 to 6,800 feet amsl. Islands of low sagebrush occur within the big sagebrush community with occasional Utah juniper in the area. Other overstory species found in the existing community include Nevada ephedra and rabbitbrush. Dominant understory vegetation species found in this type include squirreltail and Indian ricegrass. The big sagebrush/low sagebrush type is solely found in the Ratto soil association. The Project Area is located within the NRCS 028BY010NV MLRA. The NRCS rangeland ecological site description for this MLRA identifies Wyoming big sagebrush as the dominant shrub species, with other species of trees and shrubs including Douglas' rabbitbrush, fourwing saltbush (*Atriplex canescens*), Nevada ephedra, spiny hopsage (*Grayia spinosa*), and Utah juniper. The NRCS also identifies Indian ricegrass and needle and thread as the dominant grasses in this MLRA, with other grasses including bottlebrush squirreltail, Sandberg's bluegrass, western wheatgrass, and basin wildrye. Forbs include globemallow (*Sphaeralcea* sp.), phlox (*Phlox* sp.), and paintbrush.

Vegetation in this community generally agreed with the potential native vegetation predicted by the NRCS ecological site description for loamy 8-10" P.Z, except for the presence of low sagebrush which was observed during the surveys but not predicted for the ecological site.

Salt Desert Scrub Vegetation Type

The salt desert scrub vegetation type generally occurs in saline areas along drainages, margins of lake beds and marshes, and on flats and basins at elevations between 5,900 and 6,200 feet amsl. Phreatophytic vegetation is typically located in this vegetation type. Black greasewood dominates the south end of Kobeh Valley and comprises approximately 261.4 acres, or 1.1 percent of the Project Area. Associated species in the area include rabbitbrush, halogeton (*Halogeton glomeratus*), spiny hopsage, shadscale saltbush, iodine bush (*Allenrolfea occidentalis*), and saltgrass. Low sagebrush also occurs as inclusions throughout the greasewood community and transitions to low sagebrush communities where there is elevated clay content in soils (Great Basin Ecology 2008).

The list of potential native vegetation included in the NRCS ecological site descriptions associated with this vegetation community and species observed include shadscale and black greasewood.

Agricultural Land

Approximately 70.4 acres of the Project Area is located on private agricultural land along the proposed powerline route. This vegetation type is cultivated, and is therefore altered from natural

conditions, and constitutes approximately 0.1 percent of the Project Area. **Although this vegetation type is located in the loamy (8-10" P.Z.) and silty (8-10" P.Z.), the potential native vegetation is not present as a result of the modified landscape.**

Vegetation Types Located Outside of the Project Area

Additional vegetation communities located outside of the Project Area have the potential to be indirectly impacted by the Project. These communities include agricultural lands that are located outside of the Project Area in the Roberts Creek drainage and phreatophytic vegetation. Phreatophytic vegetation as described in Section 3.2.2.6.5 includes plants that send their roots in to the water table and depend on a constant supply of ground water. The mapped locations of phreatophytic vegetation in the Project Area and vicinity are illustrated on Figures 3.2.20 and 3.9.2.

3.9.2.2.2 Special Status Plant Species

The Project Area contains limited acreage of potentially suitable habitat for Beatley buckwheat. Although several species of buckwheat were identified in the Project Area, including locations on or around the rock outcrops, Beatley buckwheat was not among the species identified. Round headed desert buckwheat (*Eriogonum sphaerocephalum*), umbrella desert buckwheat (*E. umbellatum*), and parsley desert buckwheat (*E. heracleoides*) were the species observed in the Project Area (SRK 2007b).

The claypan soils located on the valley floor and the volcanic ridge located in the eastern portion of the proposed well field in Kobeh Valley were identified as potential habitat for windloving buckwheat. Potential habitat in the Project Area was surveyed and no windloving buckwheat individuals were located.

No occurrences of least phacelia were identified during the survey. Most of the drainages in the Project Area are ephemeral drainages serving as channels for storm water drainage and spring snow melt. The associated species, false hellebore (*Veratrum viride*), mule's ear (*Wyethia amplexicaulis*), and aspen, were also not found in the Project Area. Only five springs were located in the Project Area. Garden Pass Spring, located in the northeast portion of the Project Area, has been developed into a stock pond. The soil was heavily compacted and devoid of vegetation due to **trampling and heavy** use. A second "spring" was located on the east slope of Mount Hope. This "spring" consisted of a pipeline extending from an historic adit. The pipeline transported a portion of the flow to a stock pond that was in similar condition to the Garden Pass Spring stock pond. Neither site provided suitable habitat for least phacelia. Mount Hope Spring was dry, with extensive piñon-juniper and sagebrush dominating the site. No other suitable habitat was observed during the survey (SRK 2007b).

The Monte Neva Indian paintbrush, a Nevada endemic, has not been located within the Project Area; however, the BLM and NNHP have identified this species as occurring at a location that is approximately two miles southwest of the southern extent of the ten-foot drawdown just north of U.S. Highway 50 near Hot Springs Hill between Lone Mountain and 3 Bars Road outside the Project Area boundary. Focused surveys for the Monte Neva Indian paintbrush were not conducted in the Project Area because suitable habitat for this species is not located within the Project Area. This is one of the two known populations of this species in Nevada. The NNHP describes potential habitat for the Monte Neva Indian paintbrush as damp, open, alkaline to

saline clay soils of hummocks and drainages on travertine hot-spring mounds with greasewood, rubber rabbitbrush, and alkali sacaton (<http://heritage.nv.gov/atlas/castisalsu.pdf>).

3.9.2.2.3 Wildland Fire Prevention and Control

Historically, the approach to fire management has been one of full or modified suppression for all wildland fires on public lands; therefore, very limited use of prescribed fire or fuels management has occurred. The past practice of fire suppression has led to the development of a dense overstory that inhibits the existence of a healthy native herbaceous understory. This practice has also resulted in creating a high level of fire fuel hazards. As a result, there have been numerous and extensive wildland fires in the recent past and greater emphasis has now been placed on wildland fire rehabilitation and hazardous fuels reduction. New national direction is outlined in the Review and Update of the 1995 Federal Wildland Fire Management Update (2001 Federal Fire Policy). In addition, the National Fire Plan (NFP) provides for implementation of hazardous fuel reduction activities such as those outlined in the Healthy Forests Initiative and **HFRA**. Congress has provided funds to address hazardous fuels management issues and to re-introduce fire into fire dependent ecosystems.

BLM fire management activities include the creation of fuel breaks via mechanical thinning, by the BLM, adjacent to key vegetative communities prior to conducting prescribed fire. Activity fuels created by vegetation removal are either piled and burned or chipped. Pile burning disposal involves the burning of piles of specific size and fuel size distribution. BLM fire management activities also include treatment with prescribed fire followed by seeding. A combination of ignition devices are used including helitorches, terra torches, drip torches, fuses, flare guns, and hand thrown ignition devices. The size of burn areas are limited by the existing and planned fuel breaks, time of day and season of ignition, live fuel moisture variations as a result of changes in elevation, and firing patterns.

3.9.2.2.4 Climate Change

Vegetation composition is integral to many **functioning ecosystems**. Potential changes in vegetation associated with projected effects of climate change may alter **plant communities** (**U.S. Global Research Program 2009**). Climate change contributes to changes in stream systems, such as flow, temperature, and turbidity. It is predicted that climate change will exacerbate the effects of land management activities to streams and aquatic habitats. Changes in climate can influence the timing and length of seasons, which in turn can have a direct effect on plants and animals. This includes changes in ranges, abundances, phenology (timing of an event such as breeding), morphology and physiology, community composition, biotic interactions and behavior. Changes are being seen in all different types of taxa, from insects to mammals, in North America as well as on many other continents. Climate change is contributing to effects on glacial systems, which are advancing or receding, depending on local conditions.

Climate change predictions include increased duration and frequency of droughts and an increase in extreme precipitation events. This combination can result in an increase of surface soil erosion and gullying beyond current levels. Continental scale shifts in precipitation may lead to areas where there are increases and decreases in soil moisture. Prolonged drought would also affect soil respiration, resulting in a decreased soil C pool. Climate change (warmer/drier summer conditions, warmer winters) may be one of the factors in recently observed changes in forest health involving large areas of tree mortality from a variety of insect agents. Many forest

communities are resilient in responding to normal variations in weather and climate to which they are adapted. However, currently occurring increases in forest insect infestations and tree mortality throughout the Planning Area may be partially due to global climate change acting in concert with other variables such as long-term fire suppression, particularly in areas where stands are overstocked. Due to changes in climate, grasslands and rangeland could expand into previously forested areas. Additionally, sagebrush habitats may decline sharply throughout the region and be replaced with grasslands. Increasing CO₂ concentrations also lead to preferential fertilization and growth of specific plant species, such as invaders like cheat grass. Climate change may favor certain shrub species, both native and exotic. Increased CO₂ in the atmosphere may favor growth of most woody plants and “cool-season” grasses at the expense of “warm season grasses.” These and other differences among species could lead to changes in the composition of rangeland vegetation, but generalizations are difficult. Climate change affects the water cycle through decreased snow pack, runoff timing, and changes to total runoff volumes. Increased frequency of high intensity rainfall events related to global climate change could result in increased stream sedimentation or alteration of stream channels.

3.9.3 Environmental Consequences and Mitigation Measures

The environmental consequences of the Proposed Action and each alternative as they relate to vegetation resources are discussed in this section.

3.9.3.1 Significance Criteria

Based upon NEPA guidelines and commonly accepted criteria, the Proposed Action or alternatives would normally be considered to have a significant effect on vegetation resources if the following occurred:

- Substantially affect a species or habitat afforded protection under either the ESA or state law, or designated as having special status (e.g., species of concern, sensitive species, etc.) by an overseeing agency;
- Eliminate, reduce, or adversely affect a unique or rare natural plant community within the Project Area;
- Failure of reclamation efforts to achieve a stable, perennial vegetation cover that protects disturbed soil surfaces against erosion; or
- Establish plant communities on the reclaimed areas that fail to meet the reclamation objective for providing suitable forage for livestock, wildlife, and wild horses.

3.9.3.2 Assessment Methodology

Potential effects on vegetation resources can be categorized as direct and indirect, as well as short term (i.e., during the life of the Project) and long term. Direct effects on vegetation resources would include temporary and permanent loss of vegetation associated with construction, operation, and maintenance of the Project. Additional direct effects from the Project could include degradation of vegetation due to trampling, soil compaction, spills, increased access, and introduction of noxious weeds and invasive and nonnative species. Indirect effects could occur as a result of water table decline. Short-term impacts are those that could occur during Project implementation and until reclamation is complete. Long-term impacts are those occurring after reclamation is complete. The effects are determined to be significant or not significant based on the applicable significance criteria listed in Section 3.9.3.1.

