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

Preliminary Environmental Assessment

Target 3 Project
Marigold Mining Company
DOI-BLM-NV-W010–2013–0018–EA

August 2013

Marigold Mine (June 2013)

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Prepared by
U.S. Department of the Interior
Bureau of Land Management
Winnemucca District Office
Humboldt River Field Office
Winnemucca, Nevada

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ACRONYMS

°F:	Degrees Fahrenheit
2001 FEIS:	2001 Final Environmental Impact Statement
2003 FEIS:	2003 Final Environmental Impact Statement
2005 EA:	2005 Environmental Assessment
ABA:	Acid-Base Accounting
ACEC:	Area of Critical Environmental Concern
ACHP:	Advisory Council on Historic Preservation
ACOE:	United States Army Corps of Engineers
AIRFA:	American Indian Religious Freedom Act of 1978
AMSL:	above mean sea level
ARPA :	Archaeological Resources Protection Act of 1979
AUM:	Animal Unit Month
BAQP:	Bureau of Air Quality Planning
BLM:	Bureau of Land Management
BMRR:	Bureau of Mining Regulation and Reclamation
CAA:	Clean Air Act
CEQ:	Council on Environmental Quality
CERCLA:	Comprehensive Environmental Response, Compensation, and Liability Act
CESA:	Cumulative Effects Study Area
CFR:	Code of Federal Regulations
CO_2e:	Carbon Dioxide Equivalent
DNA:	Determination of NEPA Adequacy
EA:	Environmental Assessment
EMT:	Emergency Medical Technician
EPA:	Environmental Protection Agency
EPM :	Environmental Protection Measure
ERP:	Emergency Response Plan

ESA:	Endangered Species Act
FLPMA:	Federal Land Policy and Management Act
GBE:	Great Basin Ecology, Inc.
GHG:	Greenhouse Gas
GIS:	Geographic Information System
GMMC:	Glamis Marigold Mining Company
H:	horizontal
HAP:	Hazardous Air Pollutants
HCSO:	Humboldt County Sheriff's Office
HMA:	Herd Management Area
HRFO:	Humboldt River Field Office
I-80:	Interstate 80
IM:	Instruction Memorandum
KOP:	Key Observation Point
LR2000:	BLM's Land and Mineral Legacy Rehost 2000 System
MBTA:	Migratory Bird Treaty Act
mg/L:	Milligrams Per Liter
MMC:	Marigold Mining Company
MOU:	Memorandum of Understanding
mS/cm3:	Millisiemens Per Cubic Centimeter
MSHA:	Mine Safety and Health Administration
MWMP:	Meteoric Water Mobility Procedure
NAAQS:	National Ambient Air Quality Standards
NAC:	Nevada Administrative Code
NAGPRA:	Native American Graves Protection and Repatriation Act of 1990
NDEP:	Nevada Division of Environmental Protection
NDOT:	Nevada Department of Transportation
NDOW:	Nevada Department of Wildlife
NDWR:	Nevada Division of Water Resources

NEPA:	National Environmental Policy Act of 1969
NESHAP:	National Emissions Standards for Hazardous Air Pollutants
NHPA:	National Historic Preservation Act of 1966
NNHP:	Nevada Natural Heritage Program
NRHP:	National Register of Historic Places
NRS:	Nevada Revised Statutes
NSHPO:	Nevada State Historic Preservation Office
NSPS:	New Source Performance Standards
NVMA:	Nevada Mining Association
OHV:	Off-Highway vehicle
OSHA:	Occupational Safety and Health Administration
p.z.:	Precipitation Zone
PFYC:	Potential Fossil Yield Classification
PGH:	Preliminary General Habitat
Plan:	Plan of Operations (NVN-065034)
PM_{10}:	Particulate Matter 10 Microns in Diameter
$PM_{2..5}$:	Particulate Matter 2.5 Microns in Diameter
ppb:	Parts Per Billion
PPH:	Preliminary Priority Habitat
ppm:	Parts Per Million
PSD:	Prevention of Significant Deterioration
RCRA:	Resource Conservation and Recovery Act
RFFAs:	reasonably foreseeable future actions
ROD:	Record of Decision
ROW:	Right-of-Way
SGMFP:	Sonoma-Gerlach Management Framework Plan
SHPO:	State Historic Preservation Office
SIL:	Significant Impact Levels
Sulfide Plan:	Marigold Mine Sulfide Management Plan

T/kT CaCO3:	Tons Per Kilotons of Calcium Carbonate
TCP:	Traditional Cultural Property
TDS:	Total Dissolved Solids
TSP:	Total Suspended Particulate
USFS:	United States Forest Service
USFWS:	United States Fish and Wildlife Service
VFD:	Volunteer Fire Department
VRM:	Visual Resource Management
WD:	Winnemucca District
WOUS:	Waters of the United States
WRSA:	Waste Rock Storage Area
WSA:	Wilderness Study Area
WWTF:	Wastewater Treatment Facility
$\mu g/m^3$:	Micrograms Per Cubic Meter

Chapter 1. Introduction

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1.1. Identifying Information

1.1.1. Title, EA number, and type of project

Target 3 Project for the Marigold Mining Company

DOI-BLM-NV-W010-2013-0018-EA

1.1.2. Location of Proposed Action

The Proposed Action is located in all or portions of the following sections as provided in Mount Diablo Base and Meridian; Humboldt County, Nevada:

- Township 34 North (T.34N.), Range 43 East (R.43E.), section (sec.) 19, 20, 28, 29, 30, 31, 32, and 33;
- T.34N., R.42E., sec. 36;
- T.33N., R.43E., sec. 4, 5, 6, 7, 8, 9, 10, 16, 17, 18, 19, 20, 30, 31, and 32;
- T.33N., R.42E., sec. 1, 12, 13, 24, 25, and 36; and
- T.32N., R.43E., sec. 6.

1.1.3. Name and Location of Preparing Office

Bureau of Land Management, Winnemucca District, Humboldt River Field Office: 5100 East Winnemucca Blvd., Winnemucca, Nevada 89445.

1.1.4. Identify the subject function code, lease, serial, or case file number

Subject Function Code: 3809

Serial#: NVN-065034

1.1.5. Applicant Name

Gold Corp Inc., doing business as Marigold Mining Company.

1.2. Introduction

Marigold Mining Company (MMC) operates the Marigold Mine located approximately three miles south of Valmy in the southern portion of Humboldt County, Nevada (Map 1: Project Location). MMC has submitted an amendment to the Plan of Operations (NVN-065034) (Plan) for the Target 3 Project to the Bureau of Land Management (BLM) Winnemucca District (WD), Humboldt River Field Office (HRFO).

The original Plan for the Marigold Mine was authorized by the BLM in a Record of Decision (ROD) in July 1988. Since that time, several amendments leading to the current authorized operations were analyzed in numerous National Environmental Policy Act of 1969 (NEPA) documents and other documents demonstrating a Determination of NEPA Adequacy (DNA) as identified in Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy".

MMC's mine operations occur within the authorized Plan boundary, which consists of an area of approximately 8,543.5 acres. This area is herein referred to as the "authorized Plan boundary". Within this area, MMC is authorized to construct facilities on 2,371.9 acres of private land and 2,071.1 acres of public land for an authorized mine disturbance of 4,443 acres. The mine is located within the checkerboard pattern of alternating public land and private land (Map 2: Land Ownership Status). The authorized mining operations consist of multiple open pits, heap leach facilities, waste rock storage areas (WRSA), and precious metal recovery facilities (Map 3: Authorized Facilities).

To optimize permitting and exploration activities, MMC proposes to expand the authorized Plan boundary to incorporate all MMC land-holdings. MMCs land holdings include lands administered by the HRFO as well as privately owned lands. MMC owns or manages the majority of the mining claims on approximately 8,320 acres of private land and 10,480 acres of public land for a total of 18,800 acres around the Marigold Mine. MMC does not own or manage the 80-acre private parcel in T.33N., R.43E., sec. 30, which is surrounded by MMCs holdings (Map 2: Land Ownership Status).

MMC proposes to expand the authorized surface disturbance by an additional 387.2 acres. Approximately 296 acres would be located on private land managed by MMC, and approximately 91.2 acres would be located on public land managed by the BLM HRFO (Map 4: Proposed Surface Disturbance). MMC proposes to amend the existing mining operations to include mining the Target 3 Pit, expand the existing North-West WRSA, relocate a portion of the Trout Creek diversion channel, add a new utility transmission line on the west side of the property near the western edge of the Terry Zone north pit, and add additional acres for infill. The Proposed Action with the authorized facilities is shown on Map 5: Proposed Action with Authorized Facilities.

MMC's proposed amendment to the Plan must meet requirements contained in the Code of Federal Regulations (CFR), specifically the Surface Management Regulations at 43 CFR 3809. BLM's decision regarding the Proposed Action must also conform to the requirements of NEPA, and be consistent with the Sonoma-Gerlach Management Framework Plan (SGMFP) (BLM 1982). Based on a review of potential environmental effects that could result from implementation of the Proposed Action, the BLM has determined an Environmental Assessment (EA) is appropriate to disclose and evaluate the direct, indirect, and cumulative impacts of the Proposed Action and the alternatives to resources present. This EA was prepared in order to determine whether the impacts of the Proposed Action would have significant effects. Any additional environmental concerns, interests, resource values, or circumstances that have arisen since the publication of the previous NEPA analyses will be identified in this EA and analyzed to determine the impacts of the Proposed Action.

MMC's proposed amendment must also meet requirements of the State of Nevada as administered by the Bureau of Mining Regulation and Reclamation (BMRR), Nevada Division of Environmental Protection (NDEP). The BMRR, in cooperation with other state, federal, and local agencies, regulates mining activities in Nevada under regulations adopted in 1989. The

Nevada Administrative Code (NAC) 445A.350-445A.447 and NAC 519A.010-519A.415 were developed to implement requirements of Nevada Revised Statutes (NRS) 445A.300-445A.730 and NRS 519A.010-519A.290.

This document is compiled in accordance with regulations promulgated by the Council on Environmental Quality (CEQ) for implementing procedural provisions of NEPA (40 CFR 1500-1508) and BLM's NEPA Handbook (H-1790-1).

1.3. Purpose and Need for Action

The purpose of the Proposed Action is to provide MMC the opportunity to expand mining operations at the Marigold Mine, to extract economically recoverable gold reserves in the authorized pits, and to develop additional gold reserves in the proposed Target 3 Pit.

The need for action is established by BLM's responsibility under the 2008 Energy and Mineral Policy, Federal Land Policy and Management Act of 1976, BLM Surface Management Regulations in 43 CFR 3809, and Section 302(b) of the General Mining Law of 1872, as amended, to respond to a plan of operations and to take any action necessary to prevent unnecessary or undue degradation of public land administered by the BLM.

Decision to be Made

The BLM will decide whether to authorize the Plan amendment as proposed or as described in any alternative to the Proposed Action, or to not approve the Plan per 43 CFR 3809.411. The BLM's authorization may include conditions of approval and any additional mitigation measures identified through this analysis in order to prevent unnecessary or undue degradation of public lands, protect sensitive resource values, and provide for reclamation of disturbed areas.

1.4. Scoping, Public Involvement and Issues

The internal scoping process began with a BLM interdisciplinary team meeting that was held on January 9, 2013, in order to define issues, alternatives, and data needs.

External scoping was conducted to identify and refine key issues for this EA. The BLM sent a Dear Interested Party Letter describing the Proposed Action to a mailing list of potentially interested members of the public on December 19, 2012. The scoping letter and figure were also accessible through the BLM's WD NEPA website (http://www.blm.gov/nv/st/en/fo/wfo/blm_information/nepa0.html). The Humboldt Sun newspaper posted an article in the January 11 through 14, 2013, edition in which the BLM asked for input on the Marigold Mine expansion. The scoping letter, website posting, and newspaper article requested comments be sent to the BLM through January 19, 2013.

One comment letter from the Humboldt County Board of Commissioners supporting the Proposed Action was received by the BLM during the scoping period supporting the Proposed Action.

As a result of the scoping process, the following issues pertaining to the Proposed Action were identified by the BLM interdisciplinary team:

- How would air quality in the vicinity of the area be impacted?
- Would cultural resources in the area be impacted?
- Would Native American religious concerns be affected?
- Are there any threatened or endangered plant or animal species in the area, and if so how would they be impacted?
- Would the Proposed Action increase the presence of, or spread, noxious weeds or invasive and non-native plant species?
- Would the quality or quantity of surface water be impacted?
- Are there any wetlands or riparian zones impacted by the Proposed Action?
- Would social values and the local economy be impacted?
- Would there be conflicts with any existing rights-of-way due to the proposed utility corridor for the project?
- Do any conflicts exist with the livestock grazing permittee in the area?
- Would soils be impacted?
- Are there any BLM sensitive species in the area? If so, how would they be impacted?
- How much vegetation would be removed from the area? How would reclamation alleviate this impact?
- Would the Proposed Action be in conformance with the current visual resource management class established for the area?
- How would wildlife habitat be impacted?

1.5. Past NEPA Actions And Other Applicable Permits

On April 15, 1988, Rayrock submitted a Plan of Operation for operation of a new mine. This Plan was assigned plan number N26-88-005P and serial number NVN-065034. Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy" lists the Plan (3809 minerals) and NEPA actions that were generated with expansion of the mine. Other significant non-BLM permits for the Marigold Mine are listed in Table 1.2, "Summary of Significant Federal, State, and County Permits".

Table 1.1. Marigold Mine NEPA Documents and Documentation of NEPA Adequacy

Amend #	Action	Brief Description	Decision Date	NEPA Number (If Applicable)
	Marigold Mining Project EA	New open pit mine	07/21/1988	NV-020-08-32-EA
1	DNA	Move 2,000 tons of heap material from test facility operated by True North, Inc. under Notice N26-81-129N to the Marigold Mine heap leach pad; no new authorized disturbance.	07/14/1992	
2	DNA	Expansion of East Hill Pit design; addition of haul roads; authorized disturbance increased by 53.5 acres.	01/05/1993	
3	DNA	Additional drilling to define ore reserves in the Red Rock ore body; authorized disturbance increased by 2 acres.	01/06/1993	
4	DNA	Expansions of East Hill and Top Zone pits; Addition of Red Hill Pit; expands the authorized Plan boundary to allow additional exploration drilling; adds paleontological supplement to EA; authorized disturbance increased by 280 acres; expansion within area previously analyzed by NV-020-08-32-EA.	11/16/1993	
5	DNA	Construction of a stormwater/process solution storage pond; authorized disturbance increased by 2 acres.	09/26/1995	
6	DNA	Installation of a test bio-leach facility, widening of haul road accessing the Top Zone Pit, and conversion of the cyanide system from a dry briquette to a liquid cyanide; authorized disturbance increased by 1.4 acres.	02/23/1996	NV-020 -96 DNA 06
7	Minor Amendment	Existing Occupancy Form Filed	10/15/1996	
8	Resort Project EA	Expansion of the East Hill, Top Zone and Red Rock pits, expansion of the Top Zone overburden stockpile, two new overburden stockpiles (Resort and Old Marigold), expansion of the heap leach facility, modification of the tailings impoundment, development of an additional water supply system, partial backfill of the Red Rock Pit, stabilization of the Trout Creek diversions, and other ancillary facilities. Authorized disturbance increased by 326 acres.	07/03/1997	NV-020-07-20-EA
9	Old Marigold Pit Project Supplemental EA	Addition of a new pit (old Marigold), partial backfilling of the Top Zone, 8-South, and East Hill pits, complete backfilling of the Old Marigold Pit; authorized disturbance would not increase due to deferment of previously permitted acreage in the Red Rock Pit. East Hill Pit backfill conditionally approved pending additional geochemical testing.	05/22/1998	NV-020-08-23-EA
10	Minor Amendment	Approval of East Hill North Pit backfill.	06/21/1999	
	Change of Operator	Rayrock to Glamis Marigold Mining Company (GMMC)	08/24/1999	
11	East Side Leach Pad Modification DNA	Expansion of the existing heap leach pad, Cells 3 through 7. Expansion would occur on the east side of the heap leach. Plan modification submitted June 22, 2000.	07/21/2000	NV-020-00-DNA-68

Amend #	Action	Brief Description	Decision Date	NEPA Number (If Applicable)
12	Millennium Expansion EIS	Expansion of the Red Rock and Top Zone pit, new pits (5-North and 8-North), expansion of two WRSAs and two new WRSAs, expansion and new heap leach facilities, expansion and/or new tailings impoundment and miscellaneous ancillary facilities, and exploration disturbance. Authorized disturbance increased by 717 acres. EIS initiated 09/09/1988.	09/21/2001	Draft EIS - January 2000 – BLM/WN/PL-00/003+1610 Published 02/11/2000 Final EIS – March 2001 – BLM/WN/PL-01/009+1610 Published 03/09/2001. ROD signed 09/21/2001
13	Groundwater Monitoring Wells DNA	Addition of three groundwater monitoring wells	12/13/2001	NV-020-02-DNA-10
14	Minor Amendment and DNA	Construct Cell 11 of the heap leach pad; increase the height of the heaps from 160 to 300 feet; increase the heap leach capacity; backfill the 8-South Pit; reduce the footprint of the Resort WRSA from 173 to 80 acres; construct a groundwater monitoring well in Section 30; increase the mining rate from 1.7 million tons/month to ~2.5 million tons/month; augment the existing equipment fleet; construct an internal power line; increase the workforce; and increase bonding.	Approve Minor Amendment: 03/25/2002 Approve DNA: 03/27/2002	NV-020-02-DNA-21
15	Minor Modification and DNA for Valmy Backfill	Additional mining and backfill in the 8-South Pit	Approve DNA: 04/16/2003 Approve Minor Amendment: 05/07/2003	NV-020-03-DNA -09

Amend #	Action	Brief Description	Decision Date	NEPA Number (If Applicable)
16	SEIS for Millennium Expansion	SEIS initiated due to revised POO that did not match EIS. SEIS initiated 02/14/2002. Expansion of two pits, five new pits, expansion of one WRSA, three new WRSA, expansion of heap leach facility, two new heap leach facilities, and miscellaneous new ancillary facilities. Authorized disturbance increased by 1474 acres. Appeal filed by Western Exploration, Inc. and Doby George L.L.C. IBLA No. 2004-134.	02/04/2004 Appealed 03/04/2004; Dismissed 04/16/2004	Draft EIS - April 2003 – BLM/NV/PL-03/006+1610 Published April 4, 2003 Final EIS – December 2003 - BLM/NV/PL-04/02+1610, Published December 5, 2003 ROD signed 02/04/2004
17	DNA	Expand the East Hill Pit; relocate the fresh water storage pond and a topsoil stockpile; construct a new shop building; add a fresh water storage tank; perform maintenance on one mile of a BLM road. New disturbance on public land is ~43 acres.	06/21/2004	NV-020-04-DNA-29
18	Minor Amendment	Relocate approved support facilities area from Section 31 NE to Section 20SW.	12/27/2004	
19	West Marigold Expansion EA	Expand the Terry Zone, East Hill and Marigold pits; New Terry Zone North Pit; expand two WRSA, construct a new heap leach pad, construct a new process pond, alter the existing diversion for Trout Creek; divert Cottonwood Creek. New disturbance would be 987 acres with 579 acres on public land. EA initiated 09/14/2004.	10/31/2005	NV-020-05-EA-11
20	Minor Amendment and DNA	Backfill the Antler Pit; relocate an approved leach pad; relocate and widen an access road/haul road/utility corridor; add an additional 14 acres to the heap leach pad (re-leach pad); add Cell 14 to the heap leach pad. Disturbance increased by 14 acres with ~10 acres on public lands.	03/31/2006	NV-020-06-DNA-06
21	Minor Amendment and DNA of October 2006	Increase heap leach solution application rate from the existing authorized 6,000 gpm to 10,500 gpm. GMMC has sufficient water supply to meet the increase. Additional 39 acres of ET cells have been proposed for heap leach closure. No increase in disturbance proposed.	11/22/2006	NV-020-07-DNA-04
	Name Change	GMMC to MMC	03/30/2007	
22	Minor Amendment	Relocate groundwater monitoring well MPS 6-1 approximately 1,000 feet east of currently authorized location.	04/05/2007	
23	Minor Amendment and DNA	Relocate authorized Heap Leach Cell 15 to an area already authorized for disturbance as the Resort Waste Rock Dump and Infill Areas.	07/17/2008	NV-020-08-DNA-45

Amend #	Action	Brief Description	Decision Date	NEPA Number (If Applicable)
24	Minor Amendment and DNA	Amend cultural mitigation for Site CrNV-21-7476 from avoidance to data collection.	09/15/2008	NV-020-08-DNA-51
25	Antler Pit Diversion Extension DNA	Extend the stormwater diversion at the southern end of the Antler Pit ~500 feet.	01/29/2009	LLNV-W01000-2009-0009-DNA
26	DNA	Reconfigure Target 2 Pit; backfill Basalt and Mackay pits; reshape Heap Leach Cells 16 and 17; relocate the 5-North pad; relocate a permitted but not constructed growth media stockpile; relocate and re-leach material from Heap Leach Cells 1, 2, 7 and 8; re-line Heap Leach Cells 1, 2, 7 and 8 to meet current standards; expand Heap Leach Cell 11; create a runaway truck ramp; change fleet equipment; increase mining rate from 50 million tons per year to 60 million tons per year; convert ~49 acres of disturbance authorized for growth media and tailings disposal to exploration disturbance. No increase in disturbance proposed.	03/04/2010	DOI-BLM-NV-W010-2010-0004-DNA
27	Minor Amendment	Reslope ~2.4 acres along the east wall of the Basalt Pit to remove surface cracks that have developed above the pit. The pit boundary would be modified so that no new disturbance would occur.	06/04/2010	
28	Minor Amendment	Construct Heap Leach Cell 16; construct a process water pond; install a carbon tank set. Total increase in disturbance includes 57 acres on public land.	02/08/2011	
29	Ephemeral Drainage Management Minor Amendment	Amend the previously authorized stormwater diversion and management structures for Trout Creek; expand the North-West WRSA; amend the authorized Plan boundary; and begin mining in the Target 2 Pit. No increase in disturbance proposed.	06/01/2011	

Table 1.2. Summary of Significant Federal, State, and County Permits

Permit	Expiration Date	Number	Comments
NDEP – BMRR Water Pollution Control Permit	March 2012	NEV88040	-
NDEP – Bureau of Air Quality Air Quality Operating Permit	March 2011	AP1040-0158	Renewal under review
Nevada Department of Wildlife Artificial Industrial Pond Permit	July 31, 2018	S230629	-
NDEP – Bureau of Water Pollution Control General Stormwater Permit	August 2014	NVR 300000	-

1.6. Authorized Facilities

Large-scale mining operations began at MMC in 1988 and continued uninterrupted to the present. Mining activities occur seven days per week, 24 hours a day. Authorization of mining activities was approved through several Plan amendments and related NEPA actions. Authorized mining operation facilities and activities include open pits, WRSAs, pit backfill, heap leach pads and processing areas, plant and general site structures, haul and access roads surface water diversion structures, water supply facilities, and exploration. Although activities have been authorized, several have yet to be developed. Facilities authorized but not fully constructed include:

- 5-North Pit and associated WRSA on private land;
- 8-Pit (includes 8 North and 8 South);
- Terry Zone North Pit;
- Buffalo Valley Road realignment; and
- Heap leach facility in T.32N., R.43E., sections 19 and 30.