3.9.3.3 Proposed Action

3.9.3.3.1 Vegetation Communities Disturbed by the Proposed Action

Implementation of the Proposed Action would result in the temporary disturbance or loss of up to 8,355 acres of vegetation over the 44-year mine life. Table 3.9-4 indicates the types of plant communities that could be impacted within the Project Area boundary. None of the eight vegetation communities located in the Project Area are considered unique with regard to the area's known resources, as they represent some of the most common vegetation types in northern Nevada. Under the Proposed Action, eight plant communities (big sagebrush, piñon-juniper, big sagebrush/piñon-juniper, piñon-juniper/big sagebrush, big sagebrush/low sagebrush, salt desert scrub, and juniper) would be disturbed. Disturbance acreages are presented in Table 3.9-4.

As indicated in Table 3.9-4, the vegetation community with the largest impact from Project-related surface disturbance would be the big sagebrush community, with 28.8 percent of the total surface disturbance occurring in that community. The disturbance would be associated with the construction of the North TSF, South TSF, the Kobeh Valley Well Field, and the powerline. Approximately 24.5 percent of the surface disturbance would occur in the big sagebrush/piñon-juniper community, and 20.6 percent would occur in the piñon-juniper/big sagebrush vegetation community, 16.3 percent would occur in the piñon-juniper vegetation community, and 9.1 percent would occur in the big sagebrush/low sagebrush vegetation community. Approximately 0.5 percent of disturbance would occur in the salt desert scrub community and 0.02 percent in the agricultural lands.

Table 3.9-4: Areas of Vegetation Communities Disturbed or Removed by Project Components

Vegetation Community Types	Total Project Disturbance ³	Percent of Total Project Disturbance
Big sagebrush	1,976	23.80
Piñon-juniper	1,401	16.87
Big sagebrush/ Piñon-juniper	2,195	26.43
Piñon-juniper/Big sagebrush	1,895	22.82
Big sagebrush/ Low sagebrush	830	9.99
Salt Desert Scrub	6	0.07
Agricultural	2	0.02
Undetermined (unspecific exploration activities) ²	50	-
Total Disturbance Acreage	8,355	100.0

Up to 50 acres of exploration surface disturbance may occur under the Proposed Action. Since the location of exploration areas cannot be determined at this time, the impact of that disturbance has not been calculated. Site-specific reviews/approvals would be coordinated with the BLM.

The Proposed Action would result in the conversion of tree- and shrub-dominated vegetation types in the Project Area to grass/forb-dominated vegetation types following reclamation. Over the long term, shrubs and trees would become reestablished and increase in abundance within the majority of disturbed areas as a result of reclamation and natural recolonization. Due to timing of Project development and concurrent reclamation, the total acreage of vegetation disturbed would not occur all at one time. Upon completion of the Project, the reclamation portion of the Proposed Action would be completed for 7,621 acres (91 percent of the disturbed area).

Approximately 734 acres of vegetation in the vicinity of the open pit would be removed and not reclaimed.

The removal of 3,296 acres of singleleaf piñon and Utah juniper trees would be a long-term impact, since it would take approximately 75 to 100 years for mature woodlands to become reestablished in the disturbance areas. Of the 3,296 acres of total disturbance in piñon-juniper vegetation, approximately 734 acres of piñon-juniper woodland would be permanently lost due to the development of the open pit.

Project-related development would also impact approximately 5,007 acres of shrub-dominated vegetation types. This loss would represent a long-term impact as it would take up to 15 to 20 years following reclamation for mature shrubs species to reestablish.

Reclamation and revegetation would minimize the aforementioned impacts to vegetation. A total of 7,621 acres (or 91 percent of the disturbed area) would eventually be revegetated. Only the 734 acres of the open pit would remain unvegetated. Revegetation activities would be conducted as outlined in Section 2.1.17. Reclamation seed mixtures and application rates, based on BLM requirements, are shown in Tables 2.1-9 and 2.1-10. These mixtures would provide forage and cover species similar to the pre-disturbance conditions, facilitating the post-mining land uses of livestock grazing, wild horses, and wildlife habitat. In addition, these seed mixes have been determined based on the species' ability to grow within the constraints of the low annual precipitation experienced in the region, its suitability for site aspect, and the elevation and soil type. The proposed seed mixture and application rates would be subject to modification by the BLM. The actual seed mixture and application rates would be determined prior to seeding based on the results of reclamation in other areas of the mine, concurrent reclamation, revegetation test plots, or changes by the BLM in its seed mix requirements.

- **Impact 3.9.3.3-1:** Disturbance or removal of vegetation community types would occur as a direct result of the Proposed Action.

Significance of the Impact: The impact would be considered less than significant because the disturbance would not occur all at once and would include concurrent reclamation.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Phreatophytes that may be impacted as a result of the Proposed Action aquifer drawdown occur in Kobeh Valley. In the central Kobeh Valley, as discussed in Section 3.2 the shallow ground water (between zero and ten feet bgs) at the valley floor supports substantial areas of phreatophyte vegetation (Figure 3.9.2). Current conditions include the presence of the following phreatophytic species in the phreatophyte vegetation community: greasewood; rabbitbrush; and saltgrass. ET of ground water by phreatophytes is the primary ground water discharge in the basin. As illustrated on Figure 3.2.9, approximately 4,122 acres of phreatophyte vegetation were mapped as occurring within the area predicted to be impacted by aquifer drawdown. More recent data from satellite imagery indicate that as many 28,500 acres of phreatophytes are located in Kobeh Valley; however, these data are not yet finalized (USGS 2011). In order to verify the extent of phreatophytes potentially impacted by the Project, the soil associations in Kobeh Valley were reviewed to determine

which soils are associated with phreatophytes. This review identified Bubus loam (1010), Bubus-Dianev (1012), Ocala silt loam (161), Dianev silt loam (250), Brinum silt loam (400), and Beanflat silt loam (410). The extent of these soils in Kobeh Valley is similar to the extent of phreatophytes identified in the preliminary results from the USGS Open-File Report 2011-1089 (USGS 2011), and are distributed southwest of the Project Area and overlap modeled ground water drawdown contours up to 70 feet in depth. However, the majority of phreatophytes that would be impacted are located in the area predicted to experience a ten- to 20-foot drawdown. The resultant depth to ground water would be between ten feet (if the baseline ground water level was at the surface) and up to 30 feet (if the baseline ground water level was ten feet below the surface). On average, the majority of the phreatophytes are predicted to experience an increase in depth to ground water of 20 feet as a result of the Proposed Action. However, based on the more recent phreatophyte location data some of the phreatophytes would be located where the depth to ground water is predicted to increase as much as 70 feet as a result of the Proposed Action.

Where the phreatophytes would be impacted as a result of ground water drawdown, the increase in the depth to ground water is expected to result in impacts to the phreatophyte vegetation through a change in vegetation composition and cover. Lowering of the water table resulting from ground water drawdown is a change in resource availability for the vegetation with an associated increase in ecological stress. Species adapted to conditions of higher available water would be replaced over time by species adapted to conditions of lower available water. Change in the depth to ground water is not the only factor that affects the composition of phreatophyte communities. Other factors that affect changes in phreatophyte communities include the following: amount of annual precipitation; climate change; livestock grazing; and fire regime (McLendon 2011).

In the areas where the phreatophytes would experience an increased depth to water of 20 feet (which is what the majority of phreatophytes would experience), the xeric phreatophytes (rabbitbrush and greasewood) are expected to respond by increasing their root depth as the depth to ground water increases and utilize more surface water when it is available (Naumberg et al. 2005). While the percent cover of greasewood and saltgrass may decrease, the percent cover of rabbitbrush would increase (McLendon 2011; Stringham 2011). In areas where the phreatophytes would experience an increase depth to water of 50 feet, the vegetation community would likely shift from greasewood and rabbitbrush to mainly rabbitbrush, and then as the depth to ground water increases more would likely shift to a community dominated by Wyoming big sagebrush (populations of Wyoming big sagebrush are located adjacent to the xeric phreatophytes in Kobeh Valley). A water table decline could result in perennially drier soils. The deeper water table would preclude salt accumulation at the soil surface, allowing precipitation to leach salts to deeper soil depths, resulting in drier, less saline soils, and creating conditions where xeric phreatophytes can survive (Cooper et al. 2006). Additionally, recovery of the water table following Project-related ground water pumping could result in a transition back to a pre-Project vegetation community state (Stringham 2011).

Impacts to other vegetation communities as a result of drawdown are not expected. The predicted ten-foot water drawdown contour for the Proposed Action does not intercept any known phreatophyte vegetation within Diamond Valley, Antelope Valley, or Pine Valley.

- **Impact 3.9.3.3-2:** Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.

Significance of the Impact: The impact is **not** considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The Project mining activities and vehicular traffic would affect vegetation within the immediate vicinity of the Project Area by increasing the amount of airborne particulate deposition onto vegetation surfaces. Deposition could result in lowered primary production in plants due to reduced photosynthesis and decreased water-use efficiency. The potential effects on vegetation from dust would be reduced by wind and periodic precipitation, which would remove some of the accumulated dust. In addition, the implementation of the fugitive dust reduction measures outlined in the Proposed Action would reduce the impact of dust deposition on vegetation.

- **Impact 3.9.3.3-3:** Vegetation in the immediate vicinity of the Project Area could suffer periodic short-term reductions in primary production due to airborne particulate deposition onto exposed surfaces.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The fenced area around the Project would limit BLM fire management activities by preventing normal access. The development of the Project well field in Kobeh Valley would create multiple unvegetated linear features (roads) that could be used as fire breaks in BLM fire management activities. These constructed roads could also provide additional access for potential fire management activities. Mine equipment and water resources could also be used to aid in suppression activities.

Potential impacts to the management of vegetation communities for wildland fire prevention and control as a result of Project activities would be limited as a result of the implementation of precautionary measures outlined in Sections 2.1.10 and 2.1.14.8.

- **Impact 3.9.3.3-4:** The Project would result in limitations and enhancements to the BLM's fire management activities within the vicinity of the Project Area.

Significance of the Impact: Based on the conclusions from the analysis, the impact is not significant. The following mitigation is proposed **for this impact**.

- **Mitigation Measure 3.9.3.3-4:** During periods of high fire danger, EML would utilize welding tents during welding activities along the pipeline or powerline routes in the Project Area.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.9.3.3-4 would be effective at reducing the potential for Project activities to result in wildland fires.

3.9.3.3.2 Special Status Plant Species

Based on habitat requirements or known distribution, three special status plant species were identified as potentially occurring in the Project Area. As discussed above, field surveys were conducted in the Project Area for Beatley buckwheat, windloving buckwheat, and least phacelia. No habitat was observed for least phacelia and no populations of least phacelia were observed in the Project Area. Limited potentially suitable habitat was identified for Beatley buckwheat and windloving buckwheat; however, no populations of Beatley buckwheat or windloving buckwheat were observed in the Project Area.

- **Impact 3.9.3.3-5:** Disturbance or removal of potential habitat for Beatley buckwheat and windloving buckwheat could occur as a result of the Proposed Action.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Habitat for Beatley buckwheat, windloving buckwheat, and least phacelia is located outside of the Project Area within the area that is predicted to be impacted by the aquifer drawdown. Potential habitat for Beatley buckwheat includes dry volcanic outcrops and potential habitat for windloving buckwheat includes claypan soils located on the valley floor and volcanic ridges. While there is potential habitat for these two species of buckwheat located within the area predicted to be impacted by the aquifer drawdown, these species are not wetland-dependent. Therefore, no indirect impacts to these species are anticipated as a result of the aquifer drawdown.