Open Pit Facilities

There have been multiple open pits permitted at the Marigold Mine since its inception, several of which have been consolidated under previous NEPA actions. Authorized pits and associated names are presented in Table 1.3, “Authorized Open Pit Parameters”. Pits that have been authorized but not fully constructed include 8-Pit, Terry Zone North Pit, and 5-North Pit. Both 8-Pit and Terry Zone North Pit have been partially mined with most of their authorized footprint cleared and grubbed. No mining activities have been initiated at the authorized 5-North Pit area.

Ore and waste rock are drilled, blasted, loaded by wheeled loaders or power shovels into trucks, and hauled to appropriate facilities. Material is typically mined on 20- to 40-foot benches, and the slope angles in the open pits range from 34 to 55 degrees depending on rock types and geologic structures within the pit. Maintenance personnel work two shifts per day whereas the truck operators work three shifts per day.

Table 1.3. Authorized Open Pit Parameters

Open Pit	Approximate Length	Approximate Width	Depth to Pit Floor	Pit Floor (feet AMSL)
8-Pit (includes 8 North and 8 South)	4,800	1,600	430	4,440
5-North Pit	1,400	1,050	410	4,450
East Hill Pit (includes Red Rock, Top Zone, and Mackay)	5,000	1,500	850	4,550
Target 1 Pit	1,500	500	200	5,300
Target 2 Pit	3,400	1,800	480	5,020
Antler Pit	2,625	1,380	600	5,180
Basalt Pit	3,975	1,925	840	5,220
Terry Zone North Pit (includes Old Marigold)	2,500	2,400	500	4,470

AMSL = Above Mean Sea Level

Pit Backfill

NDEP and BLM approved a flexible pit backfill approval process (BLM 2001 and 2003), which requires the following documentation to be submitted to NDEP and BLM prior to backfilling:

- Source of the material to be used as backfill;
- Material testing for Acid Base Accounting and Meteoric Water Mobility Procedure (MWMP) and kinetic testing, if necessary;
- Bottom elevation of the pit to be backfilled; and
- The elevation of the 1992 Lone Tree Mine pre-dewatering water table beneath the pit.

Currently, pit backfilling is approved for all authorized pits. As noted in previous NEPA documents, 8-Pit and Terry Zone North Pit may intersect the 1992 Lone Tree Mine pre-dewatering water table and will be partially backfilled to an elevation that would preclude the formation of pit lakes. Terry Zone North Pit has not yet been constructed; the southern portion of 8-Pit has been constructed and is partially backfilled.

The Target 1 and Target 2 pits are authorized for complete backfill with expansion of the north, south, and west WRSA to form a continuous WRSA over the backfilled Target 1 and 2 pits. Target 1 Pit has been constructed and is partially backfilled; Target 2 Pit is currently being constructed. The Antler and Basalt pits have been authorized to be backfilled and integrated, on the east and south sides, into the South WRSA to approximate the pre-mining surface topography; backfilling in both of these pits is currently occurring.

Waste Rock Storage Areas

There are eight authorized WRSAs at Marigold Mine (Map 3: Authorized Facilities), all of which are partially constructed. WRSAs are created by end dumping onto the active bench face of the storage area at the angle of repose. The WRSAs are typically constructed with average bench heights between 50 and 60 feet and would be reclaimed to an overall side slope of 3H:1V (Horizontal:Vertical). Authorized WRSA parameters are shown in Table 1.4, "Authorized Waste Rock Storage Area Parameters".

Table 1.4. Authorized Waste Rock Storage Area Parameters

Waste Rock Storage Area	Height Elevation (feet)	Approximate Storage Capacity (million tons)
8-Pit (was 8-North and 8-South)	350	136.5
Top Zone	590	30
Old Marigold	590	72
Resort	590	126.7
5-North	200	8.3
North-West	600	150
North-West Expansion	400	85
South	200	5

Heap Leach and Process Facilities

There are two authorized heap leach facilities at Marigold Mine (Map 3: Authorized Facilities), one active and one not constructed. The active heap leach facility consists of 18 leach pad cells and associated solution conveyance ditches and piping. Process facilities consist of process ponds, stormwater ponds, carbon columns and storage tanks, two lime silos, and plant facilities. There are also infill areas associated with process facilities used for such things as equipment parking, access, and fencing. The other authorized heap leach and process facilities (which consists of approximately 195 acres located in T.33N., R.43E., sections 19 and 30) have not yet been constructed; however, this area has been cleared and grubbed.

Infill and Ancillary Areas

Infill and ancillary areas include crushing, operating/maintenance, office, plant facilities and utility corridors at the site. Infill surface disturbance areas are used for access between facilities, disturbance in the course of routine mine construction and operation, and laydown yards for storage of extra pipe, culverts, and other non-hazardous materials during installation, construction, or maintenance activities.

Tailings Facility

An authorized tailings disposal facility (184.4 acres) has been closed and reclaimed. The tailings lines were abandoned and the mill building was closed, sold, and removed from the property in 1999. The tailings area was reclaimed within three years following the closure.

Growth Media Stockpiles

Growth media encountered during mining activities is strategically placed in WRSAs or infill areas for future use during reclamation. The upper part of the soil profile is stripped to a depth of approximately six inches and stockpiled for later reclamation use as a suitable growth media. At present, there are 16 growth media stockpiles, eight of which are located within in-fill areas (Map 3: Authorized Facilities). These stockpiles were placed in close proximity to the areas that were stripped and where they would not be affected by mining activity. Growth media from these stockpiles has been used to reclaim approximately 67 acres of the 8-WRSA. Growth media stockpiles acreage has not changed from previous NEPA document (BLM 2005).

Haul and Access Roads

Roads are associated with access roads, haul roads, and public access. Access roads are located for access to appurtenant structures and facilities necessary for operation of the site, and to allow

the continuation of exploration activities. Haul roads are constructed to connect the pits with authorized and proposed WRSA, leach pads, and ore processing facilities. Access roads are generally constructed to accommodate two-way traffic for the largest anticipated vehicle size. Haul roads are constructed in conformance with Mine Safety and Health Administration (MSHA) regulations. The roads are maintained, as needed. The Buffalo Valley Road has been authorized for realignment to allow continued public access to Buffalo Valley without entering the active mine area; however, this realignment has not yet been constructed. MMC's Trout Creek southern access road crosses Newmont Mining Corporation's Valmy Haul Road (BLM Right-of-Way [ROW] Grant N-59591) in Section 31.

Surface Water Diversion Structures

Surface water diversion structures consist of diversions, sediment traps, ponds, and culverts to route stormwater flow away from project facilities and to slow down storm flow to minimize erosion. Surface disturbance for stormwater diversions are included within the area of disturbance for individual project components such as pits and WRSAs. Stormwater disturbance associated with facilities such as buildings and roads that are located within the infill area are included with the infill area to avoid double counting. Stormwater ponds that are a component of the heap leach facilities are shown as separate line items in Table 1.5, "Authorized Surface Disturbance".

Trout/Cottonwood Creek Drainages and Catchment Area

MMC is currently authorized and has constructed an earthen dam and permanent catchment area within the ephemeral Trout Creek drainage in T.32N., R.43E., sec. 31, approximately one mile below the lower extent of perennial flow in Trout Creek. The catchment area design was presented in detail in the *Marigold Mine Plan of Operations (NVN-065034) and Reclamation Permit (#0108) Ephemeral Drainage Management Amendment* (MMC 2011).

A conservation pool, an area with a capacity of 20 acre-feet, can be maintained via a vertical standpipe with discharge valves that will create a steady conservation pool of water (surface elevation 5,563 feet AMSL). Overflows can flow downstream via a pipeline buried beneath the expanded North-West WRSA. In addition, a hydraulically-activated sluice gate provided on the upstream dam face would allow drainage of the conservation pool. Both the standpipe and the sluice gate can deliver water flows as requested to a downstream water right owner. The catchment area has been designed to contain the runoff from a 100-year, 24-hour storm event. As a contingency for overflow conditions and per state requirements, a diversion structure has been constructed on the west side of the dam. This overflow channel flows to an unnamed drainage in T.33N., R.42E., sec. 25, which is a tributary to Cottonwood Creek.

Water Supply Facilities

The authorized water supply facilities currently consist of three water wells, a freshwater storage tank, freshwater pipeline, a freshwater storage pond, and other miscellaneous storage tanks. The freshwater storage pond is located on infill disturbance, and the storage tanks are located on pit, infill, or WRSA disturbance. A permitted potable water system is in-place and operating.

Exploration

Up to 91.2 acres of exploration activities are currently authorized and occurring within the claims, leases, and property managed by MMC. Associated disturbance includes drill pads, sumps, and access roads to the drill sites. Drill pads and sumps typically have a surface working area

of 40 feet wide by 40 feet long. The total disturbance varies depending on the slopes of the surrounding terrain. Each drill site may be constructed with two mud pits, one for settling drill cuttings and one for settling the mud solid. A berm is typically constructed on the downhill side to provide containment and to prevent runoff from the drill site area. Access roads to the drill sites are typically 16 feet wide with an operating width of 12 feet. Existing roads are used where possible to minimize new disturbance.

Table l.5 summarizes MMC's 4,443 acres of authorized surface disturbance by mine component.

Table 1.5. Authorized Surface Disturbance

Mine Components	Authorized Disturbance		
	Public (acres)	Private (acres)	Total (acres)
Open Pits			
8-Pit (includes 8 North and 8 South)	159	14	173
East Hill Pit (includes Red Rock, Top Zone, and Mackay)	158.5	267.5	426
5-North Pit (not constructed)	0	29	29
Target 1 Pit	19	0	19
Target 2 Pit	93.4	31.6	125
Antler Pit	34	43	77
Basalt Pit	34	140	174
Terry Zone North Pit (includes Old Marigold)	120	114	234
Total Open Pits	**617.9**	**639.1**	**1,257**
Waste Rock Storage Areas			
8 WRSA (was 8-North and 8-South)	164	12	176
Top Zone	67	68	135
Old Marigold	59	23	82
Resort	20.6	177	197.6
5-North	0	55	55
North -West	155	273	428
North-West Expansion	80	68	148
South	53	0	53
Total Waste Rock Storage Areas	**598.6**	**676**	**1274.6**
Heap Leach and Process Facilities			
Heap Leach Pads No. 1-18	281.7	335.7	617.4
Process Ponds	7.1	6	13.1
Stormwater Ponds	3.5	3.5	7
Solution Conveyance Ditch	0	2	2
Carbon Columns & Storage Tanks	1	0	1
Section 30 Leach Pad (not constructed)	112.4	42.6	155
Section 30 Process Ponds (not constructed)	10	2	12
Section 30 Stormwater Ponds (not constructed)	4	0	4
Section 30 ADR Lime Silo/Infill (w/FW Pond) (not constructed)	24	0	24
Total Heap Leach Facilities	**443.7**	**391.8**	**835.5**
InFill and Ancillary Areas			
Total Infill and Ancillary Areas	**210**	**219.1**	**429.1**
Tailings Facilities			
Total Tailings Facilities	**0**	**184.8**	**184.8**
Growth Media Stockpile Areas (external of infill areas)			

Mine Components	Authorized Disturbance		
	Public (acres)	**Private (acres)**	**Total (acres)**
Pre-EIS	5	15	20
5-North	0	5	5
New Tailings	0	8	8
Section 19	0	5	5
Section 16	15	0	15
Old Marigold Area	10	0	10
Terry Zone North Area	5	5	10
8-South Waste Rock Area	0	10	10
Total Growth Media Stockpiles	**35**	**48**	**83**
Haul and Access Roads			
Roads (includes 5-North and Millennium Haul & Employee Access)	96	58	154
Buffalo Valley Road Realignment	5.1	10.1	15.2
Section 36 Newmont Road	1.5	0.3	1.8
Total Haul and Access Roads	**102.6**	**68.4**	**171**
Surface Water Diversion Structures			
Heap Leach - Old Tailings	0.1	2.9	3
SW Heap Leach	5	8	13
Stormwater Ponds	1	2.5	3.5
Trout Creek Water Diversion Structure	2	12	14
Trout/Cottonwood Creek	14.8	31.2	46
Total Surface Water Diversion Structures	**22.9**	**56.6**	**79.5**
Water Supply Facilities			
Water Supply	4	5	9
Lone Tree Water Line	0.1	3.9	4
Millennium Expansion Water Supply (Catchment Area)	14.3	10	24.3
Total Water Supply Facilities	**18.4**	**18.9**	**37.3**
Surface Exploration			
Drill Roads, Pads, and Trenches	22	69.2	91.2
Total Surface Exploration	**22**	**69.2**	**91.2**
Total Mine Components	**2,071.1**	**2,371.9**	**4,443**

Chapter 2. Proposed Action and Alternatives

2.1. Proposed Action

MMC proposes to expand its existing mining operations at the Marigold Mine and to amend the authorized Plan boundary. The Proposed Action would take place within the authorized plan boundary as well as the amended boundary and would consist of the following activities:

- Amend the authorized Plan boundary to coincide with MMC land holdings;
- Amend authorized facility disturbance acreage to reflect ongoing mining operations;
- Add the Target 3 Pit in an area previously authorized for disturbance;
- Amend the authorized surface disturbance within the amended Plan boundary by extending the North-West WRSA expansion and relocating a portion of the Trout Creek diversion channel;
- Amend the authorized surface disturbance within the authorized Plan boundary by constructing a new utility corridor, and adding additional acres of infill;
- Increase the mine material handling rate from 60 million to 150 million tons per year; and
- Increase workforce at Marigold Mine by approximately 10 to 15 percent.

2.1.1. Amend the Authorized Plan Boundary

MMC plans to amend the authorized Plan boundary by an additional 10,537.5 acres. This amended boundary area is herein referred to as the "proposed Plan boundary". The proposed Plan boundary would consist of the authorized Plan boundary (approximately 8,543.5 acres) and the additional 10,537.5 acres for a total of approximately 19,081 acres. The proposed Plan boundary would consist of approximately 10,761 acres of public land and 8,320 acres of private land. MMC manages mining claims on or owns 18,800 acres within the proposed Plan boundary that includes approximately 10,480 acres of public land and 8,320 acres of private land. MMC does not own or manage the 81-acre private parcel in T.33N., R.43E., sec. 30, which is surrounded by MMCs holdings, and MMC does not have claims on or manage an additional 200 acres within the proposed Plan boundary.

2.1.2. Amend Authorized Facility Disturbance

MMC proposes to amend the pit boundaries of the Terry Zone North Pit and East Hill Pit. The ongoing mine operations and smoothing of the pit boundaries would increase the size of the East Hill Pit by approximately 62 acres. The Top Zone, Old Marigold, and Resort WRSAs would be amended to show a decrease in their overall storage capacities of approximately 47.6 acres. The boundary of the North-West WRSA would be amended to show a decrease in storage capacity of approximately 19 acres resulting in a 66.6-acre reduction in WRSAs for authorized facilities. This component of the Proposed Action does not result in any new surface disturbance or constitute a change in the total authorized disturbance or previous NEPA analyses associated with these activities. A summary of the acreages changes associated with this action is presented in Table 2.1, “Proposed Acreage Amendment to Authorized Disturbance”.

The heap leach facility and associated ponds located in T.33N., R.43E., sections 19 and 30 that is known as the Section 30 heap leach facility has not been constructed. The surface area was

cleared and grubbed; however, the heap leach facility and process ponds were never built. MMC proposes to amend this authorization to allow the development of this area for the Target 3 Pit. The Target 3 Pit would be constructed on 150 acres of the 155-acres authorized for the heap leach pad. The five acres not constructed for the heap leach pad, and acres not constructed for the process ponds, stormwater ponds, and ADR lime silo would be amended for use as additional infill acres for equipment parking, storage, and maintenance activities. Adjustments in acres for the heap leach facility are shown in Table 2.1. The net change in amended acreage for the East Hill Pit and Section 30 heap leach facility would be zero.

Table 2.1. Proposed Acreage Amendment to Authorized Disturbance

Mine Component	Authorized Acres	Proposed Acres	Change in Acres
East Hill Pit			
East Hill Pit	426.0	488.0	62.0
Top Zone WRSA	135.0	108.0	-27.0
Old Marigold WRSA	82.0	74.0	-8.0
Resort WRSA	197.6	185.0	-12.6
North-West WRSA	428.0	409.0	-19.0
		Net Change	**-4.6**
Section 30 Heap Leach Facility			
Target 3 Pit	n/a	150.0	150.0
Section 30 Heap Leach Pad	155.0	0.0	-155.0
Section 30 Process Ponds	12.0	0.0	-12.0
Section 30 Stormwater Ponds	4.0	0.0	-4.0
Section 30 ADR Lime Silo and Infill	24.0	0.0	-24.0
Infill (Sections 19 and 20)	0.0	49.6	49.6
		Net Change	**4.6**

2.1.3. Add the Target 3 Pit

MMC proposes to construct the Target 3 Pit, which would be located south of the East Hill Pit and north of the Target 1 Pit as shown on Map 4: Proposed Surface Disturbance. The Target 3 Pit area would merge with the southern boundary of the East Hill Pit and the northern boundary of the Target 1 Pit. The Target 3 Pit would be developed within the 155-acre area analyzed and authorized for the Section 30 heap leach facility (see Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy") as described above and shown in Table 2.1, "Proposed Acreage Amendment to Authorized Disturbance".

The Target 3 Pit would be mined to a depth of approximately 4,680 feet AMSL, which is above the 1992 pre-dewatering water table level estimated at 4,508 feet AMSL. Mining activities would remove an estimated 52 million tons of ore and approximately 190 million tons of waste rock. The ore to waste ratio fluctuates over time; however, would ultimately average 25 percent ore and 75 percent waste rock (MMC 2010). Material would be removed in 80-foot benches. Ore would be processed at the existing Marigold heap leach facilities. Waste rock would be placed in adjacent WRSAs, the North-West expansion WRSA, or used as backfill for adjacent pits. Mining in the Target 3 Pit would be scheduled to begin in the year 2013 and continue for approximately five years. During final reclamation, a portion of the highwall features may remain and the pit may be partially backfilled and reclaimed; however, it would not be reclaimed to post-mining use for livestock grazing. Upon completion of mining, the final reclamation plan for the Target 3 Pit

would be completed pursuant to the final closure plan and schedule submitted to the BLM and NDEP for approval.

Mining processes and activities (e.g. blasting) would be the same as what has been previously authorized at Marigold Mine (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy"). There would be no change in the management and handling of ammonium nitrate stored or transported to the site other than what has already been authorized (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy"). There would be an increase in the amount of ammonium nitrate used for mining activities.

During mining and post-mining, the west perimeter of the Target 3 Pit would be offset from adjacent private land not managed by MMC in Section 30 by construction of a fence and a berm. The fence would be constructed in accordance with approved BLM standards and the berm would be placed between 20 and 30 feet from the pit crest. The fence would be constructed per MSHA and the Nevada Division of Minerals standards.

As a result of public comments for the 2003 Final Supplemental Environmental Impact Statement (2003 FSEIS) (BLM 2003), the February 2004 ROD required MMC to retain a qualified third-party professional engineer to conduct a stability analysis, analyzing the long-term stability of the south Antler Pit wall at specified elevations. Based on the ROD, MMC was required to implement recommendations from the pit stability analysis. MMC has voluntarily conducted a stability analysis for the Target 3 Pit in the area where the final pit wall would be directly adjacent to private property.

A slope stability analysis was performed for the Target 3 Pit west wall (Golder 2011). The proposed pit outline runs adjacent to the private property along the west side of the pit for a length of approximately 2,600 feet with an offset between the pit crest and the property line varying between 50 and 300 feet. The specific technical criteria used in the determination of final gradient and stability of the pit walls are rock type and strength, geological structure, the presence and quantity of ground water, and the results of previous studies and construction. According to the slope stability report, development of the Target 3 Pit would present a low risk of instability to the private property. MMC would take the slope stability and offset recommendations into consideration for the final pit wall design and construction.

2.1.4. Amend the Authorized Surface Disturbance

The following actions and amendment to the Plan would result in new surface disturbance:

- Extend the North-West Expansion WRSA;
- Relocate a portion of the upper Trout Creek diversion channel around the North-West Expansion WRSA;
- Extend the boundary fence around the North-West Expansion WRSA;
- Add a new utility corridor around the west side of the Terry Zone pit; and
- Designate additional acres as infill.

The mine components and surface disturbances associated with the Proposed Action are shown on Map 4: Proposed Surface Disturbance. The proposed acres of new surface disturbance are

shown in Table 2.2. Construction of the boundary fence (approximately 0.5 acres) around the North-West Expansion WRSA is included in the total acres for the North-West Expansion WRSA.

Table 2.2. Proposed New Surface Disturbance

Mine Component	Public Land (acres)	Private Land (acres)	Total (acres)
Temporary Surface Disturbance			
North-West Expansion WRSA	71	288	359
New Utility Corridor	1.3	3.1	4.4
Infill includes portions of areas North of heap leach pad #1-17, between 8-pit and 8-WRSA	14.9	1.6	16.5
Net Total	**87.2**	**292.7**	**379.9**
Permanent Surface Disturbance			
Trout Creek Diversion Channel	4	3.3	7.3
Net Total	**4**	**3.3**	**7.3**
Total Proposed New Surface Disturbance	**91.2**	**296**	**387.2**

North-West Expansion Waste Rock Storage Area

MMC is proposing to expand the North-West WRSA on the west side of the mine into Section 25 toward the Cottonwood Creek ephemeral drainage. The facility edge would be kept at least 100 feet away from the edge of the Cottonwood Creek drainage. Construction of the North-West Expansion WRSA would be carried out using the same techniques and design features described in Section 1.6, "Authorized Facilities" and approved for the other constructed WRSA facilities at the mine (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy"). The proposed maximum height and approximate storage capacity of the North-West Expansion WRSA extension would be 550-feet and 211 million tons.

Waste rock placed on the North-West Expansion WRSA would be from the authorized Target 2 Pit and the proposed Target 3 Pit. Waste rock from the Target 2 Pit and Target 3 Pit would be composed of the same suite of rocks that has been mined in the Basalt, Antler, Target 1, and Terry Zone pits. This waste rock has been characterized as non-acid-generating and sparingly leachable to other materials at the mine and has previously been authorized by the BLM and NDEP for placement in WRSAs and for pit backfill. Dominant waste rock lithologies would be the Valmy and Antler formations. Given the waste characterization results obtained to date from these lithologies, MMC anticipates that the waste rock materials would continue to be non-acid generating (Geomega 2012). Waste rock from the Target 2 Pit and Target 3 Pit would be tested and characterized as previously permitted. If the performance criteria identifies that waste rock has the potential to be acid generating, this material would be managed in accordance with the management requirements of the *Marigold Mine Sulfide Management Plan* (Sulfide Plan) (Appendix A) that was approved by the BLM on May 19, 2000.

The Sulfide Plan has specific testing for Acid Base Accounting, MWMP, and kinetic testing, if necessary. It also includes performance criteria, material management procedures, and reporting requirements. These requirements are to ensure that potential acid generating material is identified prior to being mined, and once identified, managed in accordance with the Sulfide Plan. To date, MMC has not encountered waste rock material requiring management procedures in accordance with the Sulfide Plan requirements.

Boundary Fence

MMC is proposing to extend the existing fence around the North-West Expansion WRSA by approximately 8,300 feet as shown on Map 4: Proposed Surface Disturbance. The fence would meet BLM fence specifications for three strands of barbed wire and one strand of smooth wire at the bottom with 12-inch spacing between the strands. New surface disturbance associated with the boundary fence (approximately 0.5 acres) would be located within the footprint of the North West Expansion WRSA; therefore, this disturbance is included in the total disturbance acres for the North West Expansion WRSA. Areas associated with the North-West Expansion WRSA would be enclosed, and areas within the proposed Plan boundary not associated with the proposed surface disturbance would remain available for livestock use.

Trout Creek Diversion Channel

MMC proposes to re-route a portion of the upper Trout Creek diversion channel around the proposed North-West Expansion WRSA. Outflow would continue to be directed into the Cottonwood Creek drainage in Section 36 as shown on Map 4: Proposed Surface Disturbance. This would allow for more efficient placement of waste rock while maintaining the diversion dam overflow ability. The diversion channel would be constructed to the same specification and design previously approved to accommodate a 100–year, 24–hour storm event (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy").

New Utility Corridor

MMC proposes to construct a new transmission line from an existing substation east of the 8WRSA that would provide power to the western side of the property near the western edge of the Terry Zone North Pit. A 25-foot wide utility corridor would be located around the north side of the mine facilities as shown on Map 4: Proposed Surface Disturbance. A 25 kilovolt single pole overhead transmission line approximately 5.8 miles long would consist of 60-foot treated wood poles. Design and construction of the transmission line would consider Avian Power Line Interaction Committee guidance.

A maintenance road for the transmission line with an operating width of approximately 12 feet wide would run adjacent to the transmission line corridor. Approximately 1.4 miles of an existing road is available for use and approximately 4.4 miles of new road would be required. Maintenance of the transmission line would occur on an as needed basis. Use of the transmission line maintenance road is expected to be infrequent and very short duration.

Infill

Approximately 16.5 acres of new disturbance would be designated for additional infill. These areas include a narrow strip of land between the 8-Pit and 8-WRSA and a portion of the area northeast of the active heap leach facility. These areas would allow for access between facilities, additional storage, and general operational activities.

2.1.5. Increase Mine Material Handling Rate

MMC plans to replace 22 of their older 185-ton diesel trucks with 18 to 22 more efficient 320 ton class diesel electric haul trucks. MMC currently has two 30-cubic yard diesel shovels and two 30-cubic yard loaders. MMC plans to increase the loading efficiency by replacing one of the diesel wheel loaders with an 80-cubic-yard electric shovel and replace the other wheeled loader with

a smaller electric shovel. The efficiency in new equipment is expected to increase the material handling rate from approximately 60 million tons per year to approximately 150 million tons per year. The older diesel powered trucks would be sold or recycled as they are phased out over time.

2.1.6. Workforce

Currently, MMC employs approximately 380 people. There are approximately 345 full-time employees at the Marigold Mine and approximately 35 contractors. The total number of employees fluctuates between 10 to 15 people within any given year. Employees and contractors primarily live in and commute from Battle Mountain, Winnemucca, and Valmy. It is anticipated that activities associated with the Plan would require a 10 to 15 percent increase in the workforce at the Marigold Mine over the life of the project.

2.1.7. Reclamation

Reclamation activities for the Proposed Action would remain the same as those approved in previous NEPA documents (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy") and amendments to the Reclamation Plan (BLM 2001, 2003, and 2005). The goals and objectives for final closure and reclamation would remain the same. Reclamation procedures for open pits, WRSAs, roads, utilities, and water diversion structures identified in the Proposed Action would be the same as those described in the approved Reclamation Plan. Reclamation monitoring and maintenance would remain the same. Reclamation activities previously approved are summarized below as they pertain to the Proposed Action.

Site reclamation would continue to be completed to the standards described in 43 CFR 3809.420 and NAC 519A as well as the existing reclamation permit for MMC. Reclamation would meet the reclamation objectives as outlined in the *United States Department of the Interior Solid Minerals Reclamation Handbook #H-3042-1* (BLM 1992), Surface Management of Mining Operations Handbook H-3809-1 (BLM 1989), and revegetation success standards per BLM/NDEP *Revised Guidelines for Successful Mining and Exploration Revegetation* (BLM 1999).

Open Pits

The objective of mine pit reclamation is to create safe and stable topographic features. Following the completion of mining, in-pit benches, highwalls, and haul roads would be left in place for pits not backfilled. Post-mining safety barriers (e.g., berms, fencing, or other appropriate barriers) would be installed peripherally to the crest of the Target 3 Pit (based on predicted wall stability at the time of closure) to control access by people, livestock, and most wildlife. Pit ramps would be barricaded in a similar manner to prevent entrance. Some barriers may be installed earlier in the mining operation when access is readily available. Stormwater runoff would be diverted around each pit, if necessary, by stormwater controls.

Waste Rock Storage Areas

Upon final mine closure, the North-West Expansion WRSA would be regraded to approximately 3H:1V slopes, recontoured, and crowned to prevent water ponding. Perimeters would be irregular to allow blending with the existing topography and to break up long, linear features. Large boulders encountered during mining would be placed strategically to provide wildlife habitat, and patches of bare, loose rock may be used to visually simulate adjacent natural conditions. The WRSA flat benches would be ripped and/or scarified to produce a rough surface for anchoring

of reapplied growth media. Growth media of at least six inches in depth would be distributed on the tops and portions of the WRSA slopes. Disturbed areas would be reseeded with the approved seed mix.

Road Features

Roads with compacted surfaces, would be ripped, scarified, and revegetated. Roads would be contoured to blend in with the surrounding terrain. Culverts and other water diversion structures would be removed and the natural drainage patterns restored. Waterbars or other structures may be left in place to reduce undue erosion.

Disposition of Support Facilities

Power lines and electric systems not required for post-mining use would be removed and disposed of. Following removal, the ground surface would be recontoured, prepared, and seeded. This includes approximately 5.8 miles for the proposed new transmission line and its 4.4 acres of associated new disturbance.

Facilities not Subject to Reclamation

The following mine components would not be subject to post-mining reclamation:

- Electric power lines and substations, communication systems, or equipment necessary for post-mining uses. The need for these systems would be coordinated with the utility provider, private land owner and BLM; and
- Trout Creek and Cottonwood Creek channel diversions would remain as permanent features.

Growth Media / Soil Balance

Growth media (i.e., alluvial material) would continue to be salvaged during development of the Target 3 Pit, and construction of the North-West Expansion WRSAs for subsequent use in reclamation. The salvage of growth media and reclamation procedures are expected to remain the same as approved in previous Plans and NEPA documents (BLM 2001). The upper part of the soil profile would be stripped to a depth of approximately six inches, placed in stockpiles within designated areas such as the WRSAs, and would be located such that mining operations would not disturb the stockpiles. To minimize wind and water erosion, the stockpiles would be recontoured to slopes of approximately 2.5H:1V and seeded with an interim seed mix shown in Table 2.3. Diversion channels and/or berms would be constructed around the stockpiles, as needed, to prevent erosion from overland runoff. Environmental Protection Measures (EPMs) (e.g., silt fences or staked weed-free straw bales) also would be used, as necessary, to control sediment transport (Section 2.1.8, "Environmental Protection Measures"). Alternatively, the growth media may be transported to, and redistributed on mine-related surface disturbance areas undergoing concurrent reclamation (e.g., WRSAs).

Table 2.3. Interim Reclamation Seed Mix

Species	Common Name	Pure Live Seed (pounds per acre)
Agropyron cristatum	Crested wheatgrass	7.0
Achnatherum hymenoides	Indian ricegrass	3.5
Atriplex confertifolia	Shadscale saltbush	3.5

Based on BLM and NDEP requirements and reclamation experience at the existing facilities, the proposed growth media/alluvial replacement depth for the mine facilities (with the exception of the open pits) would be a minimum of approximately six inches.

Following placement of growth media, EPMs for erosion control (e.g., silt fences or staked weed-free straw bales) (Section 2.1.8) would be installed and maintained to minimize erosion from the facilities until vegetation has been re-established.

Revegetation, Seeding, and Planting

Revegetation of disturbance areas would be conducted as soon as practical to reduce the potential for wind and water erosion. Following construction activities, areas such as cut-and-fill embankments and growth media stockpiles would be seeded. Concurrent reclamation would be conducted to the extent practical and safe to accelerate revegetation of disturbance areas. Sediment and erosion control measures and revegetated areas would be inspected periodically to ensure long-term erosion control and successful reclamation.

Reclamation would be completed to control runoff, reduce erosion, provide forage for wildlife and livestock, and reduce visual impacts. Prior to seeding, disturbance areas would be recontoured, surfaces would be ripped or scarified (where conditions warrant), and growth media would be redistributed. Following the placement of growth media, the final surface would be contour scarified, where conditions warrant, to promote water retention, reduce erosion, and prepare the final seed bed. Seedbed preparation may be performed immediately prior to seeding to allow seed placement prior to soil re-compaction. Seedbed preparation and seeding would typically be conducted in the fall to take advantage of winter and spring moisture.

Seeding would be conducted by a number of methods (e.g., rangeland drill, mechanical broadcast seeder and harrow, hydroseeding, etc.) depending upon accessibility and success. The seed mix presented in Table 2.3, "Interim Reclamation Seed Mix" was developed by the BLM and are based on the species' effectiveness in providing erosion protection, the ability to grow within the constraints of the low annual precipitation experienced in the region, the species' suitability for site aspect, and the site elevation and soil type. These mixtures would provide forage and cover species similar to the pre-disturbance conditions, facilitating the post-mining land uses of livestock grazing and wildlife habitat. These plant mixes are previously authorized by the BLM and contain both native and non-native species.

Table 2.4 provides a list of BLM-approved reclamation species and rates. The actual seed mix would likely vary from one area to another based on field conditions, aspect, and seed availability. The BLM, Nevada Department of Wildlife (NDOW), NDEP, and MMC would decide upon the actual seed mix before seeding of a particular area.

Table 2.4. Seed Mix Species and Rates

Species		Pure Live Seed (pounds per acre)
Scientific Name	**Common Name**	
Agropyron cristatum	Crested wheatgrass	2.0
Achnatherum hymenoides	Indian ricegrass	2.5
Atriplex confertifolia	Shadscale saltbush	3.0
Elymus elymoides	Squirreltail	2.5
Atriplex canescens	Fourwing saltbush	3.0
Krascheninnikovia lanata	Winterfat	0.5
Sphaeralcea coccinea	Scarlet globemallow	0.5

The actual seed mix and application rates would be determined prior to reseeding based on the results of reclamation in other areas of the mine, concurrent reclamation, revegetation test plots, or changes by the BLM in the seed mix recommendations. In addition, seed mix and application rates may need to be modified as a result of limited species availability or poor seed quality; modifications would be undertaken with the concurrence of the BLM, NDOW, and NDEP.

Revegetation success would be determined based on criteria outlined in the Nevada Guidelines for Successful Revegetation (NDEP 1998).

Reclamation Schedule

The mine is projected to be in operation until approximately 2027. The Proposed Action would not extend the life of the mine, only the amount of ore processed during that time. Concurrent reclamation would be conducted on inactive mine areas during this period as soon as areas become available and when reclamation is practical and safe. Up to an additional three years would be required for ongoing ore processing, site closure, and final reclamation.

Concurrent WRSA reclamation would occur during the life of the mine on inactive areas as available and when reclamation is practical and safe. This reclamation would include recontouring and revegetating the completed sections of the WRSAs incrementally during operations. Upon completion of mining, final WRSA reclamation would be completed pursuant to the final closure plan submitted to the BLM and NDEP for approval.

Post Reclamation Monitoring and Maintenance

When reclaimed areas meet the specified bond release criteria, no post-reclamation maintenance or monitoring would take place. Reclaimed areas, which have not met specified bond release criteria, would be maintained to achieve the following goals: prevention of undue degradation of the disturbed lands; determination of revegetation success; and completion of bond release.

Remedial measures would be performed as necessary until the revegetation requirements and bond release criteria have been met. Where required, the following corrective actions would be taken to prevent undue erosion, sedimentation, soil de-stabilization and unsatisfactory vegetation growth:

- Construction and maintenance of surface diversion facilities;
- Construction and maintenance of rock filters;
- Application of soil stabilizers;
- Additional shaping and recontouring;
- Noxious weed control; and
- Additional revegetation operations.

MMC would monitor the portions of the proposed Plan boundary still under bond stipulations to ensure that warning signs, erosion control structures, fences, and other facilities remain in good condition. MMC would continue monitoring and maintaining the proposed Plan boundary until the reclamation goals and requirements have been achieved, and the bond is released.

2.1.8. Environmental Protection Measures

During implementation of the Proposed Action, measures would continue to be taken to minimize impacts to air, land, water, wildlife, and cultural resources and to prevent undue or unnecessary degradation of the environment within the proposed Plan boundary. Pre-development planning, pollution prevention measures, and pollution control measures and equipment would be used to reduce potential mine-generated environmental impacts. EPMs specific to the Proposed Action are described in this section and are consistent with those previously implemented by MMC (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy").

Air Quality

MMC has incorporated a number of EPM measures into the existing operation through previous authorizations (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy") to control particulate emissions. These measures would continue to be incorporated into the proposed operation. To control fugitive dust, water or chemical stabilizers would be applied to haul and access roads within the proposed Plan boundary. Speed restrictions would be enforced to further minimize particulate emissions from roadways. Concurrent reclamation during the life of the operation, as mine components are completed, would reduce the acreage of disturbed lands, thereby reducing fugitive dust. MMC maintains an Air Quality Operating Permit (AP1040-0158).

Cultural and Paleontological Resources

Protection measures have been incorporated into the existing operation to prevent and to minimize potential impacts to cultural and paleontological resources. These measures, as identified below, also would provide protection of resources during development and operation of the Proposed Action. MMC has developed the Proposed Action with regard to the location of sites known to be eligible for inclusion on the National Register of Historic Places (NRHP). MMC has a Cultural Resources Protection Program previously authorized under NEPA for the Marigold Mine that includes the following:

- Employee and equipment access within the proposed Plan boundary would be prohibited in known eligible cultural sites to prevent the potential for direct impacts to resources;
- Mine exploration and operations equipment would be limited outside of the proposed Plan boundary;
- Employee access to known archaeological and paleontological sites on public and private land in the vicinity of the mine would be prohibited;
- Per the 2003 SEIS, a 100-foot buffer zone around the eligible site boundary would be established by installing a two-strand smooth wire fence with signage "No Off-Road Travel". The buffer zone would be established by a qualified, third-party archaeologist approved by the BLM;
- If a previously undocumented or unidentified cultural (archaeological or historical) resources, subsurface components of documented sites, human remains, burial sites, or vertebrate paleontological resources are discovered during exploration, construction, operation, or reclamation activities, MMC would immediately cease activities within 300 feet of the discovery, ensure that the discovery is appropriately protected, and immediately notify the

BLM by telephone followed with written communication. Work would not resume until a BLM Authorized Officer issued a notice to proceed. If resources are identified as eligible for the NRHP, impacts would be mitigated through an appropriate Treatment Plan approved by the BLM, the State Historic Preservation Office (SHPO), MMC, and the Advisory Council, or through site avoidance;

- If fossiliferous deposits, specifically vertebrate fossil deposits, are located during exploration construction, operation, or reclamation activities, the BLM would be notified, and measures would be taken to identify and preserve or avoid the fossils;

- MMC would be responsible for ensuring that employees, contractors, or others associated with the Marigold Mine do not damage, destroy, or vandalize archaeological, historical, or vertebrate paleontological sites or the artifacts/fossils within them. Should damage to cultural or paleontological resources occur within in or near the Proposed Action during the period of construction, operation, or rehabilitation due to unauthorized, negligent, or inadvertent actions of MMC or other mine personnel, MMC would be responsible for costs of rehabilitation or mitigation. Individuals involved in illegal activities could be subject to penalties under the Archaeological Resources Protection Act (16 U.S.C 470ii), Federal Land Policy and Management Act of 1976 (FLPMA), the Native American Graves and Repatriation Act (16 U.S.C. 1170) and other applicable statutes;

- Known site locations would be avoided by exploration activities. Secondary effects to eligible sites resulting from road and drill site construction and use would be minimized through the implementation of erosion control measures, such as waterbars, double sumps for drill water, and appropriate road design; and,

- The entire Area of Potential Effect has been inventoried at the Class III level.

Invasive and Non-Native Species

MMC would continue active management of noxious weed controls at the site as described in MMCs Integrated Weed Management Plan (JBR 2013a). Noxious and invasive weed controls would be implemented through vegetation establishment to minimize competition from weedy species and to maximize the establishment of disturbed sites, and chemical control of new or established infestations of noxious weeds. If herbicides are used to control noxious weeds, the application rates and methods would conform to BLM standards, thereby avoiding potential risks to human health and the environment. Noxious weed occurrences on public lands adjacent to the proposed Plan boundary would be reported to the BLM.

Migratory Birds and Raptors

MMC would continue to use a qualified biologist to conduct breeding bird surveys within all suitable habitats prior to ground disturbance, if construction activities were to occur from March to the end of July. This survey would identify either breeding adult birds (i.e., by territorial defense behavior) or nest sites within the areas to be disturbed. If active nests are present, MMC would coordinate with the BLM to develop appropriate protection measures for these sites, which may include avoidance, construction constraints, buffer establishment, etc. An option to conducting breeding bird surveys would be to avoid ground disturbance activities between March and July, allowing construction to proceed outside of the breeding season without clearance surveys.

Additional protection measures for migratory and raptor bird species would include the following:

- Protect active raptor nests in undisturbed areas within 0.25 miles of areas proposed for vegetation conversion using species-specific protection measures provided by the BLM, NDOW, and USFWS;
- Limit permitted activities from May 1 to the end of July within 0.25 miles of raptor nest sites unless the nest site has been determined to be inactive for at least the previous five years; and
- Prevent access of migratory birds to cyanide solutions in process ponds by utilizing bird balls and netting.

Waste, Hazardous or Solid

Management of solid waste and hazardous materials would continue to be managed under MMCs integrated Emergency Response Plan (ERP) to address the potential release of fluids from mine facilities. The section of the ERP that addresses chemical releases contains procedures for the control of leaks or spills. Continued operation in accordance with the ERP would assist in keeping spills localized and contained to allow for efficient cleanup. MMC has the necessary spill containment and cleanup equipment and trained personnel available at the site to quickly respond to minor releases.