Potential habitat for least phacelia includes vernal saturated, summer-drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows. Potential habitat for this species is located within the area predicted to be impacted by the aquifer drawdown. However, additional habitat for this species is located outside of the area predicted to be indirectly impacted by the Proposed Action and as of 2001 this species had been located 39 times in the State of Nevada (<http://heritage.nv.gov/atlas/phaceminut.pdf>).

- **Impact 3.9.3.3-6:** Potential, unsurveyed habitat for least phacelia located outside of the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the potential habitat could potentially impact these species indirectly.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Although there are no known occurrences of Monte Neva Indian paintbrush in the Project Area; the BLM has identified occupied habitat for this species between Lone Mountain and 3 Bars Road near Hot Springs Hill. The species is aquatic or wetland-dependent but lies outside of the area impacted by the predicted aquifer drawdown.

- **Impact 3.9.3.3-7:** Occupied and potential habitat for the Monte Neva Indian paintbrush is not expected to experience water stress because it is located outside of the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. However, lowering of the water table in the occupied and potential habitat could potentially impact this species.

Significance of the Impact: No indirect impact from the Proposed Action is expected to this species or occupied habitat because they are located outside of the predicted water table drawdown. Yearly monitoring would be conducted for this species. If impacts to the species from the Project are detected mitigation would be developed by the BLM and EML.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.9.3.3.3 Residual Adverse Impacts

Residual adverse impacts to vegetation would include the permanent loss of vegetative productivity from approximately 734 acres of land associated with the open pit that would not be reclaimed and a long-term change in vegetation composition (i.e., tree and shrub dominated communities to grass and forb dominated communities, potential **change in phreatophyte vegetation percent cover and composition**) as a result of Project development and operation.

Residual adverse effects to special status species would not occur as a result of the Project since no special status species were located within the Project Area. There is a potential residual indirect effect to potential unoccupied special status plant species habitat.

3.9.3.4 No Action Alternative

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to vegetation would not occur. EML would continue existing activities under previously permitted Notices, and the area would remain available for future mineral development or for other purposes as approved by the BLM.

3.9.3.4.1 Vegetation Communities Disturbed by the No Action Alternative

Under the No Action Alternative, EML would continue to conduct mineral exploration and data acquisition within the Project Area. Ongoing reclamation would help to minimize impacts to vegetation through continuation of current and ongoing activities, with resulting short-term impacts to herbaceous species and long-term impacts to woody species.

- **Impact 3.9.3.4-1:** Implementation of the No Action Alternative would result in the general removal of vegetation.

Significance of the Impact: The impact is not considered significant.

3.9.3.4.2 Special Status Plant Species

No additional disturbance beyond that previously authorized would occur in association with ongoing existing operations. As a result, there would be no additional impacts to potential habitat for special status plant species under this alternative.

3.9.3.4.3 Residual Adverse Impacts

The No Action Alternative would have unavoidable short-term impacts to herbaceous species and long-term impacts to wood vegetation species as part of surface disturbance associated with permitted exploration and data acquisition; however, revegetation and reclamation would minimize these impacts to vegetation.

3.9.3.5 Partial Backfill Alternative

3.9.3.5.1 Vegetation Communities Disturbed by the Partial Backfill Alternative

Impacts to vegetation community types would be similar to those described for the Proposed Action; however, the Partial Backfill Alternative would involve the partial backfilling of the open pit to eliminate the pit lake and the floor of the open pit would be reclaimed using growth media and then seeded. Although the Proposed Action would have 734 acres that would remain unvegetated in the open pit, under this alternative approximately 527 acres would remain unvegetated following Project completion and reclamation; therefore, impacts to vegetation would be similar to, but slightly less than, those described for the Proposed Action.

- **Impact 3.9.3.5-1:** Disturbance or removal of vegetation community types would occur as a result of the Partial Backfill Alternative.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Impacts to phreatophyte vegetation would be similar to those under the Proposed Action.

- **Impact 3.9.3.5-2:** Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The Project mining activities and vehicular traffic would affect vegetation within the immediate vicinity of the Project Area by increasing the amount of airborne particulate deposition onto vegetation surfaces. Deposition could result in lowered primary production in plants due to reduced photosynthesis and decreased water use efficiency. The potential effects on vegetation from dust would be reduced by wind and periodic precipitation, which would remove some of the accumulated dust. In addition, the implementation of the fugitive dust reduction measures outlined in the Proposed Action would reduce the impact of dust deposition on vegetation.

- **Impact 3.9.3.5-3:** Vegetation in the immediate vicinity of the Project Area could suffer periodic short-term reductions in primary production due to airborne particulate deposition onto exposed surfaces.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The fenced area around the Project would limit BLM fire management activities by preventing normal access. The development of the Project well field in Kobeh Valley would create multiple unvegetated linear features (roads) that could be used as fire breaks in BLM fire management activities. These constructed roads could also provide additional access for potential fire management activities. Mine equipment and water resources could also be used to aid in suppression activities.

Potential impacts to the management of vegetation communities for wildland fire prevention and control as a result of Project activities would be limited as a result of the implementation of precautionary measures outlined in Sections 2.1.10 and 2.1.14.8.

- **Impact 3.9.3.5-4:** The Project would result in limitations and enhancements to the BLM's fire management activities within the vicinity of the Project Area.

Significance of the Impact: Based on the conclusions from the analysis, the impact is not significant. The following mitigation measure is proposed **for this impact**.

- **Mitigation Measure 3.9.3.5-4:** During periods of high fire danger, EML would utilize welding tents during welding activities along the pipeline or powerline routes in the Project Area.
- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.9.3.5-4 would be effective at reducing the potential for Project activities to result in wildland fires.

3.9.3.5.2 Special Status Plant Species

Impacts to special status plant species and their habitat as a result of the Partial Backfill Alternative would be similar to those for the Proposed Action.

- **Impact 3.9.3.5-5:** Disturbance or removal of potential habitat for Beatley buckwheat and windloving buckwheat could occur as a result of the Proposed Action.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.5-6:** Potential, unsurveyed habitat for least phacelia located outside of the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the potential habitat could potentially impact these species indirectly.

Significance of the Impact: The indirect impact of the Proposed Action to potential habitat of these species would not meet the significance criteria listed in Section 3.9.3.1.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.5-7:** Occupied and potential habitat for the Monte Neva Indian paintbrush is not expected to experience water stress because it is located outside of the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. However, lowering of the water table in the occupied and potential habitat could potentially impact this species.

Significance of the Impact: No indirect impact from the Proposed Action is expected to this species or occupied habitat because they are located outside of the predicted water table drawdown. Yearly monitoring would be conducted for this species. If impacts to the species from the Project are detected, mitigation would be developed by the BLM and EML.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.9.3.5.3 Residual Adverse Impacts

Residual adverse effects to vegetation would include the permanent loss of vegetative productivity from approximately 527 acres of land associated with the open pit that would not be reclaimed and a long-term change in vegetation composition (i.e., tree and shrub dominated communities to grass and forb dominated communities, potential **change in phreatophyte vegetation percent cover and composition**) as a result of Project development and operation.

Residual adverse effects to special status species would not occur as a result of the Project since no special status species were located within the Project Area.

3.9.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

3.9.3.6.1 Vegetation Communities Disturbed by the Off-Site Transfer of Ore Concentrate for Processing Alternative

Although the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in approximately 20 acres less surface disturbance in the piñon-juniper/big sagebrush vegetation community when compared to the Proposed Action, impacts to vegetation community types from this alternative would be similar to those for the Proposed Action since the disturbance acreage would decrease by only 0.2 percent.

- **Impact 3.9.3.6-1:** Implementation of the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the general removal of vegetation.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Impacts to phreatophyte vegetation would be similar to those under the Proposed Action.

- **Impact 3.9.3.6-2:** Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The Project mining activities and vehicular traffic would affect vegetation within the immediate vicinity of the Project Area by increasing the amount of airborne particulate deposition onto vegetation surfaces. Deposition could result in lowered primary production in plants due to reduced photosynthesis and decreased water use efficiency. The potential effects on vegetation from dust would be reduced by wind and periodic precipitation, which would remove some of the accumulated dust. In addition, the implementation of the fugitive dust reduction measures outlined in the Proposed Action would reduce the impact of dust deposition on vegetation.

- **Impact 3.9.3.6-3:** Vegetation in the immediate vicinity of the Project Area could suffer periodic short-term reductions in primary production due to airborne particulate deposition onto exposed surfaces.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The fenced area around the Project would limit BLM fire management activities by preventing normal access. The development of the Project well field in Kobeh Valley would create multiple unvegetated linear features (roads) that could be used as fire breaks in BLM fire management activities. These constructed roads could also provide additional access for potential fire management activities. Mine equipment and water resources could also be used to aid in suppression activities.

Potential impacts to the management of vegetation communities for wildland fire prevention and control as a result of Project activities would be limited as a result of the implementation of precautionary measures outlined in Sections 2.1.10 and 2.1.14.8.

- **Impact 3.9.3.6-4:** The Project would result in limitations and enhancements to the BLM's fire management activities within the vicinity of the Project Area.

Significance of the Impact: Based on the conclusions from the analysis, the impact is not significant. The following mitigation measure is proposed **for this impact**.

- **Mitigation Measure 3.9.3.6-4:** During periods of high fire danger, EML would utilize welding tents during welding activities along the pipeline or powerline routes in the Project Area.
- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.9.3.6-4 would be effective at reducing the potential for Project activities to result in wildland fires.

3.9.3.6.2 Special Status Plant Species

Impacts to special status plant species and their habitat as a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative would be similar to those for the Proposed Action.

- **Impact 3.9.3.6-5:** Disturbance or removal of potential habitat for Beatley buckwheat and windloving buckwheat could occur as a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.6-6:** Potential, unsurveyed habitat for least phacelia located outside of the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the potential habitat could potentially impact these species indirectly.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.6-7:** Occupied and potential habitat for the Monte Neva Indian paintbrush is not expected to experience water stress because it is located outside of the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. However, lowering of the water table in the occupied and potential habitat could potentially impact this species.

Significance of the Impact: No indirect impact from the Off-Site Transfer of Ore Concentrate for Processing Alternative is expected to this species or occupied habitat because they are located outside of the predicted water table drawdown. Yearly monitoring would be conducted for this species. If impacts to the species from the Project are detected mitigation would be developed by the BLM and EML.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.9.3.6.3 Residual Adverse Impacts

The potential residual impacts to vegetation resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative would be similar to those for the Proposed Action.

3.9.3.7 Slower, Longer Project Alternative

Impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action. As discussed in Section 3.2.3, the surface area predicted to be impacted by the drawdown by this alternative is similar to, but slightly different than, the Proposed Action. The differences between the predicted drawdown area is illustrated on Figure 3.2.3. Impacts to vegetation as a result of the Slower, Longer Project Alternative are expected to be similar to the Proposed Action at the end of the Project.