Hazardous substances are handled in accordance with applicable MSHA or Occupational Safety and Health Administration regulations (OSHA) (Titles 30 and 29 of the CFR).

Non-hazardous solid waste generated on the site is disposed in an approved Class III waivered on-site landfill. Used tires are either recycled by the suppliers or buried in the WRSAs. Used equipment, such as batteries, alternators, starter motors, etc., is recycled for remanufacture. Used petroleum products, antifreeze, and Freon are transported off-site to approved recycling facilities.

Water Quality (Surface and Ground)

Authorized EPMs would continue to be used to control sediment in precipitation runoff from project facilities and disturbed areas during construction and mine operations. EPMs may include, but are not limited to, diversion and routing of stormwater using accepted engineering practices, such as diversion ditches sediment traps, and rock and gravel cover.

Temporary stormwater diversions would be installed where appropriate and armored where flow velocities exceed approximately four feet per second, dependent upon channel material. Temporary diversions would be employed under the site's Stormwater General Permit (NVR 300000) and would be maintained and modified on an annual basis. Permanent diversion structures would be completed when a component, such as a tailings facility or a WRSA, are at final design limits, to ensure the structure is appropriately sized and located. Permanent diversions are designed to contain the 100-year, 24-hour storm event. A typical ditch is about 10 feet in width and four feet in depth; however, the dimensions vary based on topography and watershed size.

Surface waters would continue to be managed to avoid excessive sediment loading to runoff outside of the proposed Plan boundary.

The various stormwater diversion and sediment control structures would be monitored by visual inspection to ensure integrity. If necessary, precipitation accumulated within process component containment areas after major storm events would be removed by pumping and disposing of in

the heap leach processing facilities. Stormwater diversion structures at the WRSAs would be visually inspected after major storm events and during spring snowmelt to verify the integrity of the diversion structures and to remove accumulated debris that could impede water flow. These monitoring efforts comply with the requirements in the General Stormwater Permit (NVR 300000). Monitoring data would be reported to the NDEP Bureau of Water Pollution Control on an annual basis. Additional monitoring and control technologies would be further specified as part of state permitting activities (i.e., General Stormwater Permit), which includes applications and reviews for the Stormwater General Discharge Permit and the Water Pollution Control Permit (NEV88040).

Groundwater monitoring would continue to be conducted on a quarterly basis in compliance with the water pollution control permit. Water quality samples would be collected from the existing monitoring points. The samples would be analyzed for the constituents specified in the site's water pollution control permit. Monitoring data would be submitted to NDEP and BLM on a quarterly and annual basis.

Geochemistry

Waste rock from the Target 3 Pit would be tested and characterized, and if the performance criteria identifies that waste rock has the potential to be acid generating, this material would be managed in accordance with the management requirements of MMC's Sulfide Plan.

Soils

Revegetation of disturbed areas would continue to reduce the potential for wind and water erosion. Following construction activities, areas such as cut-and-fill embankments and growth media stockpiles would be seeded as soon as practical and safe. Concurrent reclamation would be maximized to the extent practical to control soil erosion.

Vegetation

MMC would continue to use established EPMs to prevent impacts to vegetation. WRSA and roads would be ripped and or/scarified to produce a rough surface for anchoring of reapplied growth media and seeded with the approved seed mix. Placement of growth media would be a minimum of approximately six inches. Seed bed preparation may be performed immediately prior to seeding to allow seed placement prior to soil re-compaction. Seed bed preparation and seeding would typically be conducted in the fall to take advantage of winter and spring moisture.

Visual Resources

During mining closure activities, WRSAs would continue to be graded to eliminate the benches between lifts, reduce the side slopes to an approximate 3H:1V grade, and round-off top benches to approximate more natural contours. After slopes are stabilized and graded, growth media would be applied, and WRSAs would be seeded. These efforts would reduce moderate contrasts in land forms and lines associated with the Marigold Mine to weak contrasts as vegetation establishes and matures.

Wildlife and Livestock

A BLM-approved range control fence would be placed around the perimeter of mine facilities as needed to prevent access by wildlife and livestock to mining operations.

MMC currently manages livestock access to water by providing a trough outside the fenced mine boundary, which is supplied by the mine supply well. Livestock herders would continue to have access to this trough to fill their water trucks.

Additional protection measures that have been incorporated into the Proposed Action for the protection of wildlife and livestock include:

- Enforced speed limit of 15 miles per hour around facilities and 35 miles per hour on haul roads;
- Proper management of the waivered-Class III landfill; and
- Formalized procedures for verbal and written reporting of wildlife mortalities to the NDOW.

Employee Training

MMC currently provides and would continue to provide environmental education for all employees and contractors on site. This training includes information on management practices incorporated into the operation of the facility to minimize impacts to the environment and ensure compliance with environmental permit criteria.

2.2. No Action Alternative

With the No Action Alternative, the Proposed Action would not be implemented. Currently, permitted operations at the Marigold Mine would continue until 2027. Final reclamation would extend approximately three years beyond closure. Additional mineral resources in the proposed Plan boundary would remain undeveloped. The Target 3 Pit would not be created, the North West Expansion WRSAs would not be expanded, the Trout Creek diversion channel reroute would not be constructed, and the new utility corridor would not be added. The Section 30 heap leach pad and facilities would be constructed if found to be economically feasible. If the pad and facilities are not constructed the disturbed areas would be reclaimed in accordance with the authorized Plan.

2.3. Alternatives Considered but not Analyzed in Detail

No alternatives were identified or raised during public scoping. Placement options of the North-West Expansion WRSA are constrained by existing mine facilities, topography, private land holdings, Cottonwood Creek, and cultural sites.

2.4. Conformance with Applicable Land Use Plan(s)

The Proposed Action is in conformance with the BLM WD SGMFP dated July 9, 1982 (BLM 1982). Objective M-1 of the SGMFP states: "Make all public lands and federally owned minerals available for the exploration and development of mineral and material commodities."

2.5. Relationship to Laws, Regulations and Other Plans

This EA was prepared in accordance with the NEPA and in compliance with applicable regulations and laws passed subsequently, including the President's Council on Environmental Quality regulations (40 CFR parts 1500-1509), United States Department of the Interior

requirements, and guidelines listed in the BLM NEPA Handbook H-1790-1 (BLM 2008a). The Proposed Action and Alternatives conform to the following policies, plans, and programs:

- FLPMA of 1976;
- Mining and Mineral Policy Act of 1970;
- NEPA;
- Locatable Minerals Surface Management Regulations (43 CFR 3809);
- CEQ Memorandum dated March 6, 2012;
- NAC 519A.010; and
- Humboldt County Regional Master Plan.

Chapter 3. Affected Environment

The affected environment section describes the existing conditions and trend of issue-related elements that may be affected by implementing the Proposed Action. Description of the affected physical, biological, and human resources is based upon data gathered from field investigations, BLM and other agency files, and baseline data, which have been generated for the mine since 1988. Description of the affected environment within the authorized Plan boundary includes reference to previous studies and NEPA documents. Description of the affected environment within the proposed Plan boundary expansion includes data collected during baseline surveys from 2007 through 2013 and previous NEPA documents.

To comply with the NEPA, the BLM must address specific elements of the environment subject to requirements defined by Supplemental Authorities associated with each element as specified by statues, regulations, or executive orders (BLM 2008a).

Table 3.1 identifies the Supplemental Authority elements that are addressed in this EA. Supplemental Authority elements determined to be Not Present or Present/Not Affected were not carried forward for analysis or discussed further in the EA. Supplemental Authority elements determined to be Present/May Be Affected were carried forward for analysis in the EA, and are further discussed in Sections 3.1 through 3.9. The elimination of elements determined to be Not Present or Not Affected follows the CEQ policy, as stated at CFR 1500.4.

Table 3.1. Supplemental Authority Elements Considered for Analysis

Element	Not Present*	Present Not Affected*	Present May be Affected **	Rationale
Air Quality and Atmospheric Values			X	See Section 3.1, "Air Quality"
Areas of Critical Environmental Concern (ACECs)	X			There are no ACECs in the proposed Plan boundary.
Cultural Resources			X	See Section 3.2, "Cultural Resources"
National Historic Trails			X	See Section 3.3, "National Historic Trails"
Environmental Justice	X			The Proposed Action would have insignificant economic and social impacts within the context of current conditions within Humboldt and Lander counties.
Floodplains	X			There are no Federal Emergency Management Agency designated floodplains within the proposed Plan boundary.
Invasive, Non-native Species			X	See Section 3.4, "Invasive-Nonnative Species"
Migratory Birds			X	See Section 3.5, "Migratory Birds"
Native American Religious Concerns			X	See Section 3.6, "Native American Religious Concerns"
Prime or Unique Farmland	X			There are no known designated prime or unique farmlands in the proposed Plan boundary.
Threatened & Endangered Species	X			See Section 3.7, "Threatened and Endangered Species"
Wastes, Hazardous or Solid		X		See Section 3.8, "Wastes, Hazardous or Solid"

Element	Not Present*	Present Not Affected*	Present May be Affected **	Rationale
Water Quality (Surface/Ground)			X	See Section 3.9, "Water Quality (surface and ground)"
Wetlands and Riparian Zones		X		See Section 3.10, "Wetlands and Riparian Zones"
Wild and Scenic Rivers	X			There are no wild and scenic rivers in the proposed Plan boundary.
Wilderness	X			There are no wilderness and wilderness study areas in the proposed Plan boundary.

*A Supplemental Authority element determined to the Not Present or Present/Not Affected need not be carried forward or discussed further in the EA (BLM 2008a).

A Supplemental Authority element determined to be Present/May Be Affected **must be carried forward in the EA (BLM 2008a).

In addition to the resources or elements managed under Supplemental Authorities, the BLM considers other resources and uses that occur on public land and the issues that may result from the implementation of the Proposed Action. Other elements or resources of the human environment that have been considered for analysis in this EA are listed in Table 3.1, "Supplemental Authority Elements Considered for Analysis". The rationale for each element that would not be affected by the Proposed Action or No Action Alternative is described in Table 3.2.

Table 3.2. Other Elements or Resources Considered for Analysis

Other Resources	Not Present	Present Not Affected	Present May be Affected	Rationale
Access, Land Use, and Realty			X	See Section 3.11, "Access, Land Use, and Realty"
Geochemistry			X	See Section 3.12, "Geochemistry"
Geology and Mineral Resources			X	SeeSection 3.13, "Geology and Mineral Resources"
Lands with Wilderness Characteristics	X			No lands within the proposed Plan boundary meet any wilderness characteristics requirements
Noise			X	See Section 3.14, "Noise"
Paleontology	X			See Section 3.15, "Paleontology"
Range Resources			X	See Section 3.16, "Range Resources"
Recreation			X	See Section 3.17, "Recreation"
Social Values and Economics			X	See Section 3.18, "Social Values and Economics"
Soils			X	See Section 3.19, "Soils"
Special Status Species			X	See Section 3.20, "Special Status Species"
Vegetation			X	See Section 3.21, "Vegetation"
Visual Resources			X	See Section 3.22, "Visual Resources"

Other Resources	Not Present	Present Not Affected	Present May be Affected	Rationale
Wild Horses and Burros	X			There are no wild horses, wild burros, or Herd Management Areas for either animal within the proposed Plan boundary. Resource is not present.
Wildlife			X	See Section 3.23, "Wildlife"

Supplemental Authorities

3.1. Air Quality

The area of analysis for air quality includes the predicted maximum impact area where air dispersion modeling showed a potential contribution to the ambient air quality from the Proposed Action.

The regulatory framework for air quality includes state and federal statutes, regulations, and standards. The Environmental Protection Agency (EPA) codifies the air quality framework and delegates the NDEP, Bureau of Air Quality Planning (BAQP), and Bureau of Air Pollution Control to implement and enforce the state and federal statutes, regulations, and standards. The legal requirements applicable to the Proposed Action and alternatives include the following: The Clean Air Act (CAA), as amended (42 USC 7401 et seq.), National Ambient Air Quality Standards (NAAQS), National Emission Standards for Hazardous Air Pollutants, Federal Operating Permit Program (Title V), and State of Nevada air quality regulation and standards for permits to operate under NAC 445B Air Controls.

The CAA required the EPA to establish the NAAQS for pollutants considered harmful to public health and the environment. These pollutants are referred to as criteria pollutants and include carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ozone, particulate matter 10 microns in diameter or less (PM_{10}), particulate matter 2.5 microns in diameter or less ($PM_{2.5}$), and sulfur dioxide (SO_2). Table 3.3, "National Ambient Air Quality Standards" lists the final rule of the NAAQS as signed on June 2, 2010 and reference to the respective pollutants and when it was posted in the Federal Register.

Table 3.3. National Ambient Air Quality Standards

Pollutant [final rule cite]		Primary / Secondary	Averaging-Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3-month average	0.15µg/m^3	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb	Annual Mean
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution 14-Dec-12	$PM_{2.5}$	primary	Annual	12 µg/m^3	Annual mean, averaged over 3 years
		secondary	Annual	15 µg/m^3	Annual mean, averaged over 3 years
		primary and secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010]		primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
[38 FR 25678, Sept 14, 1973]		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source: EPA 2013
ppm = parts per million
µg/m^3 = micrograms per cubic meter
ppb = parts per billion

The EPA developed a classification system for distinct air pollution control regions pursuant to the CAA. In Nevada, the regions are based on geographical boundaries and hydrographic basins. Each region has been classified as Attainment, Non-Attainment, or Maintenance for each of the criteria air pollutants. Regions classified as Attainment are areas in which a pollutant has either not exceeded the NAAQS or there has not been sufficient ambient monitoring data to further classify the region. A Non-Attainment classification represents an area in which a pollutant has exceeded the NAAQS. The Maintenance designation is used for areas in which a pollutant has exceeded the NAAQS, but has since been reduced to attainment levels.

The CAA also required the EPA to significantly limit the deterioration of air quality in specific areas. The EPA has developed a classification system of areas for the Prevention of Significant Deterioration (PSD) regulations. The most restrictive category is the Class I Area and the least restrictive category is the Class III Area. The Class I Areas include National Parks, Wilderness Areas, which exceed 5,000 acres and were in existence prior to 1977, and areas that have been designated as Class I Areas under the PSD regulation in 40 CFR 52.21. All regions not designated as Class I Areas are considered Class II Areas. No Class III Areas have been designated. The federal PSD regulations limit the maximum allowable increase in Class I, Class II, and Class III Areas as seen in Table 3.4, "Prevention of Significant Deterioration Limits".

Table 3.4. Prevention of Significant Deterioration Limits

Pollutant	Averaging Time	Maximum Allowable Increase (µg/m³)		
		Class I Area	Class II Area	Class III Area
$PM_{2.5}$	Annual	1	4	8
	24-hour	2	9	18
PM_{10}	Annual	4	17	34
	24-hour	8	30	60
SO_2	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
NO_2	Annual	2.5	25	50

Source: GPO 2013

There are no Class I Areas located within 100 kilometers of the proposed Plan boundary. The Jarbidge Wilderness Area is located approximately 180 kilometers northeast of the proposed Plan boundary. Class II Areas are regions that have been designated as Non-Attainment or Maintenance. The proposed Plan boundary is located in Nevada Hydrographic Area 64 (Clovers Area). The Clovers Area was triggered as a PSD area on March 2, 1977 from an application submitted to NDEP by Sierra Pacific Power Company for the Valmy Power Station (NDWR 2013). The application exceeded the minor source baseline for SO_2 and PM_{10}. The baseline was set for the pollutants that were reviewed under the 1977 application and increment consumption is evaluated for changes that occur after the date throughout the Clovers Area.

The CAA also enacted the New Source Performance Standards (NSPS) for specific types of new or modified equipment located at affected sources. The NSPS regulations limit emissions from source categories to minimize the deterioration of the ambient air quality. In addition to the NSPS regulations, the CAA also enacted the National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations, which focus on pollutants known to cause serious health effects or serious environmental effects. The proposed Plan boundary includes equipment that is subject to various NSPS and NESHAP regulations.

The 1990 CAA Amendment introduced a new facility-wide federal operating permit program, the Title V Permit. Title V Permits are required for facilities with the potential to emit greater than 100 tons per year of a regulated pollutant, 10 tons per year of any single hazardous air pollutant, or 25 tons per year of any combination of hazardous air pollutants. In addition, emission units subject to 40 CFR Part 63, Subpart EEEEEEE – National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category are required to be permitted under a Title V Permit.

Local Climatological Air Quality

The proposed Plan boundary is located between 5,000 to 6,000 feet AMSL on the northwestern flank of Battle Mountain in the Humboldt River Basin. Terrain to the northeast, north, west, and southwest of the area levels out to the valley floor. Terrain to the east, southeast, and south of the area increases in elevation to the Battle Mountain summit. Winds are affected by the local terrain and topography and generally flow from the southwest or northeast due to the mountains and the valley in the immediate vicinity of the proposed Plan boundary. Wind speeds are generally more moderate in the daylight hours and lighter throughout the night.

Baseline meteorological conditions near the proposed Plan boundary are characterized from ambient monitoring data taken at nearby monitoring stations listed in Table 3.5, "Meteorological

Conditions Near the Proposed Plan Boundary". The climate in the proposed Plan boundary is classified as semi-arid or steppe. An arid climate is characterized by low rainfall, low humidity, clear skies, and relatively large annual and diurnal temperature ranges. Table 3.5 summarizes the meteorological conditions found in the vicinity of the proposed Plan boundary.

Table 3.5. Meteorological Conditions Near the Proposed Plan Boundary

Monitor	Elevation (feet)	Winter	Spring	Summer	Fall	Annual
Mean Seasonal Temperature Average (degrees Fahrenheit)						
Battle Mountain	4,510	30.5	47.9	70.6	50.4	49.9
Battle Mountain 4 SE	4,530	30.9	47.9	69.2	49.2	49.3
Cortez	4,910	32.0	47.5	71.2	50.2	50.2
Reese Valley Carper	4,910	30.6	44.0	64.5	47.4	46.7
Buffalo Ranch	5,430	34.5	47.5	70.9	52.5	51.4
Golconda	4,390	31.1	48.2	69.8	49.6	49.7
Mean Seasonal Precipitation Average (inches)						
Battle Mountain	4,510	2.20	2.00	0.82	1.28	6.30
Battle Mountain 4 SE	4,530	2.19	2.73	1.38	1.80	8.10
Cortez	4,910	2.44	3.01	1.89	2.36	9.71
Reese Valley Carper	4,910	2.39	3.01	1.47	2.35	9.21
Buffalo Ranch	5,430	4.57	3.55	2.68	2.80	13.60
Golconda	4,390	2.05	2.00	1.03	1.41	6.50
Mean Snow Fall Average (inches)						
Battle Mountain	4,510	7.3	1.7	0.0	1.2	10.2
Battle Mountain 4 SE	4,530	14.5	5.3	0.0	2.2	22.0
Cortez	4,910	12.0	4.3	0.0	2.0	18.2
Reese Valley Carper	4,910	8.7	3.4	0.0	1.3	13.3
Buffalo Ranch	5,430	18.5	5.9	0.0	2.3	26.7
Golconda	4,390	9.7	2.5	0.0	1.8	14.0
Mean Snow Cover Average (inches)						
Battle Mountain	4,510	0.0	0.0	0.0	0.0	0.0
Battle Mountain 4 SE	4,530	0.7	0.0	0.0	0.0	0.0
Cortez	4,910	0.0	0.0	0.0	0.0	0.0
Reese Valley Carper	4,910	0.3	0.0	0.0	0.0	0.0
Buffalo Ranch	5,430	0.7	0.0	0.0	0.0	0.0
Golconda	4,390	0.0	0.0	0.0	0.0	0.0

Source: WRCC 2013

The annual precipitation in the area averaged over the period of record from the Western Regional Climate Center is 8.9 inches with more moisture occurring as snow during the winter, averaging 17.4 inches annually. Four distinct seasons can be seen at Marigold Mine with winter temperatures averaging in the low 30s and summer temperatures averaging in the upper 60s. Summer maximum temperatures tend to be hot with averages of 82 degrees Fahrenheit (°F) to 92°F from June to August.

Regional Air Quality

The area of analysis and immediate surrounding areas are currently classified as a minor PSD increment tracked area through the BAQP for SO_2 and PM_{10} pollutants, all other criteria pollutants are in attainment or unclassified. Monitoring of criteria pollutants has been discontinued in the area since the late 1990s when the EPA allowed monitoring to cease where monitoring showed less than 60 percent of the NAAQS. The closest ongoing PM_{10} monitoring station is located in the city of Elko, Nevada. This monitoring station is located approximately 115 kilometers to the east

of the proposed Plan boundary in an urban developed area and unsuited for use in the rural locale of Marigold Mine. The next closest ongoing PM_{10} monitoring station is located approximately 300 kilometers southeast of the proposed Plan boundary in the Great Basin National Park. This monitoring station indicates the low particulate levels as expected in rural Nevada. Monitoring data from the Lehman Caves in Great Basin National Park is used to simulate background concentrations for air quality permitting at the Nevada BAPC. The values used are 10.2 $\mu g/m^3$ for the 24-hour averaging period and 9.0 $\mu g/m^3$for the annual averaging period. The $PM_{2.5}$ background concentrations are estimated from the Interagency Monitoring of Protected Visual Environments station that monitors aerosol data in the Great Basin National Park. The three year weighted average for the 24-hour averaging period is 7 $\mu g/m^3$ and 2.4 $\mu g/m^3$ for the annual averaging period.

Gaseous pollutants are typically monitored near highly populated and industrialized urban areas. The proposed Plan boundary is located in a rural area where gaseous concentrations are expected to be low. The Nevada BAPC recommends using zero for background concentrations of gaseous pollutants in rural Nevada. Due to the lack of monitoring data available for rural areas such as Marigold Mine and the recommendation from the Nevada BAPC, background concentrations of CO, nitrogen oxide (NO_x), SO_2, and volatile organic compounds will be assumed as zero for the Marigold Mine baseline level.

Existing Air Pollution Sources

The project shares Nevada Hydrographic Basin 64 with Sierra Pacific Power Company's, Valmy Power Station, which is a significant source of emissions for EPA PSD purposes. A small portion of the Lone Tree Mine falls within this basin as well. In 1977, the basin was triggered as a minor source for particulate matter and sulfur dioxide. As such, changes to sources within the basin may be further constrained to the amount of particulate matter and sulfur dioxide emissions that can be increased.

Operations at Marigold Mine are currently permitted through the BAPC with a Class II Air Quality Operating Permit, AP1040-0158. A Title V permit application was submitted to the BAPC in February 2012 for the mine. The permit application is currently in review, pending issuance.

Climate Change

Ongoing scientific research indicates that anthropogenic (man-made) greenhouse gas (GHG) emissions and changes in biological carbon sequestration due to land management activities potentially impact global climate. Through complex interactions on a global scale, GHG emissions and net losses of biological carbon sinks lead to a net warming of the atmosphere. GHGs have been found to be capable of trapping heat in the atmosphere by decreasing the amount of heat radiated by the Earth out to space. The GHG emissions are comprised of many separate chemicals, the most notable is carbon dioxide (CO_2) from fossil fuel development, large wildland fires, and activities using combustion engines. The leading causes of GHG emissions in 2005 for Nevada were attributed to electrical generation (approximately 48 percent) and transportation (approximately 30 percent). Lesser causes included resident/commercial fuel use (approximately seven percent), industrial fuel use (approximately 5 percent), industrial processes (approximately five percent), agriculture (approximately three percent), waste (approximately two percent), and fossil fuel industry (approximately one percent). Nevada historical data measured since 2005 indicated CO_2 to represent approximately 91 percent of GHG emissions with methane, nitric oxide, and hydrofluorocarbons/perfluorocarbons representing approximately four percent, three

percent, and two percent, respectively (NDEP 2008). By 2020, transportation is expected to account for 33.2 percent of statewide GHG emissions.

Current emissions within the vicinity of Marigold Mine include electrical generation, vehicle combustion emissions, fugitive dust from travel on unimproved roads, mine activities, and wildland fires. Future actions would have incremental change in CO_2 emission; however, the tools necessary to quantify incremental climate impacts of specific actions are presently not available. Specific levels of significance have not been established.

Existing climate prediction models are global in nature; therefore, they are not at the appropriate scale to estimate potential impacts of climate change within the Clovers Area. Due to the nature and scale of the Proposed Action, effects on climate change are not further analyzed in the EA.

3.2. Cultural Resources

Cultural resources and traditional cultural properties (TCPs) are protected under the National Historic Preservation Act of 1966, as amended (NHPA), the Archaeological Resources Protection Act of 1979 (ARPA), the American Indian Religious Freedom Act of 1978 (AIRFA), and the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA). Federal regulations require federal agencies to protect and manage cultural resource properties.

Cultural resources are defined as any definite location of past human activity identifiable through field survey, historical documentation, and/or oral evidence. Cultural resources have many values and provide data regarding past technologies, settlement patterns, subsistence strategies, and many other aspects of human sociocultural development and adaptation. The term "Cultural Resources" can apply to "those aspects of the environment – both physical and intangible, both natural and built – that have cultural value to a group of people." This can include spiritual places, historic resources, archaeological resources, Native American cultural items, historical objects, religious practices, cultural uses of the natural environment, community values, or historical documents (King 2013).

A TCP is a property associated with cultural practices or beliefs of a living community that are rooted in that community's history, and are important in maintaining the continuing cultural identity of the community (Parker and King 1998). This property type may be determined eligible for the NRHP if it meets criteria found in 36 CFR 60.4 and NRHP's Manual Number 38.

The NHPA sets forth procedures for considering effects to historic properties and supports and encourages the preservation of prehistoric and historic resources. It directs federal agencies to consider the impacts of their actions on historic properties. The NHPA established the Advisory Council on Historic Preservation (ACHP) and tasked the ACHP with administering and participating in the preservation review process established by Section 106 of the NHPA.

The purpose of ARPA is to secure the protection of archaeological resources and sites that are on public land and Indian land and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals having collections of archaeological resources.

The AIRFA was passed in 1978 to "protect and preserve for American Indians their inherent right to freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites."

The NAGPRA became law in 1990 and formally affirms the rights of Indian tribes, Native Alaskan entities, and Native Hawaiian organizations to custody of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that have a relationship of cultural affiliation.

The prehistoric period in the Great Basin region is divided into the Pre-Archaic (approximately 12,000 BP to 7,000 BP) and the Archaic (approximately 7,000 BP to the first arrival of Euro Americans [approximately 150 BP]). Studies in the western and eastern portions of the Great Basin indicate that human occupation occurred in the area as early as 12,000 BP. Information for this time period is limited, but suggests that the groups were small, very mobile, and may have relied on hunting in an environmental setting that was wetter and cooler than the present climate. The Pre-Archaic lifestyle focused on big game hunting, utilization of smaller animals, and consumption of easily available and easily processed plant materials generally associated with the lacustrine/marsh environment present at the time (BLM 2003).

Linguistic evidence suggests that Numic speaking people reached the area sometime between 1000 and 1300 AD. These people were the ancestors of the Paiute and Shoshone, who were living in the area at the time of the incursion of Euro American trappers, explorers, and settlers into the region (BLM 2003).

The project is located near the traditional boundary between the Northern Paiute and the Western Shoshone, which is generally considered to be at Iron Point, about 20 miles north-northwest of the proposed Plan boundary. The proposed Plan boundary is located within the traditional territory of the White Knife, or Tosawihi, band of the Western Shoshone. However, it is possible that the area may also have been utilized by Northern Paiutes who belonged to either the Makuhadökadö (also referred to in the available literature as the Pauide tuviwarai, Pauide tuviwarai, It-sa'-a-ti-a-ga, or idza'a-teaga-tekade) or Sawawaktödö tuviwarai. The Tosawihi, named for the white chert found at the Tosawihi Quarry located about 40 miles northeast of the proposed Plan boundary, wintered in a few small villages scattered along the Humboldt River between Battle Mountain and Iron Point. Northern Paiutes traveled into the area east of Winnemucca for hunting and gathering (BLM 2005).

Mining activity began in north-central Nevada in the late 1850s with the discovery of mineral wealth near Dayton and Virginia City, Nevada. The Battle Mountain Mining District, which includes the Marigold Mine, was established in 1866 and remained relatively active until 1885. By 1870, 32 mines, a mill, and two smelters operated in the District. The first records for the Marigold Mine were from 1938 and included a mining assessment that lists $600 in improvements to claims in the area, including a few hundred feet of crosscuts, drifts, buildings, and roads (BLM 2003).

Cultural Resource Inventory

A summary of previous cultural resource inventories conducted to date for Marigold Mine is included in Table 3.6, "Cultural Resource Inventories within the Proposed Plan Boundary". Prehistoric resources within the area include lithic scatter, temporary camps, and isolated finds. Most often historic resources found are related to mining activities. Architectural remains have not been identified within the proposed Plan boundary. No TCPs have been identified in the proposed Plan boundary during previous surveys or through on-going consultation to date.

Multiple Class III cultural resources surveys have been conducted within the proposed Plan boundary over the last 10 years. Several of these surveys included the areas associated with the

Proposed Action. Table 3.6, "Cultural Resource Inventories within the Proposed Plan Boundary" summarizes these cultural surveys.

Ten archaeological sites have been identified within the boundaries of the proposed disturbance. Six of the 10 sites are eligible for the NRHP. Of these six sites, the Proposed Action would have an adverse effect on one historic property eligible for the NRHP under Criteria D, and natural erosional processes are actively impacting the five additional historic properties eligible for the NRHP under Criteria D.

MMC has volunteered to conduct data recovery activities for these six sites in accordance with a Memorandum of Agreement (MOA) and Treatment Plan between the BLM and the Nevada SHPO for this Proposed Action and Treatment Plan.

Table 3.6. Cultural Resource Inventories within the Proposed Plan Boundary

BLM Report Number	Report Title	Reference	Number of Sites Recorded in the Area of Potential Effects*
CR2-83	Archaeological Reconnaissance Along Proposed 230KV Transmission Line Right-of-Way of Sierra Pacific Power Co. Part 1. Tracy to Valmy, Nevada	Rusco and Seelinger 1974	1 (0 are eligible)
CR2-248	Survey of Material Test Areas South of Valmy, Nevada	Wallof and Cunningham 1977	0
CR2-2236	A Cultural Resources Inventory of the Marigold Mine Project, Humboldt County, Nevada	Harmon et al. 1988a	4 (0 are eligible)
CR2-2236 (Addendum)	Preliminary Report Of Field Investigations for a Supplement to a Cultural Resources Inventory of the Marigold Mine Project	Harmon et al. 1988b	1 (0 are eligible)
CR2-2294	Cultural Resource Inventory of the Trout Creek Project, Humboldt County, Nevada	Clay 1989	0
CR2-2384	The Stonehouse Mine Project: A Cultural Inventory of Approximately 835 Acres in Humboldt County, Nevada for Marigold Mining Company	Johnson 1990	0
CR2-2612	Cultural Resource Inventory of 1,880 Acres South of the Marigold Mine, Humboldt County, Nevada	Newsome 1994	10 (1 is eligible; 7 are not eligible; 1 site has one component as eligible and one component as not eligible; and 1 site requires additional data collection before NRHP status can be finalized)
CR2-2681	A Class III Inventory of 685 Acres Within the Trenton Canyon Project Study Area of Santa Fe Pacific Gold Corporation, Humboldt County, Nevada	Dugas 1995	2 (1 is eligible, 1 is not eligible)
CR2-2632	A Cultural Resources Inventory in the Trenton Canyon Area, Humboldt and Lander Counties, Nevada	Obermayr and Dugas 1996	12 (4 are eligible, 8 are not eligible)
CR2-2686	A Class III Inventory of Section 21, T33N, R43E for the Trenton Canyon Project, Humboldt County, Nevada	Dugas 1996	1 (requires additional data collection before NRHP status can be finalized)
CR2-1256	A Cultural Resource Inventory of 187 Acres for the Marigold Mine Rock Dump Project near Valmy, Humboldt County, Nevada	Crosland and Prince- Mahoney 1996	0
CR2-1316	A Cultural Resource Inventory of 690 Acres for the Marigold Mine Project Near Valmy, Humboldt County, Nevada.	Martin-Moore 1997	0
CR2-1460	A Class III Cultural Resource Inventory of 520 Acres Within the Newmont Mining Corporation Valmy Project Proposed Access/Haul Road, Humboldt County, Nevada	Obermayr 2002	2 (1 is eligible, 1 is not eligible)
CR2-2915	A Cultural Resource Inventory of a 74.4 Acre Block in Humboldt County, Nevada	Kautz 2004	0
CR2-2891	A Class III Inventory of 1220 Acres for the Glamis Marigold Mining Company, Humboldt County, Nevada	Clay 2004	24 (4 are eligible, 20 are not eligible)

BLM Report Number	Report Title	Reference	Number of Sites Recorded in the Area of Potential Effects*
CR2-2929	A Cultural Resources Inventory of Seven Blocks at the Marigold Mine, Humboldt County, Nevada;	Simmons and Kimball 2005	10 (6 eligible, 4 not eligible)
CR2-2929	A Cultural Resources Inventory of Seven Blocks at the Marigold Mine, Humboldt County, Nevada;	Simmons and Kimball 2005	
CR2-3044	A Cultural Resources Survey of 7,258 Acres Conducted for Marigold Mining Company, Humboldt County, Nevada	Risse 2010	

*Sites may be duplicated between inventories

3.3. National Historic Trails

The California National Historic Trail is located approximately one mile north of the proposed Plan boundary and generally parallels Interstate 80 (I-80) from the Edna Mountain foothills to Battle Mountain. As described in BLM Manual 6280, National Historic Trails are managed to recognize the nationally significant resources, qualities, values, and associated settings of the areas through which such trails may pass, including the primary use or uses of the trail. Properties eligible for the NRHP may be identified along the National Historic Trail, including segments of the National Historic Trail.

Most of the California National Historic Trail has been marked, mapped, and described in detail. The section of trail from the Edna Mountain foothills to Battle Mountain has four trail markers and published diary accounts for each location (Helfrich and Hunt 1984). The California Natural Historic Trail is located approximately one mile north of the northern most edge of the proposed Plan boundary. Marigold Mine is visible from a portion of the California National Historic Trail.

Visual resources have been previously defined from two Key Observation Points (KOPs). Both KOPs were established in locations where the Marigold Mine facilities are most revealing as seen by the casual observer (BLM 2005). KOP 1 is located along I-80 between mile marker 215 and 216 on I-80 near the Valmy rest area and is described in detail in Section 3.22. KOP 2 is located along a segment of the California National Historic Trail approximately 200 to 300 yards to the north of I-80 near a railroad line and frontage road and is described below.

From KOP 2, Marigold Mine is located approximately six miles to the southwest. The integrity of the setting has been degraded by I-80, a frontage road, and a major east/west railroad line and associated traffic within the foreground view. Valmy and associated residential and commercial buildings and power plant dominate the view shed from the observation point on this section of trail. The association is present yet weakened by the present uses of the area. Vegetation and terrain conditions surrounding the proposed Plan boundary are generally unchanged; however, there are highly visible contrasting modern features in view including I-80, Valmy, mining operations, and transmission lines.

3.4. Invasive-Nonnative Species

The affected environment for invasive non-native species has been described in previous NEPA documents. This information is summarized from the 2001 Final Environmental Impact Statement (2001 FEIS) (page 3-83 through 3-87), 2003 FSEIS (pages 3-80 through 3-85), and 2005 Environmental Assessment (2005 EA) (page 60) and has been updated to present day conditions.

An “invasive species” is defined as a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112). Invasive, non-native species are species that reproduce quickly, mature rapidly, and spread aggressively. They include fungi, feral animals, some invertebrates, and weeds designated as “invasive,” “noxious,” or “pests” by federal, state, or other legally responsible authority. There are no known invasive, non-native animal species (pests), fungi, or invertebrates that are mandated for control in the proposed Plan boundary; therefore, they are not addressed further in this EA.

A noxious weed is defined by the BLM as “a plant that interferes with management objectives for a given area of land at a give point in time” (BLM 2009). Nevada Revised Statute (NRS

555.005) says noxious weeds are "any species of plant which is, or likely to be, detrimental or destructive and difficult to control or eradicate."

The following noxious weeds have been observed within the proposed Plan boundary: Scotch thistle (*Onopordum acanthium*), hoary cress (*Cardaria* spp.), and saltcedar (*Tamarix ramosissima*). Russian knapweed (*Acroptilon repens*), a Category B noxious weed, has been identified along the I-80 corridor; however, this area is considered to be outside of the proposed Plan boundary (JBR 2012). The location of these weeds is shown on Map 6: Noxious Weeds.

- Scotch thistle is a Category B Nevada listed noxious weed species (NDA 2012). Scotch thistle was identified as being common in the area in the 2001 FEIS, 2003 FSEIS, and 2005 EA. It was previously found along Trout Creek and Cottonwood Creek and near the 8-Pit and tailings dam. Through yearly weed eradication, Scotch thistle populations have minimized dramatically within the proposed Plan boundary.

- Hoary cress is a Category C Nevada listed noxious weed species (NDA 2012). As described by the Nevada Department of Agriculture, Category C weed species are established and generally widespread in many counties in the state. Abatement is at the discretion of the state quarantine officer (NDA 2012). Hoary cress populations are established along portions of Trout Creek and Cottonwood Creek, the Buffalo Valley Road realignment, areas previously burned in the salt desert shrub community, the catchment dam area, and the North-West WRSA area. Hoary cress is the most abundant noxious weed within and outside of the proposed Plan boundary.

- Saltcedar is a Category C Nevada listed noxious weed species (NDA 2012). Saltcedar has been identified near the 8-Pit and heap leach facilities. Saltcedar is typically eradicated whenever it is encountered and is not prevalent in the proposed Plan boundary.

The following invasive species have been observed within the proposed Plan boundary: forage kochia (*Bassia prostrata),* cheatgrass (*Bromus tectorum*)*,* curveseed butterwort (*Ceratocephala testiculata*), blue mustard (*Chorispora tenella*), saltlover (*Halogeton glomeratus*), prickly lettuce (*Lactuca serriola*), clasping pepperweed (Lepidium perfoliatum), and curly dock (*Rumex crispus*).

Cheatgrass is the most extensively established invasive plant species within the proposed Plan boundary and occurs on all aspects of slopes ranging from gentle to steep. All of the invasive, non-native species tend to occur most regularly in disturbed open areas, along roadsides and other clearings, and in other similar areas where native vegetation is sparse or previously disturbed.

MMC has an Integrated Weed Management Plan that has been developed for the mine to prevent and control the spread of noxious and invasive species during operation and post-reclamation activities at the Marigold Mine (JBR 2013a).

The most recent invasive non-native species inventory was conducted by Great Basin Ecology, Inc. (GBE) during the 2011 baseline survey (GBE 2012b); however, locations of invasive non-native species have been recorded during all baseline surveys. Table 3.7, "Noxious and Invasive Species Observed in the Proposed Plan Boundary" presents a list of all noxious and invasive species documented within the proposed Plan boundary and when they were observed.

Table 3.7. Noxious and Invasive Species Observed in the Proposed Plan Boundary

Scientific Name	Common Name	Category	1997-2005 EIS/ FEIS/EA	2011 Mule Deer Habitat Analysis	2012 Biological Baseline Survey	2012 Jurisdictional WOUS	Migratory Bird Surveys 2007-2012
Bassia prostrate	forage kochia	Invasive		X			
Bromus tectorum	cheatgrass	Invasive	X	X	X	X	X
Ceratocephala testiculata	curveseed butterwort	Invasive			X	X	X
Chorispora tenella	blue mustard	Invasive			X		X
Halogeton glomeratus	saltlover	Invasive	X	X	X	X	X
Lactuca serriola	prickly lettuce	Invasive	X				
Lepidium perfoliatum	clasping pepperweed	Invasive	X		X		
Rumex crispus	curly dock	Invasive			X	X	
Onopordum acanthium	Scotch thistle	Category B	X				
Cardaria draba	hoary cress	Category C	X		X	X	X
Tamarix ramosissima	Saltcedar	Category C				X	

WOUS = waters of the United States

3.5. Migratory Birds

Information detailing migratory birds in the proposed Plan boundary and authorized Plan boundary prior to 2005 is provided in the 2001 FEIS (pages 3-99 through 3-91), 2003 FSEIS (pages 3-88), and 2005 EA (pages 63 through 65). This information is summarized and has been updated to present day conditions.

Migratory birds are those listed in 50 CFR 10.13 and include all native birds commonly found in the United States, with the exception of native resident game birds. Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) (16 USC 701-718h), which prohibits the taking of migratory birds, their parts, nests, eggs, and nestlings without a permit. Federal agencies are directed to protect migratory birds by integrating bird conservation principles, measures, and practices under Executive Order 13186, signed January 10, 2001.

Additional direction comes from the Memorandum of Understanding (MOU) between the BLM and the United States Fish and Wildlife Service (USFWS), signed April 12, 2010. This MOU has management objectives and recommendations to avoid or minimize potential impacts to high priority migratory bird species. The purpose of the MOU is to strengthen migratory bird conservation through enhanced collaboration between the BLM and USFWS, in coordination with state, tribal, and local governments.

Migratory birds include those species of birds that breed in the proposed Plan boundary and then migrate south prior to the onset of winter. In addition to migratory bird species that arrive to nest in the area, several species of birds observed in the area are migratory species that only pass through the area.

The proposed Plan boundary is located within the Great Basin subregion (Bird Conservation Region 9) of the Intermountain West Bird Conservation Region as defined by Partners in Flight, and represents the center of distribution for many migratory birds. Over half of the biome's species of continental importance have 75 percent or more of their population in the Intermountain West (Beidleman 2000). In general, avian diversity is lowest in Great Basin habitats during the winter season. Diversity increases as migratory species arrive to nest in the area with the onset of spring. Some species are year-round residents; however, migratory birds are typically only present during the breeding season through late summer.

There are three vegetation communities within the proposed Plan boundary including sagebrush, salt desert shrub dominated by shadscale, and sagebrush-shadscale early seral stage in previously burned areas (GBE 2012b). All three communities are widespread and common throughout the area.

There are two naturally occurring springs within the proposed Plan boundary: Mud Spring and an unnamed spring. Both springs are heavily impacted by livestock and almost devoid of vegetation (GBE 2012b). There are no perennially flowing drainages within the proposed Plan boundary. Trout Creek is perennial in its upper reaches; however, this is approximately 0.5 miles south (upgradient) of the proposed Plan boundary.

The plant communities and presence of seasonal water within and adjacent to the proposed Plan boundary provides foraging and nesting habitat for numerous migratory bird species. Habitat within the proposed Plan boundary is influenced by human-caused disturbances such as active open pit mines, haul roads, and I-80.

A wide variety of migratory birds utilize the habitat within the proposed Plan boundary. Surveys of wildlife species, including migratory birds, at the Marigold Mine were conducted by JBR in 1998 and 2013 and GBE from 2007 through 2012. A golden eagle nesting survey was conducted by JBR in April 2013, within a 10-mile radius of the proposed Plan boundary. Baseline surveys conducted in 2011, 2012, and 2013 were conducted for the Target 3 Project and areas associated with the Proposed Action. Table 3.8 lists the bird species that were observed within the proposed Plan boundary during these site surveys. The table also lists migratory bird species identified by NDOW as occurring within the vicinity of the proposed Plan boundary (NDOW 2012). Migratory birds that are BLM sensitive species are presented in bold and are discussed further in Section 3.20, "Special Status Species".