3.9.3.7.1 Vegetation Communities Disturbed by the Slower, Longer Project Alternative

Vegetation communities impacted by the Slower, Longer Project Alternative would be the same as the Proposed Action.

- **Impact 3.9.3.7-1:** Disturbance or removal of vegetation community types would occur as a result of the Slower, Longer Project Alternative.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.7-2:** Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.

Significance of the Impact: The impact is **not** considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.7-3:** Vegetation in the immediate vicinity of the Project Area could suffer periodic short-term reductions in primary production due to airborne particulate deposition onto exposed surfaces.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The fenced area around the Project would limit BLM fire management activities by preventing normal access. The development of the Project well field in Kobeh Valley would create multiple unvegetated linear features (roads) that could be used as fire breaks in BLM fire management activities. These constructed roads could also provide additional access for potential fire management activities. Mine equipment and water resources could also be used to aid in suppression activities.

Potential impacts to the management of vegetation communities for wildland fire prevention and control as a result of Project activities would be limited as a result of the implementation of precautionary measures outlined in Sections 2.1.10 and 2.1.14.8.

- **Impact 3.9.3.7-4:** The Project would result in limitations and enhancements to the BLM's fire management activities within the vicinity of the Project Area.

Significance of the Impact: Based on the conclusions from the analysis, the impact is not significant. The following mitigation measure is proposed for this impact.

- **Mitigation Measure 3.9.3.7-4:** During periods of high fire danger, EML would utilize welding tents during welding activities along the pipeline or powerline routes in the Project Area.
- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.9.3.7-4 would be effective at reducing the potential for Project activities to result in wildland fires.

3.9.3.7.2 Special Status Plant Species

Impacts to special status plant species from the Slower, Longer Project Alternative would be the same as the Proposed Action.

- **Impact 3.9.3.7-5:** Disturbance or removal of potential habitat for Beatley buckwheat and windloving buckwheat could occur as a result of the Slower, Longer Project Alternative.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.7-6:** Potential, unsurveyed habitat for least phacelia located outside of the Project Area would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the potential habitat could potentially impact these species indirectly.

Significance of the Impact: The indirect impact of the Proposed Action to potential habitat of these species would not meet the significance criteria listed in Section 3.9.3.1.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.9.3.7-7:** Occupied and potential habitat for the Monte Neva Indian paintbrush is not expected to experience water stress because it is located outside of the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. However, lowering of the water table in the occupied and potential habitat could potentially impact this species.

Significance of the Impact: No indirect impact of the Proposed Action is expected to this species or occupied habitat because they are located outside of the predicted water table drawdown. Yearly monitoring would be conducted for this species. If impacts to the species from the Project are detected, mitigation would be developed by the BLM and EML.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.9.3.7.3 Residual Adverse Impacts

Residual adverse impacts to vegetation would include the permanent loss of vegetative productivity from approximately 734 acres of land associated with the open pit that would not be reclaimed and a long-term change in vegetation composition (i.e., tree and shrub dominated communities to grass and forb dominated communities, potential **change in phreatophyte vegetation percent cover and composition**) as a result of Project development and operation.

Residual adverse effects to special status species would not occur as a result of the Project since no special status species were located within the Project Area.

3.10 Noxious Weeds, Invasive & Nonnative Species

3.10.1 Regulatory Framework

Noxious weeds are designated by state, federal, or other laws and regulations and are mandated to be prevented or controlled because of their potential to cause economic harm (e.g., affect the quality of forage on rangelands, affect cropland, or forest land productivity), environmental harm (e.g., displace native plants and natural habitats), or harm human and animal health. There are no State of Nevada listed noxious weeds found within the boundary of the Project Area. This analysis will focus on invasive plant and nonnative species. Invasive and/or nonnative plant species are generally plants that have become too extensive and widely distributed to be effectively controlled or eradicated.

3.10.1.1 Executive Order 11312: Prevention and Control of Invasive Species

Several federal laws provide direction for addressing the prevention and control of noxious weeds, invasive and nonnative species. For example, the Plant Protection Act authorizes the USDA to list weeds that have been determined to cause certain harm, including damage to agricultural or natural resources, as being "noxious weeds." EO 11312 established a national Invasive Species Council, made up of federal agencies and departments, and a supporting Invasive Species Advisory Council, composed of state, local, and private entities. The Invasive Species Council and Advisory Committee oversees and facilitates implementation of the EO, including preparation of a National Invasive Species Management Plan.

3.10.1.2 Federal Noxious and Invasive Weed Laws

A number of federal laws pertain to noxious and invasive weeds, including the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 U.S.C. 4701 et seq.), Lacey Act, as amended (18 U.S.C. 42), Federal Plant Pest Act (7 U.S.C. 150aa et seq.), Federal Noxious Weed Act of 1974, as amended by the Food, Agriculture, Conservation, and Trade Act of 1990 (Section 1453 "Management of Undesirable Plants on Federal Lands" U.S.C. 2801 et seq.), the Carlson-Foley Act of 1968 (Public Law 90-583), and Federal EO 11312 released February 3, 1999. In Nevada, the BLM is primarily concerned with the control of State of Nevada listed noxious weed infestations and their dispersal on public lands. The BLM, USDA and the Nevada Department of Agriculture (NDOA) maintain lists of noxious weeds of economic or ecological concern.

3.10.1.3 Nevada Noxious Weed Laws

Chapter 555 of the NRS pertains to noxious weeds. The NDOA has responsibility for jurisdiction, management, and enforcement of the state's noxious weed law. Plants on Nevada's noxious weeds list are mandated to be controlled on both private and public land. The NDOA also maintains and updates a list of state listed noxious weeds, which can be found at the following web link, (http://agri.nv.gov/nwac/PLANT_No WeedList.htm). Chapter 555 also calls for the establishment of county "Weed Control Districts" with the responsibility to control and eradicate noxious weeds. The legislature declared that it is the responsibility of each owner or occupier of land in Nevada to control noxious weeds on their land, but finds that in certain areas this responsibility can best be discharged through control by organized Weed Districts. **In Eureka County, weed control is primarily discharged through Eureka County weed control under the County Department of Natural Resources and through the Diamond Valley Weed Control District.**

3.10.2 **Affected Environment**

3.10.2.1 Study Methods

Noxious weed, invasive and nonnative weed surveys were conducted by SRK in a majority of the Project Area between June 2005 through August 2006. The noxious weed, invasive and nonnative species surveys were conducted concurrently with the vegetation and wildlife biological baseline surveys (SRK 2007b, 2007c). The Kobeh Valley portion of the Project Area was surveyed for noxious weeds, invasive and nonnative species by Great Basin Ecology in July 2008 (Great Basin Ecology 2008).

3.10.2.2 Existing Conditions

No infestations of NDOA listed noxious weeds were observed in the Project Area. Cheatgrass (an invasive nonnative annual grass species) was observed as an understory component of most of the vegetation types; however, no large cheatgrass monocultures were observed (SRK 2007b). Other invasive nonnative plants species observed within the Project Area were halogeton and Russian thistle (*Salsola kali*). These two species are not considered noxious weeds by the State of Nevada and, therefore, not listed on the NDOA's noxious weed list.

Although no noxious weeds were observed in the Project Area during the initial 2007 survey, weedy annual species including cheatgrass and halogeton were identified within the Project Area, weedy annual species including cheatgrass and halogeton were identified within the Project Area, and Russian thistle was located near the Project Area. Although Scotch thistle (*Onopordum acanthium*), hoary cress (*Cardaria draba*), and salt cedar (*Tamarix ramosissima*) have been mapped and treated by Eureka County in the vicinity, these species were not observed during initial surveys of the Project Area. Subsequently, hoary cress has been observed along roadsides within the Project boundary.

3.10.3 Environmental Consequences and Mitigation Measures

3.10.3.1 Significance Criteria

Based upon BLM Manual 9015 guidelines, the Proposed Action or alternatives would be considered to have a significant effect on noxious weed management if it resulted in the following:

- An increased likelihood of the introduction of noxious weed species or invasive, nonnative species, into a relatively weed-free area at moderate or high ecological risk as a result of a lack of preventative action; or
- An expansion of noxious weed infestation(s) within and outside of the Project Area into relatively weed-free areas at moderate or high ecological risk.

Ecological risk is the level of likelihood and consequence of adverse effects on the environment. A determination of a Risk Rating (none, low, moderate, or high) is made through the Risk Assessment process outlined in Appendix 1 of BLM Manual 9015. Areas with a moderate or high risk rating have the following: a) noxious weed infestations immediately adjacent to or within the Project Area; b) activities associated with the Project that are likely to result in some areas becoming infested; and c) there are probable adverse effects on native plant communities within, and possibly outside of, the Project Area.

3.10.3.2 Assessment Methodology

The assessment of the effects of the Project on noxious weed management is based on a qualitative analysis of the potential for noxious weeds, invasive and nonnative species to become introduced or established within the Project Area as a result of increased activity disturbance and reclamation. The effects of the Project are determined to be significant or not significant based on the applicable significance criteria listed in Section 3.10.3.1.

3.10.3.3 Proposed Action

Invasive, nonnative plant species readily invade areas that have been disturbed and which typically lack or have minimal vegetation cover. Development and operation of the Project would remove or disturb 8,355 acres of vegetation over the 44-year mine life, of which 734 acres associated with the open pit would not be reclaimed.

The **applicant committed practices** outlined in Section 2.1.14.8 would substantially reduce the introduction and spread of noxious weeds, invasive and nonnative species. The **applicant committed practices** include the implementation of a noxious weed monitoring and control plan

during construction and throughout operations. Implementation of this plan would be coordinated with the BLM, **Eureka County Natural Resource Department, and Diamond Valley Weed Control District.**

Reclamation would also reduce the establishment of noxious weeds in the Project Area. Due to concurrent reclamation, the total acreage of vegetation disturbed would not occur all at one time; however, minor populations of weedy annual species (e.g., halogeton and cheatgrass) may become established in localized areas for short periods of time. Growth media stockpiles would be reclaimed with an interim seed mix to stabilize the growth media, reduce soil erosion, and minimize the potential for the establishment of noxious weeds. Successful reclamation of mine related surface disturbance areas would result in the establishment of a permanent vegetative cover, which would minimize the potential establishment of noxious weeds in the long term. Although the open pit would not be reclaimed, noxious weeds would not likely become established in the open pit due to the absence of soil and the formation of a pit lake in the long term. As described in Section 2.1.14, EML would utilize certified weed-free seed mixes for reclamation. Weed control practices would be implemented in coordination with the BLM to limit the spread of noxious weeds, if they appear in the Project Area.

- **Impact 3.10.3.3-1:** Implementation of the Proposed Action could result in the introduction and spread of noxious weeds, invasive and nonnative species.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.10.3.3-2:** Phreatophyte vegetation, riparian corridors, and wet meadows would potentially experience **changes in species composition and density due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Noxious weeds as well as invasive and nonnative species associated with existing surface disturbance or those transported into the phreatophytes, riparian corridors, and wet meadows could potentially invade areas that experience changes in species composition and density.**

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.10.3.3.1 Residual Adverse Impacts

The Proposed Action would result in the unavoidable disturbance of approximately 8,355 acres of vegetation over the 44-year mine life, which would produce conditions conducive to supporting noxious weeds. Implementation of reclamation and the noxious weed monitoring and control plan would reduce or eliminate the chance of noxious weed establishment and infestation (**EML 2006, Appendix 13**).