Table 3.8. Migratory Bird Species within the Proposed Plan Boundary

Common Name	Scientific Name
Order *Accipitriformes*	
Cooper's Hawk	*Accipiter cooperii*
Golden Eagle	*Aquila chrysaetos*
Northern Harrier	*Circus cyaneus*
Red-tailed Hawk	*Buteo jamaicensis*
Order *Caprimulgiformes*	
Common Nighthawk	*Chordeiles minor*
Order *Charadriformes*	
Killdeer	*Charadrius vociferous*
Long-billed Curlew	*Numenius americanus*
Common Snipe	*Gallinago gallinago*
Order *Columbiformes*	
Band-tailed Pigeon	*Columba fasciata*
Mourning Dove	*Zenaida macroura*
Order Falconiformes	
American Kestrel	*Falco sparverius*
Order *Passeriformes*	
Sage Sparrow	*Amphispiza belli*
Black-throated Sparrow	*Amphispiza bilineata*
Cassin's Finch	*Carpodacus cassinii*
House Finch	*Carpodacus mexicanus*
Lark Sparrow	*Chondestes grammacus*
Common Raven	*Corvus corax*
Horned Lark	*Eremophila alpestris*
Brewer's Blackbird	*Euphagus cyanocephalus*
Pinyon Jay	***Gymnorhinus cyanocephalus***
Barn Swallow	Hirundo rustica
Loggerhead Shrike	*Lanius ludovicianus*
Brown-headed Cowbird	*Molothrus ater*
Sage Thrasher	***Oreoscoptes montanus***
Black-capped Chickadee	*Parus atricapillus*
Lazuli Bunting	*Passerina amoena*
Cliff Swallow	*Petrochelidon fulva*
Black-billed Magpie	*Pica pica*
Spotted Towhee	*Pipilo maculatus*
Vesper Sparrow	*Pooecetes gramineus*
Ruby-crowned Kinglet	*Regulus calendula*
Rock Wren	*Salpinctes obsoletus*
Say's Phoebe	*Sayornis saya*

Common Name	Scientific Name
American Goldfinch	*Spinus tristis*
Brewer's Sparrow	***Spizella breweri***
Western Meadowlark	*Sturnella neglecta*
American Robin	*Turdus migratorius*
Western Kingbird	*Tyrannus verticalis*
White-crowned Sparrow	*Zonotrichia leucophrys*
Order *Piciformes*	
Hairy Woodpecker	*Picoides villosus*
Order Strigiformes	
Great Horned Owl	*Bubo virginianus*
Western Burrowing Owl	***Athene cunicularia***

The Nevada Natural Heritage Program (NNHP), NDOW, and USFWS were contacted for information regarding wildlife use within and adjacent to the proposed Plan boundary (NDOW 2012; NNHP 2012; USFWS 2012). NDOW provided information regarding golden eagle nests within the 10-mile radius of proposed Plan boundary (NDOW 2013).

Table 3.9 lists the raptor species identified in NDOW's letter of response, dated January 11, 2013, that are known to reside within the proposed Plan boundary and its four-mile radius. Raptor species that have been identified during baseline surveys within the proposed Plan boundary are presented in Table 3.9.

Table 3.9. Raptor Species within the Vicinity of the Proposed Plan Boundary

Common Name	Scientific Name
Cooper's Hawk	*Accipiter cooperii*
Northern Goshawk	*Accipiter gentilis*
Sharp-shinned Hawk	*Accipiter striatus*
Northern Saw-whet Owl	*Aegolius acadicus*
Golden Eagle	*Aquila chrysaetos*
Short-eared Owl	*Asio flammeus*
Long-eared Owl	*Asio otus*
Western Burrowing Owl	*Athene cunicularia*
Great horned Owl	*Bubo virginianus*
Red-tailed Hawk	*Buteo jamaicensis*
Rough-legged Hawk	*Buteo lagopus*
Ferruginous Hawk	*Buteo regalis*
Swainson's Hawk	*Buteo swainsoni*
Turkey Vulture	*Cathartes aura*
Northern Harrier	*Circus cyaneus*
Merlin	*Falco columbarius*
Prairie Falcon	*Falco mexicanus*
Peregrine Falcon	*Falco peregrinus*
American Kestrel	*Falco sparverius*
Western Screech-owl	*Megascops kennicottii*
Osprey	*Pandion haliaetus*
Barn Owl	*Tyto alba*

During agency consultation, NDOW identified golden eagle nests within a 10-mile radius of the proposed Plan boundary (NDOW 2013). The USFWS indicated a concern for the species and recommended that baseline surveys for nesting golden eagles be conducted within a 10-mile radius of the proposed Plan boundary. An aerial survey for nesting golden eagles was conducted

in the spring of 2013 in areas that had not been previously surveyed. This survey incorporated existing data from NDOW and previously conducted golden eagle nesting surveys.

Sixteen golden eagle nests have been identified within the 10-mile radius of the proposed Plan boundary; however, none of these nests are located within the proposed Plan boundary. In 2013, seven golden eagle nests were identified, of which two nests were occupied and five nests were inactive. In 2012, nine golden eagle nests were identified. These nine golden eagle nests were not surveyed in 2013; thus, their status for the 2013 nesting season is unknown (JBR 2013b).

One occupied red-tailed hawk nest, one occupied Swainson's hawk nest, and nine inactive or vacant potential raptor nests were also identified during the 2013 aerial survey (JBR 2013b). Various raptor species have the potential to utilize the habitat located within the proposed Plan boundary and surrounding areas. While there are no rocky outcrops or rock faces suitable for raptor nesting within the proposed Plan boundary, there are open pit highwall features and utility poles that provide potential nesting habitat. Additionally, the entire proposed Plan boundary serves as potential foraging habitat for raptors (JBR 2013b).

3.6. Native American Religious Concerns

Laws and regulations that require consideration of Native American concerns include NHPA, AIRFA, Executive Order 13007 (Indian Sacred Sites), Executive Order 13175 (Consultation and Coordination with Tribal Governments), NAGPRA, Secretarial Order 3317, ARPA as well as NEPA and FLPMA.

The Treatment Plan and a request for consultation on the plan was sent to the following tribes on April 11, 2012: Battle Mountain Tribal Council, South Fork Band Council, Fort McDermitt Paiute and Shoshone Tribe, Elko Band Council, and Winnemucca Indian Colony. The certified letter to the Elko Band Council was returned as undeliverable on April 13, 2012. The Fort McDermitt Indian Reservation requested the Treatment Plan. The BLM forwarded the Treatment Plan on March 15, 2013 as requested, with the stipulation that it was not negotiable since they had over six months to comment on it and the plan had just been approved by SHPO. The BLM presented the Treatment Plan to the Fort McDermitt Indian Reservation in a consultation meeting on March 18, 2013. The Fort McDermitt Reservation informed the BLM on April 15, 2013, that they were deferring their interest in the project to the Battle Mountain Tribal Council.

Certified letters requesting consultation meetings on the project were mailed to the following tribes on February 11, 2013: Battle Mountain Tribal Council, Fort McDermitt Paiute and Shoshone Tribe, and Elko Band Council. The certified letter to the Elko Band Council was returned as undeliverable on February 21, 2013.

It is unlikely that there would be any new discoveries of historic properties that would have religious or cultural significance within the proposed Plan boundary. The Battle Mountain Band has previously indicated that the general vicinity of the proposed Plan boundary was used for hunting and gathering purposes.

3.7. Threatened and Endangered Species

The affected environment for threatened and endangered species has been described in previous NEPA documents. This information is summarized from the 2001 FEIS (pages 3-92 through

3-100), 2003 FSEIS (pages 3-93 through 3-98), and 2005 EA (pages 63 through 66), and has been updated to present day conditions.

Federally listed species are those species listed as endangered or threatened and those species that are candidates for listing or are proposed for listing by the USFWS. The status of threatened and endangered species is determined by the USFWS under the provisions of the Endangered Species Act (ESA). Under the ESA, endangered species are defined as being in danger of extinction throughout all or a significant portion of their range. Threatened species have the potential to become endangered in the foreseeable future. The USFWS also maintains a listing of species or subspecies (i.e., taxa) that may warrant listing as threatened or endangered, and for which the USFWS has sufficient biological information to support a rule to list as threatened or endangered, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. These species are referred to as candidate species. Proposed species are those species (taxa) for which the USFWS has published a proposal to list as threatened or endangered in the Federal Register.

Consultation letters were sent to USFWS and NNHP requesting information regarding threatened and endangered species that are known to occur, or are known to have the potential to occur, within the proposed Plan boundary. A letter was sent to the USFWS on November 26, 2012. The USFWS response on December 14, 2012 stated "to the best of their knowledge, no listed or proposed species occur in the project area". Based on consultation with the USFWS, no federally-listed plant species are known to occur or were identified in the proposed Plan boundary as well. One federal candidate wildlife species, the greater sage-grouse, has the potential to occur within the proposed Plan boundary. Greater sage-grouse is also a BLM sensitive species and is addressed in Section 3.20.

NNHP provided a list of documented threatened and endangered species including plant and animal taxa on November 29, 2012. There are no “at risk” taxa recorded within the proposed Plan boundary. According to the letter, potential habitat may be present for Lahontan cutthroat trout, a federally-listed threatened species (NNHP 2012). There are no riparian areas or perennially flowing drainages within the proposed Plan boundary; therefore, there is no habitat for the Lahontan cutthroat trout.

A summary of consultation efforts with federal and state agencies is provided in Section 6.2, “Coordination and/or Consultation”.

There are no threatened or endangered species identified within the proposed Plan boundary or within the vicinity of the proposed Plan boundary. There would be no impacts to threatened or endangered species as a result of the Proposed Action; therefore, this resource is not addressed in further detail in this EA.

3.8. Wastes, Hazardous or Solid

The affected environment for waste, hazardous or solid, has been described in previous NEPA documents. This information is summarized from the 2001 FEIS (pages 3-145 though 3-150), 2003 FSEIS (pages 3-137 though 3-140), and 2005 EA (pages 75 through 76) and has been updated to present day conditions.

Federal regulations applicable to the use, storage, and generation of hazardous materials include the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as

amended (43 USC 9615) (CERCLA), and Resource Conservation and Recovery Act of 1976 (RCRA) (43 USC 6901 et seq.). Materials such as spent heap leach ore and mill tailings are exempted from Subtitle C of RCRA under the Bevill Amendment, which exempts materials uniquely associated with the extraction and beneficiation process from classification as hazardous waste. MMC is classified as a small quantity generator of hazardous waste (43 CFR Part 262).

Pursuant to regulations promulgated under Section 102 of CERCLA, as amended, release of a reportable quantity of a hazardous substance to the environment in a 24-hour period must be reported to the National Response Center (40 CFR Part 302). The transportation and prescribed requirements for shipping, labeling, and transport of hazardous materials is regulated under 49 CFR 172.

The potentially affected environment resulting from the presence of hazardous materials and waste includes air, water, soil, and biological resources. The environment has the potential to be affected in the event of an accidental release of hazardous materials or wastes during transportation to and from the mine or during storage and use at the mine.

Hazardous substances associated with the Proposed Action are those chemical products purchased for use in the mining operations that require special handling because of their physical or chemical characteristics. Sodium cyanide, sodium hydroxide, hydrochloric acid, lime, flocculent, and anti-scalant are used in the assaying and gold extraction process. MMC is currently permitted by NDEP BMRR Water Pollution Control Permit NEV88040 for 15,000 gpm of barren solution application to the heap leach pad. MMC does not see any current need to increase sodium cyanide on-site storage beyond what is currently in place and permitted. No changes in the ore processing and management of the heap leach facilities is included in the Proposed Action; therefore, transportation, handling, storage and disposal of these hazardous substances would remain the same as the current conditions and are not discussed in further detail in this EA.

Existing operations at Marigold Mine include transporting, handling, storing, using and/or disposing of the following materials classified as hazardous by 49 CFR 172.101.

- Diesel fuel, gasoline, propane, petroleum oils, lubricants, ethylene glycol, acetylene, oxygen, and solvents used to operate and maintain equipment;
- Ammonium nitrate and explosives used for blasting in the open; and
- Various by-products and chemicals classified as hazardous waste from the assay laboratory.

Petroleum products have an established reportable quantity; however, they are excluded as hazardous substances under CERCLA Section 101(14). The reportable quantity for petroleum products is 25 gallons released to the ground surface, as regulated by NAC 445A.347.

Trucks are used to transport a variety on non-hazardous and hazardous materials to and from the mine site. Based on their hazardous characteristics, volume, and/or number of deliveries, the material of greatest concern is diesel fuel.

All hazardous substances are transported by commercial carriers or vendors in accordance with the requirements of 49 CFR 172, which requires that all shipments of hazardous substances be properly identified and placarded. Shipping papers must be accessible and must include information describing the substance, immediate health hazards, fire and explosion risks, immediate precautions, fire-fighting information, procedures for handling leaks or spills, first aid measures, and emergency response telephone numbers. Carriers are licensed and inspected, as

required by Nevada Department of Transportation (NDOT) and the United States Department of Transportation. Tanker trucks have a Certificate of Compliance issued by the Nevada Department of Motor Vehicles. These permits, licenses, and certificates are the responsibility of the carrier.

MMC developed an integrated ERP on September 21, 2012, that addresses release of fluids as a result of mining operations at Marigold Mine. Over the life of the project, the probability of minor spills of materials such as oils and lubricants (from loading or unloading activities) is expected to occur on an annual basis. The section of the ERP that addresses chemical releases contains procedures for the control of leaks or spills of propane, diesel or gasoline, and other petroleum products.

Continued operation in accordance with the ERP would assist in keeping spills localized and contained to allow for efficient cleanup. MMC has the necessary spill containment and cleanup equipment and trained personnel available at the mine to quickly respond to minor releases.

Hazardous materials storage tanks require secondary containment sufficient to hold 110 percent of the volume of the largest tank within the containment system. Management of all tanks and vessels comply with manufacturer's recommendations, state and federal regulations, and EPMs. All hazardous substances are handled in accordance with applicable MSHA or OSHA regulations (Titles 29 CFR and 30 CFR).

Non-hazardous solid waste generated at the mine is disposed in a waivered Class III landfill located on-site under permit SWMI-08-41. The permit allows the disposal of inert material generated on-site. Used tires are either recycled by the suppliers or buried in the WRSA. Used equipment such as batteries, alternators, starter motors, etc., is recycled for remanufacture. Slag from the on-site laboratory is recycled. Crucibles and cupels from the laboratory are sent to a licensed hazardous waste landfill for disposal. Used petroleum products, antifreeze, and Freon are transported off-site to recycling facilities.

3.9. Water Quality (surface and ground)

Information detailing water quality in the proposed Plan boundary is provided in 2001 FEIS (pages 3-2 though 3-36), 2003 FSEIS (pages 3-25 through 3-58), and 2005 EA (pages 49 through 59). Information from previous NEPA documents has been summarized and updated to present day conditions.

As described in Section 3.1, "Air Quality", the proposed Plan boundary is located within the Nevada hydrographic basin referred to as Clovers Area. This area includes a reach of the Humboldt River and associated tributaries. The proposed Plan boundary is located within three smaller hydrologic units as part of the United States Geological Survey Hydrologic Unit 12 including Stonehouse Spring-Humboldt River, Cottonwood Creek, and Trout Creek watersheds. Tributary streams drain generally northward from canyons on Battle Mountain onto relatively flat alluvial fans. Flows disperse and infiltrate into the fans.

Annual average precipitation, as measured at the mine between 2009 and 2012, was 6.49 inches. Annual precipitation varied from 7.96 inches in 2010 to 5.16 inches in 2012. Most of the precipitation occurs as snow during winter months. This precipitation is stored in the soil (approximately 90 percent) or becomes runoff discharge for the groundwater system (approximately 10 percent), and nearly all is eventually lost from the basin by evapotranspiration.

Surface Water

The proposed Plan boundary contains three main surface water drainages: Cottonwood Creek, Trout Creek, and an unnamed eastern drainage. Cottonwood Creek and Trout Creek are shown on Map 3: Authorized Facilities.

Cottonwood Creek is located in the western portion of the proposed Plan boundary. Flows are intermittent through the proposed Plan boundary with a perennial stretch located upgradient on Battle Mountain. Trout Creek is located east of Cottonwood Creek and is located within the proposed Plan boundary. It is perennial in its upper reaches located south of the proposed Plan boundary and intermittent within the proposed Plan boundary. An unnamed eastern channel is located in the eastern portion of the proposed Plan boundary and is ephemeral. Most of the unnamed drainage area has been disturbed by mining and includes pit areas that no longer contribute to surface runoff.

As a part of previous and future mine development, MMC constructed diversions designed to capture and redirect flows in both the Cottonwood Creek and Trout Creek channels. Historically, Trout Creek was diverted into Cottonwood Creek adjacent to open pits located in T.32N., R.43E., sections 17 and 18. This diversion is still in place; however, most of the surface water flows were diverted again upon construction of an earthen dam upgradient of mine activities as part of the mine's stormwater management system. An approximately one-mile-long buried pipeline beginning at the upstream face of the dam allows flow to continue downstream, upon request, to a private parcel not managed by MMC. An overflow diversion adjacent to the dam directs overflow from Trout Creek into Cottonwood Creek. A third diversion is located further downstream on Cottonwood Creek, and directs the combined flow from the Trout Creek and Cottonwood Creek drainages into an unnamed drainage west of the existing Cottonwood Creek channel. Any flows from the Trout and Cottonwood Creek drainages are captured west of the mine and redirected into these diversions. Little flow, other than flow associated with precipitation, continues to flow in the portions of the Trout and Cottonwood Creek channels below the diversions. Construction of the dam on Trout Creek and the diversion channels were permitted through the Nevada Division of Water Resources (NDWR) under Permit J-296. Cottonwood Creek, Trout Creek, and the three diversions are shown on Map 3: Authorized Facilities.

On December 31, 2007, the United States Army Corps of Engineers (ACOE) determined that Cottonwood Creek, Trout Creek, and the unnamed drainage that cross the proposed Plan boundary were not connected to the Humboldt River. This verification expired in December 2012, and the Marigold Mine had a reverification survey conducted. The survey identified that Trout Creek, Cottonwood Creek, and an unnamed drainage, as well as several smaller drainages that cross the proposed Plan boundary do not connect to the Humboldt River. Because these drainages do not connect to the Humboldt River, they would be considered by the ACOE as isolated with no interstate commerce connection (JBR 2012). The subject streams would not be considered a WOUS and would not be regulated under Section 404 of the Clean Water Act. Results of the reverification survey are pending approval by the ACOE.

Three isolated springs located within and near the proposed Plan boundary include:

- Mud Spring – T.33N., R.43E., sec. 20; SW¼;
- Ames Spring – T.33N., R.43E.; sec. 16, SE¼; and
- Unnamed Spring – T.33N., R.43E., sec. 20 SW¼.

An upward vertical gradient is created as shallow bedrock groundwater flowing perpendicular to the Mud Spring fault encounters the low permeability fault zone. The clay rich layers within the alluvium act as barriers to the vertical flow resulting in the low discharge rates and the dispersed discharge areas observed in both Mud Spring and the nearby unnamed spring. A similar mechanism may be responsible for the seepage observed at the Ames Spring location. There are no other identified surface water springs or seeps within the proposed Plan boundary or adjacent area.

Mud Spring is located within the proposed Plan boundary and was dry, lacked vegetation entirely, and did not appear to have been wetted for some time during the 2012 survey. A dry spring with two sources was identified upgradient of Mud Spring.

Ames Spring is located outside of the proposed Plan boundary, and consists of several seeps and springs within the source area. Most of the springs were dry at the time of the 2012 survey. All of the Ames Spring sites have been heavily impacted from livestock use.

The unnamed spring consists of multiple springs. During the 2012 survey, the area appeared heavily impacted from livestock use with the exception of a fenced area around one of the springs. A number of apparent springs in the area were dry when visited in 2012. The area supported minimal vegetation, which had been impacted by the dry conditions and grazing. The fenced area around one of the springs represented conditions that would normally exist at spring sites in the area had not been affected by grazing pressure.

Surface Water Quality

Surface water quality data from Trout Creek in the spring and summer of 1998 indicate that water quality both upstream and downstream of the mine is within Nevada drinking water standards. Nevada drinking water standards are presented in Table 3.10. The surface water is predominantly a calcium-bicarbonate type, with pH ranging from 7.7 to 8.7 and total dissolved solids (TDS) levels less than 350 milligrams per liter (mg/L). In addition, trace metals are generally very low, with non-detected silver, cadmium, weak acid dissociable cyanide, chromium, mercury, lead, selenium, zinc, beryllium, nickel, and antimony. Historically, however, manganese and iron exceed their secondary drinking water standards both upstream and downstream of the mine, probably due to natural mineralization, as evidenced by the same chemical signature within data from the groundwater wells upgradient of mining activities, to the south of the mine (BLM 2003).

Table 3.10. Nevada Water Quality Standards

Parameter	Reference Value (mg/L)
Aluminum	0.2
Antimony	0.006
Arsenic	0.010
Barium	2.0
Beryllium	0.004
Cadmium	0.005
Chloride	400
Chromium	0.1
Copper	1.0
Cyanide (Weak Acid Dissociable)	0.2
Fluoride	4.0
Iron	0.6
Lead	0.015
Magnesium	150

Parameter	Reference Value (mg/L)
Manganese	0.10
Nickel	0.1
Nitrate	10
pH	6.5-8.5
Selenium	0.05
Siler	0.1
Sulfate	500
Total Dissolved Solids	1,000
Thallium	0.002
Zinc	5.0

Source: NDEP 2009

To assess impacts of the mine on water quality in Trout Creek, two sample points upgradient of the mine and two sample points downgradient of the mine site were tested. All samples met Nevada drinking water standards for all primary drinking constituents. Cyanide, cadmium, chromium, lead, and zinc were not detected in the surface water samples. Concentrations of all analyzed constituents remain consistent between the upgradient water sampling locations and the downgradient water sampling locations. Seasonal variations in flow quantities are likely the reason for varying concentrations of constituents (Geomega 2012).

The evaluation of temporal and spatial surface water quality in Trout Creek has shown that solute concentrations over five years of reporting (2006 to 2011) have remained constant across the mine and are consistent with background levels. All chemical concentrations of chlorine, nitrate, and sulfate are within the outlined background levels for the mine. The absence of any significant increase in concentrations from the upstream sample point and the downstream sites shows that surface waters are not being impacted by the existing waste rock facilities. The maximum sulfate variability across the mine was 16.5 mg/L on May 18, 2011 (21.6 mg/L upstream and 38.1 mg/L downstream), compared to the drinking water standard for sulfate of 500 mg/L. While sulfate concentrations increase as water flows through the mine, these concentrations do not exceed or approach drinking water standards (Geomega 2012).

Surface water quality monitoring was conducted at Cottonweed Creek approximately two miles upgradient of the Marigold Mine. Results showed no element outside of applicable standards (BLM 2003).

Groundwater

Two aquifer systems exist in the proposed Plan boundary: a shallow alluvial system and the deeper bedrock system, which comprises the main aquifer at the mine site. The alluvial aquifer is located largely northeast of the mine and typically overlays the bedrock aquifer on-site. Groundwater in the alluvial aquifer flows to the northeast (Hydro-Engineering 2011). An alluvial water level elevation map has not been developed because the alluvium is not saturated within the proposed Plan boundary.

The bedrock aquifer is connected to the alluvial aquifer with groundwater from the bedrock aquifer flowing into the alluvial aquifer. Groundwater in the bedrock aquifer flows predominantly from south to north. A water elevation map was developed for the bedrock aquifer based on the pre-1992 static groundwater level. The pre-1992 static groundwater level is estimated to be the water level prior to dewatering of the aquifer at Newmont's Lone Tree Mine. Dewatering of the Lone Tree Mine ceased in December 2006, and the water levels have since been recovering. The depths to groundwater in the bedrock aquifer are variable due to geologic structure and rock

types. Groundwater depths in the bedrock aquifer range from approximately 350 to 970 feet below ground surface throughout the proposed Plan boundary.

MMC is permitted for a maximum groundwater pumpage volume of 828.42 million gallons annually (NDWR Permit #82060T) for production use at the Marigold Mine. According to the monthly pumpage report submitted to NDWR on a quarterly basis, MMC pumped approximately 348.93 million gallons in 2012, 286.37 million gallons in 2011, 229.65 million gallons in 2010, and 240.39 million gallons in 2009.

The Proposed Action would not increase the amount or change the use of groundwater used at Marigold Mine; therefore, it is not addressed further in this EA.

Groundwater Quality

There have been approximately 80 groundwater samples collected over a period of 19 years. Based on these samples, groundwater derived from both the bedrock and alluvial aquifers is predominantly a calcium-bicarbonate type, with pH ranging from 6.8 to 9.7 (Geomega 2012).

The water quality in the alluvial and bedrock aquifers near the Marigold Mine has TDS levels less than 500 mg/L (Hydro-Engineering 2011). Historically documented trace metals at Marigold Mine are restricted primarily to arsenic, iron, and manganese, which range from 0.03 to 0.07 mg/L, 0.02 to 2.32 mg/L, and 0.016 to 0.253 mg/L, respectively (BLM 2003). The historical presence of arsenic, iron, and manganese indicates that the area is a mineralized zone. Background groundwater pH ranges from 6.2 to 7.84; sulfate ranges from 8 to 380 mg/L, chlorine is generally less than 100 mg/L, and nitrate is less than 1.0 mg/L (BLM 2003). To ascertain whether the mineralized groundwater has been anthropogenically impacted, concentrations of chlorine, nitrate, and sulfate across the site in both surface water and groundwater were examined in 2012 and compared to background levels.

All chemical concentrations of chlorine, nitrate, and sulfate are within the outlined background levels for the site (BLM 2003). Chloride ranges from 4 to 39 mg/L, nitrate from 0 to 0.7 mg/L, and sulfate from 2.5 to 74.9 mg/L in the groundwater chemical data set. Consistency between background chlorine, nitrate, and sulfate concentrations and groundwater concentrations in wells downgradient from WRSAs support the conclusion that the mineralized groundwater has not being anthropogenically impacted by the WRSAs (Geomega 2012).

Previous sampling and testing of groundwater regarding conformance with drinking water standards in 2002 had results similar to current testing results. The secondary drinking water standard for sulfate (500 mg/L) was not exceeded. Arsenic exceeds the drinking water standard (0.01 mg/L) in 37 of 61 samples, iron exceeds the standard (0.6 mg/L) in 23 of 57 samples and manganese exceeds the standard (0.10 mg/L) in 26 of 57 samples. Fluorine, mercury, lead, and TDS numerical standards had single samples that exceeded drinking water standards. These exceeded values are internally consistent with the baseline conditions in the anthropogenically unimpacted areas for groundwater and are characteristic of playa-related soil chemistry in Nevada.

3.10. Wetlands and Riparian Zones

Several seeps and springs located within and adjacent to the proposed Plan boundary have been identified and are considered to be isolated wetlands (JBR 2012). A wetland delineation was conducted within the proposed Plan boundary in 2012 to identify potential wetlands. A dry spring with two sources was identified upgradient of Mud Spring. This area was identified as a

potential wetland that was delineated for a total of 0.11 acres of wetland. Several small areas within the Ames Spring area were delineated for a total of 1.61 acres of wetland. The unnamed spring consists of multiple springs that were delineated for a total of 0.30 acres of wetland. A total of 2.02 acres of wetlands were delineated in 2012 (JBR 2012). Because wetlands associated with Ames Spring are located outside of the proposed Plan boundary, approximately 0.41 acres of wetlands are located within the proposed Plan boundary.

The dam on Cottonwood Creek has created the potential for a wetland to develop over time within the conservation pool area; however, since the construction of the dam, no water has been impounded. Currently, this area is not considered to be a wetland.

There are no riparian areas or perennially flowing drainages within the proposed Plan boundary. The isolated wetlands are located outside of the Proposed Action disturbance areas; therefore, no impacts to 0.41 acres of wetlands are anticipated. All exploration activities would avoid the identified wetlands. Wetlands and riparian zones are not further analyzed in this EA.

Additional Affected Resources

3.11. Access, Land Use, and Realty

The affected environment for access, land use, and realty has been described in previous NEPA documents. This information has been summarized from the 2001 FEIS (pages 3-110 though 3-115), 2003 FSEIS (pages 3-105 through 3-109), and 2005 EA (pages 68 through 69), and has been updated to present day conditions.

Access

Marigold Mine is located approximately three miles south of Valmy, Nevada in Humboldt County, Nevada. Access to the Marigold Mine is via I-80, Valmy Interchange at exit 216, and the unpaved Buffalo Valley Road, which is maintained by Humboldt County. A security gate at the entrance to the mine prevents unauthorized public access to the mine property.

Land Use

The Marigold Mine is located within the checkerboard pattern land of northern Nevada as shown on Map 2: Land Ownership Status. This pattern extends to either side of the Humboldt River for approximately 20 to 25 miles. The alternating sections are administered by the BLM and private land owners. Publicly administered land, including land managed by the BLM, USFS, and State of Nevada, account for approximately 80 percent of the Humboldt County land base, and private land accounts for approximately 20 percent.

The Marigold Mine has been in operation since 1988. The authorized Plan boundary encompasses approximately 8,543.5 acres. MMC is currently authorized to construct facilities on 2,371.9 acres of private land and 2,071.1 acres of public land for a cumulative authorized mine disturbance of 4,443 acres. MMC manages or controls mining claims on approximately 8,320 acres of private land and 10,480 acres of public land for a total of 18,800 acres. The entire Plan boundary encompasses approximately 19,801 acres; however, MMC does not own or control the remaining 281 acres. There are no state-administered lands within the Plan boundary; however, the University of Nevada, Reno owns the land within T.33N., R.43E., sec. 19 in which MMC manages the mineral rights. MMC's mining operation surrounds a private land holding consisting

of approximately 80 acres located in T.33N., R.42E., sec. 30, E1/2NW1/4. The private property is not part of MMC's land holdings.

Land uses within the area of authorized disturbance consist of open pit mining, heap leach pads, WRSAs, and mine support facilities. Land use within the Plan boundary consists primarily of mineral exploration and development, livestock grazing, wildlife habitat, and dispersed recreational use.

The nearest residential dwellings are located in Valmy. Residences in Valmy include several houses and a mobile home park with approximately 48 spaces. Additional structures include a NDOT maintenance facility, rest area, and gas station.

Realty

Access to upper reaches of Trout Creek is to the south from Buffalo Valley Road, along a dirt road running parallel to the creek. This road skirts the western perimeter of the authorized Plan Boundary, on the west side of the creek. As this road enters the southern portion of Section 31, it crosses Newmont Mining Corporation's existing Valmy Haul Road (ROW N-59591), which runs northeast-southwest. The Trout Creek access road has been appropriately tied into the haul road to allow for safe crossing. Public access to Ames, Mud, and the unnamed springs is located along the east boundary of the Marigold Mine area, and is generally from the east along a dirt road from the Mote Interchange off I-80. This access is located entirely outside of the proposed Plan boundary. Three mineral material sites are located within the proposed Plan boundary on land administered by the BLM. NDOT has a ROW grant from the BLM along I-80 in T.34N., R.43E., sections 20 and 28. The Union Pacific Railroad also has a parallel ROW grant north of I-80 in T.34N., R.43E., sections 20 and 28. MMC is not proposing any activities within the boundary area north of the I-80 corridor. Other ROWs include transmission lines, telephone lines, and a water supply line that serves the mine site. Table 3.11, "Existing Rights-of-Way within the Proposed Plan Boundary" provides a detailed listing of ROWs within the proposed Plan boundary.

Table 3.11. Existing Rights-of-Way within the Proposed Plan Boundary

Serial Number	Type of Land Use	ROW Holder	Location	ROW Width/ Total Acres
N-25227	North Valmy Station Power Line (23kV), Water Pipeline (18") and Patrol Road	Sierra Pacific Power Company	T.34N., R.43E., sec. 20 and 28	30 feet
CC-023029	Power line	Sierra Pacific Power Company	T.34N., R.43E., sec. 20 and 28	100 feet
Nev-066891	Power line (120kV)	Sierra Pacific Power Company	T.34N., R.42E., sec. 36 T.33N., R.43E., sec. 4 and 10 T.34N., R.43E., sec. 32	75 feet
Nev-058529	Power line (7.2kV)	Sierra Pacific Power Company	T.34N., R.43E., sec. 28 and 32	40 feet
N-59986	Power line (24.9kV)	Santa Fe Pacific (to Newmont)	T.33N., R.42E., sec. 12, 24, and 36; T.34N., R.42E., sec. 36	30 feet
N-16360	Telephone Line	Nevada Bell	T.34N., R.43E., sec. 20 and 28	10 feet
N-57541	Telephone Line	Nevada Bell	T.34N., R.43E., sec. 20 and 28	20 feet
CC-021136	I-80	Nevada Department of Transportation	T.34N., R.43E., sec. 20 and 28	400 feet
N-59591	Patrol Road	Santa Fe Pacific (to Newmont)	T.33N., R.42E., sec. 36 T.33N., R.43E., sec. 30	Variable
Nev-059166	Highway	NDOT	T.34N., R.43E., sec 20 and 28	40 feet
NVN 043253	Railroad	Southern Pacific	T.34N., R.43E., sec 20	200 feet
N-59592	Water pipeline, road, and communication cable	Santa Fe Pacific (to Newmont)	T.33N., R.43E., sec. 6 T.33N.,R.42E., sec. 24 and 36 T.34N., R.42E., sec. 36 T.33N., R.43E., sec. 18 T.34N., R.43E., sec. 30	100 feet
N-65550	Buried Communications line	WilTel Communica-tions	T.34N., R.43E., sec 20 and 28	20 feet
CC 021178	Mineral Material site	NDOT	T.34N., R.43E., sec 28	40 acres
CC 021147	Mineral Material Site	NDOT	T.34N., R.43E., sec 28	80 acres
CC 021179	Mineral Material Site	NDOT	T.34N., R.43E., sec 20	40 acres

3.12. Geochemistry

The affected environment for geochemistry has been described in previous NEPA documents. This information has been summarized from the 2001 FEIS (pages 3-2), 2003 FSEIS (pages 3-26), and 2005 EA (pages 81 through 83) and has been updated to present day conditions.

The Marigold Mine is located along the Golconda Thrust. At the thrust, the Havallah sequence was pushed eastward to overlie the Antler and Valmy formations of the Roberts Mountains allochthon. The proposed Target 3 Pit is estimated to contain approximately 52 million tons of ore and 190 million tons of waste rock that would consist of approximately 67 percent oxidized Valmy Formation, 23 percent alluvium, nine percent Antler formation, and 0.4 percent Havallah formation. Section 3.13 provides a more complete description of these units and the geology within the proposed Plan boundary.

The mineralized rock within the proposed Plan boundary contains disseminated and vein siliceous gold ore along with veins of barite and occasionally jarosite, pharmacosiderite and scorodite. Clay alteration accompanied by iron oxides (hematite, goethite, limonite) is common in the ore zones and the waste rock (non-mineralized, altered rock) that accompanies the ore (Geomega 2012).

The sulfur content of rocks associated with the proposed Target 3 Pit have been found to be low, which is consistent with the rock descriptions summarized in the 2005 EA, 2003 FSEIS, and 2001 FEIS. Lithologies of the Target 3 Pit are extensions of the rock associations being mined at the Marigold Mine, and consist of low-sulfur, non-acid generating, oxide deposits located in the Valmy, Antler, and Havallah formations. The concentration of sulfide and total sulfur in the Valmy Formation, Battle Formation, and Antler Peak Limestone are near or below the detection limits (0.01 weight percent) and slightly higher in the Havallah Formation and Edna Mountain Formation (Geomega 2012).

Based on the lithological and acid-base accounting (ABA) similarities of Target 3 Pit rock to waste from the Antler, Basalt, Target 1, Target 2, and Terry Zone pits, leached concentration distributions from Target 3 Pit materials should be similar to the distribution of materials already mined from those pits. MWMP leachate from the Antler, Basalt, Target 1, Target 2, and Terry Zone pits, is nearly neutral with a pH ranging from 6.5 to 8.8. Measurable alkalinity, ranging from 4.6 to 209 tons per kilotons of calcium carbonate (T/kT CaCO3) and averaging 87 T/kT CaCO3, demonstrates the net neutralizing nature of the materials (Geomega 2012).

Although the water to rock ratio used in the MWMP is not representative of field conditions, the MWMP data provide qualitative information about trace metal concentrations in pore water or discharge water. The leachate from MWMP tests of geologic units mined at the Marigold Mine had parameters over the State of the Nevada drinking water criteria in one or more analyses for aluminum, antimony, arsenic, chloride, fluoride, lead, mercury, selenium, sulfate, nitrate, and TDS and was disclosed in previous NEPA documents (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy"). The MWMP results of the most current analysis show that the average concentrations of constituents displayed minor exceedances of aluminum, antimony, arsenic, and nitrate, compared to NDEP Profile I water pollution standards. Based on the MWMP results, the waste rock is benign. The low sulfur content and the abundant acid-neutralizing capacity of these geological units suggest that the material is not likely to generate acid in response to precipitation events. The pH of the MWMP test leachate of these units is generally above 7.0 (Geomega 2012).

Four drilling locations were sampled at the mine in December 2010, to assess impacts or potential impacts to subsurface materials from acid-rock drainage. Drilling was conducted following a period of wet weather. Soil conductivity was measured from holes drilled approximately 20 feet below the waste rock interface with underlying material. The pH of the four holes averaged 7.6, 7.7, 6.1, and 7.6. Soil conductivity of the four holes averaged 0.4, 0.32, 0.51, and 0.077 milliSeimens per cubic centimeter (mS/cm3). The neutral pH and low conductivity of rock sampled at Marigold Mine demonstrates that the waste rock has not produced acid after exposure to environmental conditions for up to 20 years. The soil conductivity measurements are low and consistent, showing that leaching activity is low and there is effectively no observed threat of mobilized constituents moving towards groundwater (Geomega 2012).

3.13. Geology and Mineral Resources

The affected environment for geology and mineral resources has been described in previous NEPA documents. This information has been summarized from the 2001 FEIS (pages 3-37 though 3-50), 2003 FSEIS (pages 3-3 through 3-13), and 2005 EA (pages 46 through 49) and has been updated to present day conditions.

The Marigold Mine is located in the Battle Mountain Mining District of north-central Nevada, approximately three miles south of Valmy, Nevada. The mine has been operating since 1988 and consists of open pits developed to recover siliceous gold ore along faults and fault intersections in the Valmy Formation and the Antler/Battle Sequence. The mineralization is epithermal in nature and the oxidized gold ore zones are mined and heap-leached for recovery of the gold. Milling was used on certain high-grade ores until the mill was closed and removed from the property in 1999. Mining claims and a summary of private land ownership is provided in Appendix A of the Plan (MMC 2012).

Battle Mountain is part of the Basin and Range physiographic province of northern Nevada. This portion of Nevada is characterized by large block uplifts separated by deep structural valleys that contain alluvial gravels and sands as well as old Pleistocene lake beds. These alluvial valleys can be up to 10,000 feet deep. North of the Marigold Mine, the valley alluvium is at least 2,000 feet thick. Bedrock in the uplifted blocks is commonly highly deformed Paleozoic quartzites, shales, cherts, and limestones. The Marigold Mine encompasses an area of deformed Paleozoic rocks transected by north-trending faults. Mineralization at the mine is surrounded by and often covered by alluvial fan sediments shed from the Battle Mountain Range. The gold deposits in the Marigold Mine area are hosted in Paleozoic sediments and meta-sediments that have been variably folded and faulted during as many as three major orogenic episodes.

Stratigraphy

The stratigraphy of the Battle Mountain area is shown in Table 3.12. The Paleozoic stratigraphy of the proposed Plan boundary can be divided into three rock assemblages: the Roberts Mountain allochthon (Ordovician Valmy Formation), the autochthonous overlap assemblage (Pennsylvania-Permian Antler sequence), and the Golconda allochthon (Havallah sequence), which structurally overlies both rock assemblages above the Golconda thrust fault.

Table 3.12. Battle Mountain Area Stratigraphic Column

Geologic Time Period	Unit Thickness	Stratigraphic Unit	Description
Tertiary - Quaternary	Variable	Alluvium	Alluvial deposits including terrace deposits, stream gravels, and bench gravels.
	-	Basalt flows	Basaltic flows that are locally interbedded with alluvial gravels
	-	Tuffs and ashflows	Felsic tuff and ashflows that are locally interbedded with alluvial gravels
Cretaceous - Tertiary	-	Intrusives	Felsic intrusives
Golconda Allochthon (Havallah Sequence)			
Mississippian - Permian	5,000 feet	Pumpernickel Formation	Interbedded chert and siltstone
	10,500 feet	Havallah Formation	Interbedded conglomerate, shale, sandstone, limestone, metavolcanics, and chert
Overlap Assemblage (Antler Sequence)			
Permian	600 feet	Edna Mountain Formation	Conglomerate, sedimentary breccia, calcareous siltstone, sandstone, and minor limestone
Pennsylvania - Permian	200 feet	Antler Peak Limestone	Medium-dark, gray bedded limestone with local calcareous conglomerate, sandstone, and siltstone
Pennsylvanian	400 feet	Battle Formation	Chert-pebble conglomerate, sandstone, and minor shale

Geologic Time Period	Unit Thickness	Stratigraphic Unit	Description
Roberts Mountains Allochthon			
Devonian	2,000 feet	Scott Canyon Formation	Chert, argillite and greenstone
Ordovician	3,000 to 8,000 feet	Valmy Formation	Interbedded quartzite, shale, argillite, chert, pillow metabasalt, and minor sandstone
Cambrian	3,000 feet	Harmony Formation	Olive gray-green feldspathic sandstone

Roberts Mountain Allochthon

The Roberts Mountain allochthon consists of Ordovician quartzite, argillite, shale, metabasalt, chert, and sandstone deformed by the Antler Orogeny. Within Marigold Mine, the Roberts Mountain allochthon is represented by the Valmy Formation.

Overlap Assemblage

The overlap assemblage, as represented by the Antler sequence, is autochthonous and consists of sediments eroded from the highlands of the Antler orogeny and deposited in shallow and marginal marine environmental of a foreland basin during the Pennsylvanian though the early Permian (Roberts 1964). At the Marigold Mine, the Antler sequence consists of the following formations in order from oldest to youngest:

- Battle Formation: Pennsylvanian chert-pebbled conglomerate, and sandstone with minor shale;
- Antler Peak Limestone: Pennsylvania and Permian limestone with calcareous conglomerate, sedimentary breccia, sandstone and siltstone; and
- Edna Mountain Formation; Permian conglomerate, siltstone, sandstone, and minor limestone.

All three of these formations, including the Valmy Formation, locally contain ore at the Marigold Mine.

Golconda Allochthon

The Golconda allochthon, also known as the Havallah sequence, consists of rocks that were emplaced over the Valmy Formation and Antler sequence during the Sonoma orogeny, along the Golconda thrust fault. The Havallah sequence is a major regional tectono-stratigraphic unit and is the principal unit used to define the extent of the Golconda thrust fault. The Pumpernickel member of the Havallah sequence is Pennsylvania and Permian chert and siltstone and the Havallah formation is the Mississippian and Permian aged conglomerates, shales, sandstones, limestones, metavolcanics, and cherts.