3.10.3.4 No Action Alternative

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to noxious weed management would not occur. EML would continue existing activities under previously permitted Notices for a total of 35 acres of surface disturbance and the area would remain available for future mineral development or for other purposes as approved by the BLM.

3.10.3.4.1 Residual Adverse Impacts

There are no residual adverse impacts from noxious weeds associated with the No Action Alternative.

3.10.3.5 Partial Backfill Alternative

Impacts from noxious weeds would be similar to those described for the Proposed Action; however, the Partial Backfill Alternative would involve the partial backfilling of the open pit to eliminate the pit lake and the floor of the backfilled open pit would be reclaimed with growth media and seeded. The **applicant committed practices** outlined in Section 2.1.14.8 and reclamation would reduce the potential for noxious weeds to establish in the Project Area. Although the Proposed Action would have 734 acres that would remain unvegetated in the open pit, under this alternative approximately 527 acres would remain unvegetated following Project completion and reclamation. Therefore, impacts from noxious weeds would be similar to, but slightly less than, those described for the Proposed Action.

- **Impact 3.10.3.5-1:** Implementation of the Partial Backfill Alternative could result in the introduction and spread of noxious weeds, invasive and nonnative plant species.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.10.3.5-2:** Phreatophyte vegetation, riparian corridors, and wet meadows would potentially experience **changes in species composition and density due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table.** Noxious weeds as well as invasive and nonnative species associated with existing surface disturbance or those transported into the phreatophytes, riparian corridors, and wet meadows could potentially invade areas that experience changes in species composition and density.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.10.3.5.1 Residual Adverse Impacts

The Partial Backfill Alternative would result in the unavoidable disturbance of approximately 8,355 acres of vegetation over the 44-year life of the mine, which would produce conditions conducive to supporting noxious weeds. Implementation of reclamation and the noxious weed monitoring and control plan would reduce or eliminate the chance of noxious weed establishment and infestation.

3.10.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Impacts from noxious weeds would be similar to those described for the Proposed Action; however, the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in approximately 20 acres less surface disturbance. The **applicant committed practices** outlined in Section 2.1.14.8 and reclamation would reduce the potential for noxious weeds to establish in the Project Area. When compared to the Proposed Action, impacts from noxious weeds as a result of this alternative would be similar to those for the Proposed Action since the acreage of surface disturbance would decrease by only 0.2 percent.

- **Impact 3.10.3.6-1:** Implementation of the Off-Site Transfer of Ore Concentrate for Processing Alternative could result in the introduction and spread of noxious weeds, invasive and nonnative plant species.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.10.3.6-2:** Phreatophyte vegetation, riparian corridors, and wet meadows would potentially experience **changes in species composition and density due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Noxious weeds as well as invasive and nonnative species associated with existing surface disturbance or those transported into the phreatophytes, riparian corridors, and wet meadows could potentially invade areas that experience changes in species composition and density.**

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.10.3.6.1 Residual Adverse Impacts

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in the unavoidable disturbance of approximately 8,335 acres of vegetation over the 44-year mine life of which 734 acres associated with the open pit would not be reclaimed, which would produce conditions conducive to supporting noxious weeds. Reclamation and the noxious weed monitoring and control plan would reduce or eliminate the chance of noxious weed establishment and infestation.

3.10.3.7 Slower, Longer Project Alternative

Impacts from noxious weeds would be similar to those described for the Proposed Action; however, the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action and the surface area predicted to be impacted by the drawdown by this alternative is slightly different than the Proposed Action. The differences between the predicted drawdown area is illustrated on Figure 3.2.28. The **applicant committed practices** outlined in Section 2.1.15 and reclamation would reduce the potential for noxious weeds to establish in the Project Area. Impacts from noxious weeds and invasive, nonnative species as a result of the Slower, Longer Project Alternative are expected to be similar to the Proposed Action at the end of the Project.

- **Impact 3.10.3.7-1:** Implementation of the Slower, Longer Project Alternative could result in the introduction and spread of noxious weeds, invasive and nonnative plant species.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.10.3.7-2:** Phreatophyte vegetation, riparian corridors, and wet meadows would potentially experience **changes in species composition and density due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table.** Noxious weeds as well as invasive and nonnative species associated with existing surface disturbance or those transported into the phreatophytes, riparian corridors, and wet meadows could potentially invade areas that experience changes in species composition and density.

Significance of the Impact: The impact is **not considered significant.**

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

3.10.3.7.1 Residual Adverse Impacts

The Slower, Longer Project Alternative would result in the unavoidable disturbance of approximately 8,355 acres of vegetation over the extended mine life, which would produce conditions conducive to supporting noxious weeds. Implementation of reclamation and the noxious weed monitoring and control plan would reduce or eliminate the chance of noxious weed establishment and infestation.

3.11 Wetlands and Riparian Zones

3.11.1 Regulatory Framework

This section discusses the regulatory definition of wetlands, as well as the laws and regulations that may apply to wetland and riparian resources potentially affected by the Project. Wetland communities are considered valuable natural resources that provide habitat for a variety of

dependent plant and wildlife species. Riparian/wetland areas also provide ecosystem services and values that are critical within BLM's multiple use mandate. The USACE and the EPA have policies and laws that regulate federally jurisdictional wetlands. However, there are no federally jurisdictional wetlands within the Project Area. As a result, federal management of wetlands is through the BLM on public lands and through State of Nevada Water Law relative to the use of water from wetlands. State of Nevada Water Law is discussed in Section 3.2.

3.11.1.1 Definition of Wetlands

Wetlands are defined by the USACE and EPA in 40 CFR 230.3 and 33 CFR 328.3 as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal conditions, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

The BLM defines riparian as: "A riparian area is an area of land directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lake shores and stream banks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil."

In 1991 the BLM Director approved the *Riparian-Wetland Initiative for the 1990's*, which establishes national goals and objectives for managing riparian-wetland resources on public lands. One of the chief goals of this initiative is to restore and maintain riparian-wetland areas so that 75 percent or more are in proper functioning condition (PFC) by 1997 (BLM 1991). The overall objective of this goal is to achieve an advanced ecological status, except where resource management objectives, including PFC, would require an earlier successional stage, thus providing the widest variety of vegetation and habitat diversity for wildlife, fish, and watershed protection. This objective is important to remember because riparian-wetland areas would function properly long before they achieve an advanced ecological status. The *Riparian-Wetland Initiative for the 1990's* also includes a strategy to focus management on the entire watershed. Entire watershed condition is an important component in assessing whether a riparian-wetland area is functioning properly.

The USACE's Wetland Delineation Manual (USACE 1987) defines a three parameter approach to delineating jurisdictional wetlands. In order for an area to be considered a jurisdictional wetland it must support each of the three parameters: hydric soils; wetland vegetation; and wetland hydrology.

3.11.1.2 Executive Order 11990: Protection of Wetlands

The federal government supports a policy of minimizing "the destruction, loss, or degradation of wetlands" (EO 11990, May 24, 1977). The EO directs all federal agencies to refrain from assisting or giving financial support to projects that encroach on public or privately owned wetlands.

3.11.1.3 Federal Land Policy and Management Act

The FLPMA directs the BLM to manage public lands in a manner that would provide for multiple use and at the same time protect natural resources for generations to come. In addition to FLPMA, numerous laws, regulations, policies, EOs, and Memoranda of Understanding (MOUs) direct the BLM to manage its riparian/wetland areas for the benefit of the nation and the economy. BLM Manual 1737 for Riparian Wetland Area Management identifies marshes, shallow swamps, lakeshores, bogs, muskegs, wet meadows, estuaries, and riparian areas as wetlands.

3.11.2 **Affected Environment**

3.11.2.1 Study Methods

On September 21, 2005, SRK conducted a Routine On-Site Wetland Delineation (SRK 2007e) to determine the presence or absence of jurisdictional and non-jurisdictional wetlands within the Project Area in accordance with the following: Section 404 of the CWA; the USACE Wetland Delineation Manual (USACE 1987); and the Sacramento District, Reno, Nevada, field office Minimum Standards for Acceptance of Preliminary Wetland Delineations (October 11, 1994), revised November 30, 2001. If present, the extent of the wetland was determined. Potential wetlands within the Project Area are supported by spring or seep flow, and ephemeral surface flows. On July 15 through 17, 2011, JBR Environmental Consultants, Inc. (JBR) conducted a supplemental spring and riparian area investigation (JBR 2011).

Prior to the Routine On-Site Wetland Delineation, aerial photographs and topographic map tools were reviewed for indications of open water, springs, and ephemeral, intermittent, and perennial drainages. The Soil Survey of Eureka and Part of White Pine Counties, prepared by the NRCS was reviewed prior to visiting the site (NRCS 1998).

3.11.2.2 Existing Conditions

In the Routine On-Site Wetland Delineation it was determined that no waters of the U.S. are located in the Project Area. With no jurisdictional waters present in the Project Area, USACE jurisdiction does not extend to the wetlands in the Project Area. A number of non-jurisdictional wetlands, or riparian areas, were identified in and surrounding the Project Area. Wetlands identified in the Project Area were recognized by the presence of facultative wet/obligate wetland plant species, ordinary high water mark (OHWM) indicators, and hydric soil indicators. The delineation identified 1,400 square feet (0.03 acre) of wetlands associated with Garden Spring (597) outside of the Project Area. During the July 2011 spring and seep survey, 0.22 acre of riparian vegetation was located within the Project Area associated with the Zinc adit (839) (JBR 2011). The springs and associated riparian vegetation identified in the Project Area and vicinity are shown on Figure 3.9.1.

3.11.3 **Environmental Consequences and Mitigation Measures**

3.11.3.1 Significance Criteria

Impacts to wetlands and riparian zones would be considered significant if the Proposed Action or alternatives resulted in any of the following:

- Violations of EO 11990 - Protection of Wetlands;
- Effects that are inconsistent with the objectives set forth in the BLM Riparian Initiative; or
- Eliminate, reduce, or adversely affect wetlands, riparian, or phreatophytic vegetation areas within the area directly or indirectly affected by Project activities.

3.11.3.2 Assessment Methodology

Potential effects on wetlands and riparian zones can be categorized as direct and indirect, as well as short term (i.e., during the life of the Project) and long term. Direct effects on wetlands and riparian zones could include removal or disturbance of riparian and wetland communities. Indirect effects could result from water table drawdown as a result of mine dewatering systems and well field pumping for process water. Short-term impacts are those that could occur during Project implementation and until reclamation is complete. Long-term impacts are those occurring after reclamation is complete. The effects are determined to be significant or not significant based on the applicable significance criteria listed in Section 3.11.3.1.

3.11.3.3 Proposed Action

Riparian and wetland communities that provide important habitat for local and migratory wildlife and fish species are considered sensitive resources, providing ecosystem services such as nutrient cycling, and also providing values such as irrigation and fisheries and are of concern to federal and state agencies. Riparian systems also provide water and habitat to wild horses and water to livestock. There are no jurisdictional wetlands or any other wetlands within the proposed areas of disturbance. Impacts to springs and stream water flows are discussed in Section 3.2.

- **Impact 3.11.3.3-1:** The Project would not result in the removal or disturbance (**direct impact**) of wetlands in the Project Area.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

The mine dewatering system and pumping of the production well field is expected to drawdown the ground water table in an area surrounding the open pit. As discussed in Section 3.2, modeling results show that significant water table drawdowns in the aquifer would occur in an area measuring approximately 232 square miles around the Project Area including the northeast quadrant of Kobeh Valley and the southernmost fringe of the Roberts Mountains.

Phreatophytes that may be impacted as a result of the Proposed Action aquifer drawdown occur in Kobeh Valley. In the central Kobeh Valley, as discussed in Section 3.2 the shallow ground water (between zero and ten feet bgs) at the valley floor supports substantial areas of phreatophyte vegetation (Figure 3.9.2). As illustrated on Figure 3.2.9, approximately 4,122 acres of phreatophyte vegetation were mapped as occurring within the area predicted to be impacted by aquifer drawdown. More recent data from satellite imagery indicate that as many 28,500 acres of phreatophytes are located in Kobeh Valley (these data will be finalized upon publication) (USGS 2011). In order to verify the extent of phreatophytes

potentially impacted by the Project, the soil associations in Kobeh Valley were reviewed to determine which soils are associated with phreatophytes. This review identified Bubus loam (1010), Bubus-Dianev (1012), Ocala silt loam (161), Dianev silt loam (250), Brinum silt loam (400), and Beanflat silt loam (410). The extent of these soils in Kobeh Valley is similar to the extent of phreatophytes identified in the preliminary results from the USGS Open-File Report 2011-1089 (USGS 2011), and are distributed southwest of the Project Area and overlap modeled ground water drawdown contours up to 70 feet in depth. However, the majority of phreatophytes that would be impacted are located in the area predicted to experience a ten- to 20-foot drawdown. Where the phreatophytes would be impacted as a result of ground water drawdown, the increase in the depth to ground water is expected to result in impacts to the phreatophyte vegetation through a change in vegetation composition and cover.

Impacts to other vegetation communities as a result of drawdown are not expected. The predicted ten-foot water drawdown contour for the Proposed Action does not intercept any known phreatophyte vegetation within Diamond Valley, Antelope Valley, or Pine Valley.

- **Impact 3.11.3.3-2:** Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.

Significance of the Impact: The impact is **not** considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

Direct impacts to the 0.22 acre of riparian vegetation associated with the Zinc adit are expected from the Project.

Water table drawdown would have a negative effect on wetland vegetation species dependent on seeps or springs. Lowering of the water table in the area where these plants occur would potentially cause a decline in the wetland community and the structure, functionality, and values offered by these systems. As the water table is lowered, the soils may dry out and these plants may decline due to water stress. Wetland plants that die as a result of water stress would likely be replaced by vegetation species that are not dependent on spring or seep water.

There are twenty-two existing springs, 7.7 miles of perennial streams in the Roberts Creek and Henderson Creek drainage, and 61.4 acres of riparian areas associated with these creeks that occur within the ten-foot drawdown contour (Figure 3.9.2). Table 3.2-6 in the Water Resources - Water Quantity Section identifies those springs that may be affected as a result of the Proposed Action. The total area of riparian vegetation that may be indirectly affected by the decline in the water table is approximately four acres associated with springs and 61.4 acres associated with the 7.7 miles of perennial streams.

- **Impact 3.11.3.3-3:** Vegetation dependent on springs, seeps, and perennial streams (i.e., riparian vegetation) would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water

table. Lowering of the water table in the area where these plants are located would potentially cause a decline in the riparian vegetation community. **Additionally, direct impacts to the 0.22 acre of riparian vegetation associated with the Zinc adit are expected from the Project.**

Significance of the Impact: Potential impacts to riparian vegetation areas within the area directly or indirectly affected by Project activities would be monitored as outlined in Section 2.1.15 and in the Plan. The impact is considered potentially significant.

- **Mitigation Measure 3.11.3.3-3:** As stated in Mitigation Measure 3.2.3.3-2a specific mitigation for the two perennial stream segments and 22 perennial or potentially perennial spring sites are outlined in Table 3.2-9. Implementation of the mitigation outlined in this table would result in up to 46.3 acres of additional surface disturbance associated with the pipeline construction and maintenance. This supplemental water should sustain riparian vegetation. **EML, in coordination with the BLM, would identify sites for mitigation in the area affected and implement mitigation measures at a three to one ratio with local cuttings, plugs, or seeds within one year of direct disturbance. EML would monitor these sites on an annual basis for at least three years after treatment to ensure effectiveness.**
- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.2.3.3-2a is designed to address the specific spring or surface water that is affected, which enhances the effectiveness of the mitigation. In addition, a variety of approaches to mitigation can be used within these measures to achieve the objective. These mitigation measures are expected to be effective because the mitigation measures are specifically intended to directly address the impact by restoring or enhancing surface flows, and because the measures would be reviewed and addressed by the BLM. Mitigation Measure 3.11.3.3-3 would reduce impacts to the loss of riparian vegetation during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the loss of riparian vegetation.

3.11.3.3.1 Residual Adverse Impacts

Following Project completion and reclamation, residual adverse impacts to riparian zones from the Proposed Action would consist of a gradual return of flows to those springs, seeps, and perennial streams that experienced reduced flows from the ground water pumping. In addition, up to 0.22 acre of riparian vegetation within the Project Area would be removed through Project activities.

3.11.3.4 No Action Alternative

Under the No Action Alternative, the proposed Project would not be developed and associated impacts to wetlands and riparian zones would not occur. EML would continue existing activities under previously permitted Notices, and the area would remain available for future mineral development or for other purposes as approved by the BLM.

3.11.3.4.1 Residual Adverse Impacts

There are no residual adverse impacts to wetlands and riparian zones associated with the No Action Alternative.

3.11.3.5 Partial Backfill Alternative

Although the Partial Backfill Alternative would involve the partial backfilling of the open pit to eliminate the pit lake and the floor of the open pit (approximately 527 acres) would be reclaimed with growth media and seeded, the impacts to wetland and riparian areas would be similar to those described for the Proposed Action. The absence of water in the open pit would increase the amount of water available to wetlands and riparian areas as compared to the Proposed Action, particularly related to areas close to the open pit. Under this alternative, approximately 100 ac-ft of evaporation from the pit lake would be prevented, and presumably that water would affect ground water resources.

- **Impact 3.11.3.5-1:** The Partial Backfill Alternative would not result in the possible removal or disturbance of wetlands in the Project Area.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.5-2:** Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.5-3:** Vegetation dependent on springs, seeps, and perennial streams (i.e., riparian vegetation) would potentially experience water stress due to the water table drawdown associated with mine dewatering and subsequent filling of the open pit. Lowering of the water table in the area where these plants are located would potentially cause a decline in the riparian vegetation community. **Additionally, direct impacts to the 0.22 acre of riparian vegetation associated with the Zinc adit are expected from the Project.**

Significance of the Impact: Potential impacts to riparian vegetation areas within the area directly or indirectly affected by Project activities would be monitored as outlined in Section 2.1.15 and the Plan. The impact is considered potentially significant.

- **Mitigation Measure 3.11.3.5-3:** As stated in Mitigation Measure 3.2.3.3-2a, specific mitigation for the two perennial stream segments and 22 perennial or potentially

perennial spring sites are outlined in Table 3.2-9. Implementation of the mitigation outlined in this table would result in up to 46.3 acres of additional surface disturbance associated with the pipeline construction and maintenance. This supplemental water should sustain riparian vegetation. **EML, in coordination with the BLM, would identify sites for mitigation in the area affected and implement mitigation measures at a three to one ratio with local cuttings, plugs, or seeds within one year of direct disturbance. EML would monitor these sites on an annual basis for at least three years after treatment to ensure effectiveness.**

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.2.3.3-2a is designed to address the specific spring or surface water that is affected, which enhances the effectiveness of the mitigation. In addition, a variety of approaches to mitigation can be used within these measures to achieve the objective. These mitigation measures are expected to be effective because the mitigation measures are specifically intended to directly address the impact by restoring or enhancing surface flows, and because the measures would be reviewed and addressed by the BLM. Mitigation Measure 3.11.3.5-3 would reduce impacts to the loss of riparian vegetation during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the loss of riparian vegetation.

3.11.3.5.1 Residual Adverse Impacts

Following Project completion and reclamation, residual adverse impacts to wetland and riparian zones from the Partial Backfill Alternative would consist of a gradual return of flows to those springs, seeps, and perennial streams that had reduced flows from the ground water pumping. In addition, up to 0.22 acre of riparian vegetation within the Project Area would be removed through Project activities.

3.11.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Although the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in approximately 20 acres less surface disturbance compared to the Proposed Action, impacts to riparian areas from this alternative would be similar to those for the Proposed Action.

- **Impact 3.11.3.6-1:** The Off-Site Transfer of Ore Concentrate for Processing Alternative would not result in the removal or disturbance of wetlands in the Project Area.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.6-2:** Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.

Significance of the Impact: The impact is **not** considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.6-3:** Vegetation dependent on springs, seeps, and perennial streams (i.e., riparian vegetation) would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area where these plants are located would potentially cause a decline in the riparian vegetation community. **Additionally, direct impacts to the 0.22 acre of riparian vegetation associated with the Zinc adit are expected from the Project.**

Significance of the Impact: Potential impacts to riparian vegetation areas within the area directly or indirectly affected by Project activities would be monitored as outlined in Section 2.1.15 and the Plan. The impact is considered potentially significant.

- **Mitigation Measure 3.11.3.6-3:** As stated in Mitigation Measure 3.2.3.3-2a, specific mitigation for the two perennial stream segments and 22 perennial or potentially perennial spring sites are outlined in Table 3.2-9. Implementation of the mitigation outlined in this table would result in 46.3 acres of additional surface disturbance associated with the pipeline construction and maintenance. This supplemental water should sustain riparian vegetation. **EML, in coordination with the BLM, would identify sites for mitigation in the area affected and implement mitigation measures at a three to one ratio with local cuttings, plugs, or seeds within one year of direct disturbance. EML would monitor these sites on an annual basis for at least three years after treatment to ensure effectiveness.**
- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.2.3.3-2a is designed to address the specific spring or surface water that is affected, which enhances the effectiveness of the mitigation. In addition, a variety of approaches to mitigation can be used within these measures to achieve the objective. These mitigation measures are expected to be effective because the mitigation measures are specifically intended to directly address the impact by restoring or enhancing surface flows, and because the measures would be reviewed and addressed by the BLM. Mitigation Measure 3.11.3.5-3 would reduce impacts to the loss of riparian vegetation during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the loss of riparian vegetation.

3.11.3.6.1 Residual Adverse Impacts

Following Project completion and reclamation, residual adverse impacts to wetland and riparian zones from the Off-Site Transfer of Ore Concentrate for Processing Alternative would consist of a gradual return of flows to those springs, seeps, and perennial streams that had reduced flows from the ground water pumping. In addition, up to 0.22 acre of riparian vegetation within the Project Area would be removed through Project activities.

3.11.3.7 Slower, Longer Project Alternative

Impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action. As discussed in Section 3.2.3, the surface area predicted to be impacted by the drawdown by this alternative is similar to, but slightly different than, the Proposed Action. The differences between the predicted drawdown area is illustrated on Figure 3.2.28. Impacts to riparian vegetation as a result of the Slower, Longer Project Alternative are expected to be similar to the Proposed Action at the end of the Project.

- **Impact 3.11.3.7-1:** The Slower, Longer Project Alternative would not result in the removal or disturbance of wetlands in the Project Area.

Significance of the Impact: The impact is not considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.7-2:** Phreatophyte vegetation would potentially experience a change in species composition and percent cover due to the predicted water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area of phreatophytes is not expected to result in a net loss of vegetation in these communities.

Significance of the Impact: The impact is **not** considered significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.

- **Impact 3.11.3.7-3:** Vegetation dependent on springs, seeps, and perennial streams (i.e., riparian vegetation) would potentially experience water stress due to the water table drawdown associated with ground water pumping and subsequent recovery of the water table. Lowering of the water table in the area where these plants are located would potentially cause a decline in the riparian vegetation community. **Additionally, direct impacts to the 0.22 acre of riparian vegetation associated with the Zinc adit are expected from the Project.**

Significance of the Impact: Potential impacts to riparian vegetation areas within the area directly or indirectly affected by Project activities would be monitored as outlined in the Plan. The impact is considered potentially significant.

- **Mitigation Measure 3.11.3.7-3:** As stated in Mitigation Measure 3.2.3.3-2a, specific mitigation for the two perennial stream segments and 22 perennial or potentially perennial spring sites are outlined in Table 3.2-9. Implementation of the mitigation outlined in this table would result in up to 46.3 acres of additional surface disturbance associated with the pipeline construction and maintenance. This supplemental water should sustain riparian vegetation. **EML, in coordination with the BLM, would identify sites for mitigation in the area affected and implement mitigation measures at a three to one ratio with local cuttings, plugs, or seeds within one year of direct**

disturbance. EML would monitor these sites on an annual basis for at least three years after treatment to ensure effectiveness.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.2.3.3-2a is designed to address the specific spring or surface water that is affected, which enhances the effectiveness of the mitigation. In addition, a variety of approaches to mitigation can be used within these measures to achieve the objective. These mitigation measures are expected to be effective because the mitigation measures are specifically intended to directly address the impact by restoring or enhancing surface flows, and because the measures would be reviewed and addressed by the BLM. Mitigation Measure 3.11.3.5-3 would reduce impacts to the loss of riparian vegetation during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the loss of riparian vegetation.

3.11.3.7.1 Residual Adverse Impacts

Following completion and reclamation, residual adverse impacts to wetland and riparian zones from the Slower, Longer Project Alternative would consist of a gradual return of flows to those springs, seeps, and perennial streams that experienced reduced flows from the ground water pumping. In addition, up to 0.22 acre of riparian vegetation within the Project Area would be removed through Project activities.

3.12 Livestock Grazing and Production

3.12.1 Regulatory Framework

BLM Standards and Guidelines for Livestock Grazing

The BLM has established Standards and Guidelines approved by the Secretary of the Interior (43 CFR 4180). The purpose of these Standards and Guidelines is to ensure that BLM administration of grazing helps preserve currently healthy conditions and restores healthy conditions of rangelands (BLM 2001).

BLM Resource Management Plan

The RMP that covers the Project Area includes rangeland programs that authorize livestock grazing on public lands (43 CFR 1601.0-5(b) and CFR 4100.08). The regulations require that the BLM manage livestock grazing on public lands under the principles of multiple use and sustained yield. To accomplish this, rangeland has been broken down into controllable land areas called allotments to manage both short- and long-term objectives for livestock grazing. Allotments are leased to permittees for a defined period of time. **BLM MLFO allotments are managed to achieve Northeast Great Basin Resource Advisory Council standards and guidelines.** They are evaluated periodically by the BLM to determine whether management goals are being met (BLM 2001).

disturbance. EML would monitor these sites on an annual basis for at least three years after treatment to ensure effectiveness.

- **Effectiveness of Mitigation and Residual Effects:** Mitigation Measure 3.2.3.3-2a is designed to address the specific spring or surface water that is affected, which enhances the effectiveness of the mitigation. In addition, a variety of approaches to mitigation can be used within these measures to achieve the objective. These mitigation measures are expected to be effective because the mitigation measures are specifically intended to directly address the impact by restoring or enhancing surface flows, and because the measures would be reviewed and addressed by the BLM. Mitigation Measure 3.11.3.5-3 would reduce impacts to the loss of riparian vegetation during Project activities. Replacement with local cuttings, plugs, or seeds would ensure no long-term impacts to the loss of riparian vegetation.

3.11.3.7.1 Residual Adverse Impacts

Following completion and reclamation, residual adverse impacts to wetland and riparian zones from the Slower, Longer Project Alternative would consist of a gradual return of flows to those springs, seeps, and perennial streams that experienced reduced flows from the ground water pumping. In addition, up to 0.22 acre of riparian vegetation within the Project Area would be removed through Project activities.

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3.12.2 Affected Environment

3.12.2.1 Study Methods

This section includes a discussion of existing grazing allotments, types and classes of livestock, and active grazing preferences, as well as the current grazing practices and management strategies within the Project Area.

3.12.2.2 Existing Conditions

The Project Area is located within six BLM grazing allotments: Lucky C; Roberts Mountain; Romano; Ruby Hill; Shannon Station; and 3 Bars (Figure 3.12.1). Although not located within the Project Area footprint, the Santa Fe/Ferguson Allotment is located within the maximum extent ten-foot ground water drawdown contour and is included in Table 3.12-1 below. **Associated with each of these seven allotments are private lands that are used for livestock grazing and production.** Season of use and type of livestock permitted on the seven allotments are detailed in Table 3.12-1.

Table 3.12-1: Livestock Grazing Permits for the Grazing Allotments Located within the Project Area and Ten-foot Ground Water Drawdown Contour

Grazing Allotment	Type of Livestock	Season of Use	Active Preference (AUMs)
Lucky C	Cattle	4/15 through 2/28	3,054
Subtotal			3,054
Roberts Mountain	Cattle	3/01 through 2/28	7,314
	Sheep	4/10 through 10/15	2,310
Subtotal			9,624
Romano	Cattle	5/01 through 12/31	2,887
Subtotal			2,887
Ruby Hill	Cattle	3/16 through 8/29	275
	Sheep	5/1 through 9/30	1,011
Subtotal			1,286
Shannon Station	Cattle	4/1 through 2/28	2,520
Subtotal			2,520
3 Bars	Cattle	3/1 through 2/28	4,111
	Sheep	3/1 through 2/28	1,729
Subtotal			5,840
Santa Fe/Ferguson	Cattle	3/1 through 12/1	2,767
	Sheep	3/1 through 12/1	1,227
Subtotal			3,994
TOTAL			29,205

The Lucky C Allotment includes approximately 108,666 acres of public land. The active grazing preference for the allotment is 3,054 animal unit months (AUMs) for cattle, or approximately

36 acres per AUM and is under a rotational grazing system. An AUM is the amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month. A total of 909.5 acres of the Lucky C Allotment are located in the powerline portion of the Project Area. **In addition, the ten-foot drawdown contour overlaps with the phreatophytes located within this allotment (Figure 3.12.1). According to Figure 3.12.1, this area would cover 3,143 acres (2.89 percent of this allotment).**

The Roberts Mountain Allotment includes approximately 151,060 acres of public land. The active grazing preference for the allotment is 9,624 AUMs for cattle and sheep, or on average approximately 16 acres per AUM. The allotment is currently under a rotation grazing system. A total of 7,954 acres of the Roberts Mountain Allotment are located in the fenced portion of the Project Area (of this, 1,365 acres are located in the Henderson pasture and 6,589 acres in the Nichols pasture).

The Romano Allotment consists of 76,070 acres of public lands with an active grazing preference of 2,887 AUMs for cattle, or approximately 26 acres per AUM (although AUMs/acre vary depending on pastures). This allotment is currently under a rotation grazing system. A total of 6,252 acres of the Romano Allotment are located in the fenced portion of the Project Area.

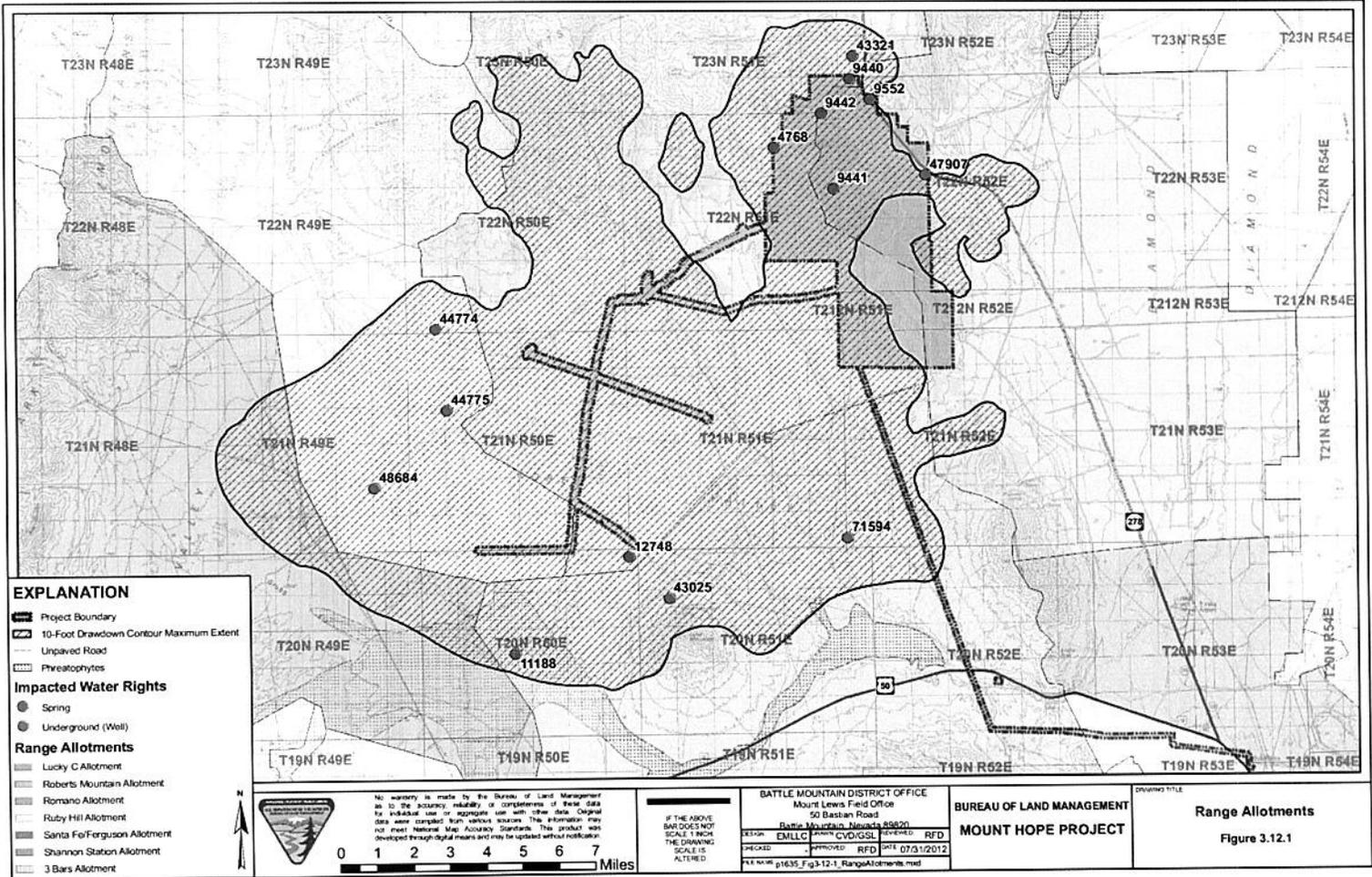
The Ruby Hill Allotment includes approximately 14,659 acres of public land. The active grazing preference for the allotment is 1,286 AUMs for cattle and sheep, or approximately 11 acres per AUM. A total of 317.7 acres of the Ruby Hill Allotment are located in the powerline portion of the Project Area.

The Shannon Station Allotment includes approximately 32,888 acres of public land. The active grazing preference for the allotment is 2,520 AUMs for cattle, or approximately 13 acres per AUM. The allotment is currently under a rotation grazing system. A total of 65.1 acres of the Shannon Station Allotment is located in the powerline portion of the Project Area.

The 3 Bars Allotment includes approximately 76,740 acres of public land. The active grazing preference for the allotment is 5,840 AUMs for cattle and sheep, or approximately 13 acres per AUM. The allotment is currently under a rotation grazing system. A total of 1,157 acres of the 3 Bars Allotment is located in the well field portion of the Project Area. **In addition, the ten-foot drawdown contour overlaps with the phreatophytes located within this allotment (Figure 3.12.1). According to Figure 3.12.1, this area would cover five acres (0.007 percent of this allotment).**

In addition to the six allotments discussed above, the ten-foot drawdown contour **overlaps with the phreatophytes located in** a seventh allotment, the Santa Fe/Ferguson Allotment (Figure 3.12.1). **According to Figure 3.12.1, this area would cover 974 acres (1.2 percent of the allotment).** The Santa Fe/Ferguson Allotment includes approximately 84,375 acres of public land. The active grazing preference for the allotment is 3,994 AUMs for cattle and sheep, or approximately 21 acres per AUM. The allotment is currently under a rotation grazing system.

The following BLM range improvements have been authorized within Sections affected by the entire Project Area: one well; one fence; one fence/cattleguard; one pipeline/trough; one pipeline; two seeding projects; one seeding tank; two spring developments; and one reservoir dam.



The consequences of weather and climate change on livestock grazing, and grassland use can be subtle and complex. The projected changes in climate – increases in temperature, reductions in soil moisture, and more intense rainfall events – may require changes in livestock management. The availability of feed and water for livestock grazing is extremely vulnerable to drought; hence the carrying capacity of land may influence livestock management.

3.12.3 Environmental Consequences and Mitigation Measures

3.12.3.1 Significance Criteria

Impacts to livestock grazing and production would be considered significant if the Proposed Action or alternatives would result in any of the following:

- Change in forage availability that measurably affects livestock grazing;
- Change in access to water that measurably affects livestock grazing;
- Change in number of AUMs available before, during, and after mining; or
- Undue harassment that adversely affects livestock grazing.

3.12.3.2 Assessment Methodology

Environmental consequences to livestock grazing and production within the Project Area were evaluated using authorized AUMs, pasture/use area acres, and Project disturbance acres. The pasture/use area acres were divided by the total AUMs by pasture (acres/AUM). The Project disturbance within each pasture was then divided by the acres/AUM to determine the total AUMs impacted. Where an allotment did not have pastures or use areas, the total acres and authorized AUMs were utilized for the calculation. **The analysis of effects to livestock grazing and production from the ground water drawdown, utilizes the acreage of phreatophytes within allotments affected by the ten-foot drawdown contour.**

3.12.3.3 Proposed Action

Project-related activities could result in direct impacts to livestock from traffic accidents or other mine-related activities. In order to minimize these impacts, a perimeter fence would be constructed during Project activities that would enclose 14,204 acres in the Mine and Process Area, which includes the open pit, WRDFs, and TSFs. The constructed fence would exclude livestock grazing during mine operations and reclamation for approximately 70 years. The open pit would result in the permanent loss of approximately 734 acres (644 acres within the Romano Allotment and 90 acres within the Roberts Mountain Allotment). **A total of 32 AUMs in the Romano and Roberts Mountain Allotments would be lost in perpetuity as a result of the open pit.** As described in the Proposed Action, the fence would be monitored on a regular basis and repairs made as needed.

When an area of **BLM administered land is devoted to a single public purpose**, such as mineral production, AUMs are adjusted to reflect the area withdrawn from multiple use. These AUMs are lost until such time mining has ceased and reclamation has been successfully completed. At that time, the area will be evaluated to determine if the AUMs can be returned.

In addition to the AUMs permanently lost as a result of the open pit, a total of 490 AUMs in the Roberts Mountain Allotment would be lost for approximately 70 years as a result of

7,954 acres being excluded by the Project fence. This would reduce the active grazing preference to 9,134 AUMs in the allotment from 9,624 AUMs (Table 3.12-2). The loss of AUMs represents five percent of the active grazing preference in the Roberts Mountain Allotment.

In addition to the AUMs permanently lost as a result of the open pit, a total of 291 AUMs in the Romano Allotment would be lost for approximately 70 years as a result of 6,252 acres being excluded by the Project fence. This would reduce the active grazing preference to 2,596 AUMs in the allotment from 2,887 AUMs (Table 3.12-2). The loss of AUMs represents ten percent of the active grazing preference in the Romano Allotment.

Table 3.12-2: Grazing Capacity within the Project Area and Area Affected by Ten-Foot Water Drawdown Contour Before and During Project Activities

Allotment	Active Grazing Capacity (AUMs)	
	Before the Proposed Action	During the Proposed Action
Lucky C	3,054	3,054
Roberts Mountain	9,624	9,134
Romano	2,887	2,596
Ruby Hill	1,286	1,286
Shannon Station	2,520	2,520
3 Bars	5,840	5,840
Santa Fe/Ferguson	3,994	3,994
Total	29,205	28,424

The grazing and agricultural service sectors of the Eureka County economy would be marginally affected by the reduction in AUMs associated with the Proposed Action due to the construction of the fence around 14,204 acres of the Project Area. The fence would exclude access to portions of the Roberts Mountains and Romano Allotments and result in a reduction of 781 AUMs for approximately 70 years **and 32 AUMs permanently from the development of the open pit.** According to the Nevada Grazing Statistics Report and Economic Analysis for Federal Lands in Nevada (Resource Concepts, Inc. 2001), the **total economic impact associated with each AUM equals \$53.40 (1999 dollars) (\$73.75 in 2012 dollars) annually. This value specifically estimates the direct, indirect, and induced impacts of industry output and added value of grazing in Nevada. Applying this value to the AUMs permanently and temporarily displaced under the Proposed Action, the total economic impact could be an annual reduction of \$41,705 (1999 dollars) (\$57,597 in 2012 dollars). This would be a \$15,539 (1999 dollars) (\$21,460 2012 dollars) impact resulting from displaced Romano Allotment AUMs and a \$26,166 (1999 dollars) (\$36,137 2012 dollars) impact resulting from displaced Roberts Mountain Allotment AUMs. While the impact may not be significant to the ranching community, the impact may be meaningful to individual ranch operations. However, it is important to note that this impact reflects the total economic impact, not lost revenue for specific operators. The subsequent two paragraphs describe in greater detail the economic impact to grazing investigated in the Nevada Grazing Statistics Report and Economic Analysis for Federal Lands in Nevada Report.**

The direct industry impacts to Nevada's economy from one AUM are estimated to be \$24.40 based on the total production value of grazing divided by the total AUMs. Indirect and induced impacts to the industry, estimated at \$16.00 per AUM, occur throughout the economy as a result

of providing goods and services to the livestock industry and include other industrial sectors such as crops, construction, manufacturing, transportation, communication, utilities, and trade and services. Induced impacts include those caused by household consumption as a result of the direct and indirect impacts. In total, industry impacts were estimated to equal \$40.40 per AUM (1999 dollars).

The labor income impact estimates (total \$7.40 per AUM) are based on the wages and salaries of workers and proprietors' income. Total value-added impacts (\$13.00 per AUM) include impacts to wages and salaries, proprietors' income, other property income (i.e., interest, rent, royalties), and indirect business taxes (1999 dollars). Employment impacts based on \$24.40 direct industry impacts are too small to have any impact based on one AUM.

Based on the estimated direct, indirect, and induced economic impacts of one AUM (\$53.40), the economic value of the 781 AUMs reduced during the life of the Project equates to \$41,705.40 per year, or in sum \$2,919,378.00 over approximately 70 years. This represents approximately 2.7 percent of the economic value of all the allotments affected by the Project. The permanent loss of 32 AUMs (valued at \$1,708.80 annually **in 1999 dollars**) represents less than one percent of all allotments affected by the Project and, therefore, is considered a minor impact on the long-term Eureka County grazing economy.

Table 3.12-2 includes the active preference before and during the Project for the affected allotments. The loss of 781 AUMs represents 2.7 percent of the active grazing preference for the allotments in the Project Area.

- **Impact 3.12.3.3-1: Project development and operation under the Proposed Action would result in the permanent loss of 32 AUMs and the loss of 781 AUMs for approximately 70 years from allotments within the fenced Project Area.**

Significance of the Impact: The impact is considered potentially significant.

No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures. Also see Section 3.26 for suggested mitigation outside of the BLM's jurisdiction.

The 14,204-acre enclosure would not impact AUMs within the 3 Bars, Santa Fe/Ferguson, or Lucky C Allotments; however, portions of these allotments could **sustain** potential impacts to AUMs due to the possible impacts to forage in the phreatophyte vegetation community related to ground water drawdown. **Figure 3.12.1 illustrates the location of phreatophytes relative to the allotments within the Project Area boundary and the ten-foot drawdown contour. There are no phreatophytes on private land within the ten-foot drawdown.**

Ground water drawdown could result in a change from phreatophytes to another vegetation community composed of plant species that do not have long roots that reach down to the water table that would still provide forage for livestock. **Impacts are not expected to other vegetation communities that do not rely on the direct connection to ground water.** Additionally, reseeding mitigation proposed in Section 3.11.3 would ensure the availability of forage for livestock in areas identified by the BLM. **Following reseeding, the BLM would evaluate and determine if there is a need to suspend livestock grazing for two years or until the objectives of the seeding are met. The BLM would utilize rangeland standards as a goal**