The majority of the gold deposits of the Battle Mountain area are believed to have formed during the late Eocene-early Oligocene time approximately 38 to 41 million years ago. This has been documented at the Battle Mountain and nearby McCoy/Cove deposits, as well as in other districts in northern Nevada.

During the Tertiary period, the Basin and Range underwent extensive faulting and volcanism. Additional felsic stocks were developed during this period, and felsic tuffs and basalt flows are interbedded with the alluvial fan sediments that were developing as a result of uplift. Battle Mountain was formed during the middle to late Tertiary uplift approximately 10 to 25 million years ago.

Structure

The main structural features are thrust faults and north-trending normal faults. The thrust faults are related to the Antler Orogeny (the Roberts Mountains thrust fault is believed to be present yet very deeply buried) and the Sonoma Orogeny. The Sonoma Orogeny resulted in development of the Golconda thrust fault. The normal faults are related to the basin and Range faulting during the middle to later Tertiary.

Mineralization

Mineralization of the Terry Zone Pit, East Hill Pit, Old Marigold Pit, and Terry Zone North Pit is found in the Valmy Formation, and primarily consists of quartzite with lesser amounts of argillite or shale, sandstone, and chert. Quartzite and argillite form the bulk of this rock unit. The quartzite is light to dark gray, with interbeds of white to green argillite. Zones have been sheared and boudined to form pods of isoclinally folded forms in outcrops. This rock unit is very low in sulfides, with iron staining along fractures and localized clay alterations.

Along the western margins of the Terry Zone Pit, Old Marigold Pit, and Terry Zone North Pit, there are minor amounts of Antler sequence rocks and the overlying Havallah Formation. These units overlie the Valmy Formation quartzite sand shales and are consistently very low in sulfides, with iron staining along fractures and localized clay.

The proposed Target 3 Pit would be developed in geological and structural conditions similar to what was encountered at the Terry Zone, East Hill, and Old Marigold Pits. The proposed Target 3 Pit area consists of Paleozoic sedimentary rocks and overlying unconsolidated Quaternary and Tertiary valley-fill alluvium. Rock masses are faulted and folded where fracture frequency is high (Golder 2011).

The proposed Target 3 Pit would contain approximately 190 million tons of waste rock that would consist of approximately 67 percent oxidized Valmy Formation, 23 percent alluvium, nine percent Antler formation, and 0.4 percent Havallah formation (Geomega 2012).

The Target 3 Pit would be excavated just to the east of an adjoining private property that is not part of MMC's land holdings. The crest of the west wall would be constrained by the property line between the Target 3 Pit and private property. As described in Section 2.1.3, "Add the Target 3 Pit", MMC has implemented a slope stability analysis for the pit wall. The engineering geological characterization indicates that the factor of safety for all test areas meet or exceeded the minimum industry standards for low to medium consequence failure except for two areas in the alluvium. The pit can be backfilled as necessary to provide an appropriate long-term factor of safety. The structural potential for toppling is low (Golder 2011).

3.14. Noise

The nearest residents to the proposed Plan boundary are located near Valmy, Nevada. This community has residents located on the north and south sides of I-80. Potential noise receptors include travelers who stop at the I-80 rest area located on the south side of I-80 at Valmy Exit 216 and Valmy residents. Current noise levels in the vicinity of these receptors are unknown; however, noise levels in the area are expected to be dominated by traffic on I-80. Other noises include Marigold Mine, Lone Tree Mine, off-highway vehicles (OHV), railroad traffic, and air traffic. Residences in Valmy are located within approximately 500 feet from I-80. Marigold Mine is located approximately three miles to the south of these Valmy residences, and Lone Tree Mine

is located approximately four miles to the west. Noises from current mining operations are perceptible to these residences only when light winds or inversions serve to carry sounds from the mine site. Noises produced by the Marigold Mine include blasting, ore haul trucks, and the dumping of waste rock. Blasting occurs at least once a day (typically in the afternoon), and the short-duration, low-frequency "thud" that results has the potential to be heard and felt at distances of over one mile. Outdoor noise levels as a result of mining activity are below standards recommended by the EPA for the protection of public health and welfare at the rest areas and Valmy (BLM 2005).

3.15. Paleontology

The affected environment for paleontology has been described in previous NEPA documents. This information has been summarized from the 2001 FEIS (pages 3-164 though 3-166) and 2003 FSEIS (pages 3-157 through 3-157), and has been updated to present day conditions.

The BLM manages paleontological resources under a number of federal laws including: FLPMA Sections 310 and 302(b), which direct the BLM to manage public lands to protect the quality of scientific and other values; 43 CFR 8365.1-5, which prohibits the willful disturbance, removal, and destruction of scientific resources or natural objects; 43 CFR 3622, which regulates the amount of petrified wood that can be collected for personal, noncommercial purposes without a permit; and 43 CFR 3809.420 (b)(8), which stipulates that a mining operator "shall not knowingly disturb, alter, injure, or destroy any scientifically important paleontological remains or any historical or archaeological site, structure, building or object on Federal lands."

Informational Memorandum (IM) No. 2008-009, effective October 15, 2007, transmits the BLM classification system for paleontological resources on public lands. The Potential Fossil Yield Classification (PFYC) system is based on the potential for the occurrence of significant paleontological resources in a geologic unit, and the associated risk for impacts to the resource based on Federal management actions. Because occurrences of paleontological resources are closely tied to the geologic units that contain them, the probability for finding paleontological resources can be broadly predicted by assessing the geologic units present at or near the surface.

The PFYC system divides areas into one of five classifications:

- Class 1 – Very Low: Geologic units that are not likely to contain recognizable fossil remains.
- Class 2 – Low: Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils.
- Class 3 – Moderate or Unknown: Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential.
- Class 3A – Moderate Potential: Units are known to contain vertebrate fossils or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low, but is somewhat higher for common fossils.
- Class 3b – Unknown Potential: Units exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological

resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this Class may eventually be placed in another Class when sufficient survey and research is performed. The unknown potential of the units in this Class should be carefully considered when developing any mitigation or management actions.

- Class 4 – High: Geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface disturbing activities may adversely affect paleontological resources in many cases.

- Class 4a: Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two acres. Paleontological resources may be susceptible to adverse impacts from surface disturbing actions. Illegal collecting activities may impact some areas.

- Class 4b: These are areas underlain by geologic units with high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

- Class 5 – Very High: Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation.

- Class 5a: Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface disturbing actions. Unit is frequently the focus of illegal collecting activities.

- Class 5b: These are areas underlain by geologic units with very high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

IM No. 2009-011, effective October 10, 2008, provides guidelines for assessing potential impacts to paleontological resources in order to determine mitigation steps for federal actions on public lands under the FLPMA and the NEPA. Together these two IMs, including the PFYC system, provide guidance for the assessment of potential impacts to paleontological resources, field survey and monitoring procedures, and recommended mitigation measures that protect paleontological resources impacted by federal actions.

Potential fossil bearing geologic units that outcrop in the vicinity of the proposed Plan boundary include the Valmy Formation, the Havallah sequence, the Antler Sequence, and the Quaternary alluvium (older and younger deposits). Formations that do not outcrop in the immediate area and found at depth within the proposed Plan boundary include the Harmony Formation, and the Edna Formation. Detailed descriptions of the geologic formations within the proposed Plan boundary are provided in Section 3.13, “Geology and Mineral Resources”.

The Valmy Formation is from the Ordovician period and contains a large percentage of marine clastic rocks (quartzite and chert) and volcanic materials (greenstone), which suggests that the environment of deposition may have been in or near an archipelago (Roberts 1964). This formation is identified as having a low potential for yielding significant fossil deposits.

The Havallah sequence is located with the proposed Plan boundary and is comprised of sandstone and interbedded minor amounts of conglomerate, shale, siltstone, and chert. Middle Pennsylvanian to Early Permian fusuliniids and crinoid fragments have been identified near the proposed Plan boundary in this sequence. These fossils are not considered to be significant and the paleontological significance for this formation is low.

The Antler sequence consists of the Antler Peak Limestone and the Battle Mountain formation. Both are generally Pennsylvania-Permian and Pennsylvanian in age. The Antler Peak Limestone consists of thick extensive limestone units. The Battle Formation consists of conglomerates and sandstone with thin limestone beds (Roberts 1964). Corals of Pennsylvania to Permian age have been identified within the Antler Sequence near the Marigold Mine. Other fossils from this unit have been found approximately five miles south of the mine and are generally common. Formations in the Antler Sequence contain proportionally higher numbers and varieties of fossils relative to other formations in the area; however, these fossils are generally common and the paleontological significance for this formation is considered to be low.

Quaternary older and younger alluvium deposits within the proposed Plan boundary generally consist of gravels in a sandy and clayey matrix. Vertebrate fossils have been found near Rye Patch Reservoir approximately 30 to 40 miles to the west. No vertebrate fossils have been found within the proposed Plan boundary; however, fragments of a horse or camel were collected in alluvium in Section 30 west of the Valmy Deposit. The erosional and depositional nature of the alluvial fossil deposits makes it difficult to predict the potential for fossil occurrences. Any fossils that may be located within the alluvium could have been transported long distances from their original depositional area. The paleontological significance for these units would be considered low to undetermined.

Under the PFYC system, the proposed Plan boundary is located in Class 3 and Class 3B. There is a moderate potential for fossils. There are no known fossil locations within one mile of the proposed Plan boundary. Although fossils have been found in the vicinity of the proposed Plan boundary, no established fossil-collecting localities or significant deposits have been previously identified in the proposed Plan boundary.

3.16. Range Resources

The affected environment for range resources has been described in previous NEPA documents. This information has been summarized from the 2001 FEIS (pages 3-104 though 3-109), 2003 FSEIS (pages 3-99 through 3-104), and 2005 EA (pages 66 through 68) and has been updated to present day conditions.

The proposed Plan boundary encompasses portions of the North Buffalo and Copper Canyon allotments as shown on Map 7: Grazing Allotments. Approximately 18,837 acres of the proposed Plan boundary lies within the North Buffalo Allotment and 84 acres within the Copper Canyon Allotment. The remaining 160 acres in the northern portion of the proposed Plan boundary located north of I-80 is not part of a grazing allotment.

The North Buffalo Allotment is located within the HRFO boundary; however, the range management is administered by the Battle Mountain District Office, Mount Lewis Field Office. The Copper Canyon Allotment is located within and managed by the Battle Mountain District Office, Mount Lewis Field Office.

Categories have been assigned to allotments in order to establish priority of projects or resources issues, or to establish priorities for investing in range improvements. A "C" (Custodial) category allotment designation means the objective for the allotment is custodial management of the existing resource values. A "C" category allotment is managed at a low priority. An "I" (Improve) category allotment designation means the objective for the allotment is to improve the current resource condition. An "I" category allotment is managed at a high priority.

The North Buffalo Allotment consists of approximately 98,067 total acres, 56,057 acres consisting of public land and 42,010 acres consisting of private land. The North Buffalo Allotment is classified as a "C" category allotment (BLM 2012a). In the 2001 FEIS, 2003 FSEIS, and 2005 EA the North Buffalo Allotment was classified as an "I" category allotment.

The North Buffalo Allotment has a carrying capacity of 3,447 animal unit months (AUMs) on public land and has an active grazing period from March 1 to February 28 for cattle and sheep for three permittees. Two sheep routes pass through the proposed Plan boundary, with the animals being moved north in the spring and south in late fall each year. Annual sheep movements originate in the Copper Canyon Allotment, continue northward into the North Buffalo Allotment, and return to the Copper Canyon Allotment at the end of the grazing season. One of these routes passes along the Trout Creek corridor between March 1 and April 30 (405 AUMs) and from November 1 to February 28 (789 AUMs). The second sheep route passes through the southern portion of the proposed Plan boundary, less than one mile north of Mud Spring from March 1 to March 31 (431 AUMs) and from November 1 to February 28 (1,669 AUMs). A third permittee has a grazing permit to utilize 153 AUMs for year-long cattle grazing within the project vicinity.

The Copper Canyon Allotment includes approximately 106,431 acres, of which 44,989 acres are private land and 61,442 acres are public land. The Copper Canyon Allotment is classified as an "I" category allotment. The Copper Canyon Allotment currently has four grazing permittees with a combined active grazing preference of 5,023 AUMs (BLM 2012a). A BLM-approved, four-strand wire fence, consisting of three top barbed wires and a smooth bottom wire, currently exists to exclude livestock from the active mining operations. Roads in and out of active mine operations either have a gate or cattle guard installed.

Table 3.13, "Livestock Grazing Permits for the North Buffalo and Copper Canyon Allotments" provides a list of permittees and grazing information for the North Buffalo and Copper Canyon allotments.

Table 3.13. Livestock Grazing Permits for the North Buffalo and Copper Canyon Allotments

Allotment	Permittee	Livestock Type	Numbers of Livestock	Season of Use	Percent Public Land	Active Preference (AUMs)
North Buffalo	Badger Ranch	Cattle	12	03/01 – 02/28	100	153
	Ellison Ranching	Sheep Sheep	1,009 1,000	03/01 – 04/30 11/01 – 02/28	100 100	405 789
	Gary Snow Livestock and Grain	Sheep Sheep	2,115 2,115	03/01 – 03/31 11/01 – 02/28	100 100	431 1,669
					Subtotal	**3,447**
Copper Canyon	Ellison Ranching Company	Sheep Sheep	300 335	03/01 – 04/30 11/01 – 02/28	100 100	120 264
	Badger Ranch	Cattle	298	03/01 – 02/28	100	3,587
	Chiara Ranch	Cattle	30	11/01 – 02/28	42	50
	Gary Snow Livestock and Grain	Sheep Sheep	1,009 1,009	03/01 – 03/31 11/01 – 02/28	100 100	206 796
					Subtotal	**5,023**
					TOTAL	**8,470**

Twelve range improvements have been constructed within the North Buffalo and Copper Canyon allotments, none of which are located within the proposed Plan boundary. A description of these improvements is provided in Table 3.14. The majority of these improvements are perimeter fences and spring/water pipelines in the western portion of the Copper Canyon Allotment. The remaining improvements are cattle guards.

Table 3.14. Range Improvements for the North Buffalo and Copper Canyon Allotments

Allotment	Range Improvement Number	Range Improvement Name	Location
North Buffalo	1220	Stock Well	T.33N., R.42E., sec. 32
Copper Canyon	4381	Copper Canyon Fence	T.31 N., R.42E., sec. 20
	4395	Mill Spring Improvement and Pipeline	T.32 N., R.42E., sec. 27
	4396	Rocky Spring Improvement and Pipeline	T.31 N., R.42E., sec. 24
	4409	Harry Canyon Division Fence	T.29 N., R.43E., sec. 9
	4441	Shoshone Highway 8A Fence	T.30 N., R.44E., sec. 5
	4661	Timber Canyon Pipeline	T.31 N., R.42E., sec. 1
	4662	Mill Creek Pipeline Expansion	T.32 N., R.42E., sec. 27
	4384	Copper Canyon Cattleguard	T.30 N., R.42E., sec. 1
	4892	State Highway 305 Fence	T.31 N., R.44E., sec. 24
	4893	State Highway 305 Cattleguards	T.31 N., R.44E., sec. 24

Source: JBR 1997

There are four major ecological sites that occur within the proposed Plan boundary:

- Droughty Loam 8 to 10" precipitation zone (p.z.) occurs on hills, piedmont slopes, and inset fans. Dominate plant species associated with the Droughty Loam 8 to 10" p.z. include Wyoming big sagebrush, spiny hopsage (*Grayia spinosa*), Nevada jointfir (*Ephedra nevadensis*), Thurber's needlegrass (*Achnatherum thurberianum*), and Indian ricegrass

(*Achnatherum hymenoides*). The average annual forage production is approximately 450 pounds per acre per year (USDA-NRCS 2003a).

- Loamy 5 to 8" p.z. occurs on low hills, piedmont slopes, and alluvial plains. Dominant plant species include shadscale (*Atriplex confertifolia*), bud sagebrush (*Picrothamnus desertorum*), squirreltail (*Elymus elymoides*), and Indian ricegrass. Average annual forage production is 450 pounds per acre per year (USDA-NRCS 2003b).
- Loamy 8 to 10" p.z. occurs on lower mountains, hills, and fan piedmonts. Dominant plant species include Thurber's needlegrass and Wyoming big sagebrush. Average annual forage production is 600 pounds per acre per year (USDA-NRCS 2003c).
- Sodic Terrace 6 to 8" p.z. occurs on alluvial flats, stream terraces, and lake-plain terraces. Dominate plant species include shadscale and greasewood (*Sarcobatus* sp.). Average annual forage production is 450 pounds per acre per year (USDA-NRCS 2003d).

Water resources available for livestock use near the proposed Plan boundary include Mud Spring, an unnamed spring, and Ames Spring. Mud Spring is an intermittent water source utilized by grazing livestock on a seasonal basis. This spring was developed in the 1970s to improve water supply and quality. The improvements that were made to the spring have deteriorated since that time. Ames Spring is a perennial spring located on private land approximately 0.1 miles outside of the proposed Plan boundary. Ames Spring as well as perennial and intermittent stretches of Trout Creek and Cottonwood Creek are utilized as a water source by grazing livestock on a seasonal basis, when available. The unnamed spring is intermittent and often goes without flow during dry periods of the year. This spring is available as a water source for livestock when flowing water is present.

3.17. Recreation

There are no developed recreational resources within the proposed Plan boundary and the general area around the mine is limited to dispersed outdoor recreation. Public land to the south and east is managed by the BLM Battle Mountain District Office. The nearest developed facility is the Mill Creek Recreation Area located approximately 10 miles to the southwest. The Mill Creek Recreation Area is maintained by the BLM Battle Mountain District Office and contains picnic facilities, camp sites, and restrooms.

Public land to the north and west is managed by the BLM WD. Approximately 70,000 visitors utilized the WD planning area in 2004. Chimney Reservoir is located at the junction of the north and south forks of the Little Humboldt River and it is situated approximately 40 miles north of the proposed Plan boundary. It has developed campsites on the eastern shoreline with adjacent boat launching facilities and vehicle parking. Winnemucca Mountain is located approximately 37 miles to the northwest and accounted for approximately 15 percent of the total visitor activity. This area provides a hiking and biking recreational trail system. The Water Canyon and Pine Forest/Blue Lakes Recreation Area accounted for over 20 percent of total visitor activity in 2004. The Water Canyon recreation area is approximately 43 miles to the southwest and offers primitive campsites, picnic areas, and an interpretive walking trail. Wildfires during the summer of 2007 burned most of the Water Canyon Area; however, the area has been revegetated and facilities rebuilt. The Pine Forest/Blue Lakes recreation area is located approximately 100 miles to the northwest of the proposed Plan boundary and offers multiple lakes, camping areas, geologic sightseeing, fishing, and hiking.

Lands in and around the proposed Plan boundary are not highly used by recreationists. Recreational activities that exist in the area include OHV use, camping, hunting, rock and mineral collecting, hiking, mountain biking, and other forms of dispersed recreation. Limited hunting occurs in the proposed Plan boundary. Big game species that occur in the vicinity include mule deer (*Odocoileus hemionus*). Other games species, such as chukar (*Alectoris chukar*), California quail (*Callipepla californica*), and mourning dove also occur throughout the area. Trout Creek is perennial south of the proposed Plan boundary and supports brook trout (*Salvelinus fontinalis*) populations (GBE 2012b).

No designated wilderness areas or wild and scenic rivers exist within 60 miles of the proposed Plan boundary. The closest Wilderness Study Area (WSA) is the China Mountain WSA, located approximately 18 miles to the southwest.

3.18. Social Values and Economics

The Humboldt County Regional Master Plan provides guidance for decision makers and the public regarding future land use and community and economic development in the unincorporated portions of Humboldt County. The Humboldt Master Plan includes the following goals relevant to social and economic values related to the project.

- To achieve a diversified and stable economy that is compatible with planned growth and quality of life objectives, provides adequate employment and business opportunities for current and future generations, and strengthens the tax base;
- To maintain and enhance natural resource-based industries including mining, agriculture, ranching, recreation and tourism, and seek value added manufacturing of these resources; and
- To promote economic development that provides continuing employment, economic vitality, increased tax base, and is consistent with the plans goals and policies.

Population and Demography

The Marigold Mine is located in Humboldt County, Nevada. Humboldt County is located in north-central Nevada and encompasses approximately 9,704 square miles. The closest incorporated communities to the mine include Winnemucca, approximately 40 miles to the west and Battle Mountain approximately 15 miles to the east. Battle Mountain is located in Lander County. Lander County encompasses approximately 5,519 square miles in central Nevada. The unincorporated communities of Denio, Kings River, McDermitt, Orovada, Paradise, and Valmy are located within Humboldt County. The unincorporated communities of Austin and Kingston are located within Lander County.

Population and Growth

Population statistics for Humboldt and Lander counties from 2000 through 2011 are provided in Table 3.15, "Population Statistics for Humboldt and Lander Counties". Humboldt County population has decreased from 18,149 residents in 2000 to 17,135 in 2011. This accounts for a 0.06 percent decrease. Likewise, Lander County population has decreased from 6,822 residents to 5,988 during this same period. This accounts for a 0.14 percent decrease (NSDO 2011).

Approximately 46 percent of Humboldt County's population resides in Winnemucca, which had a population of 7,839 residents in 2011. Winnemucca's population decreased 0.13 percent

between 2000 and 2011. Approximately 56 percent of Lander County's population resides in Battle Mountain, which had a population of 3,326 residents in 2011. Battle Mountain's population decreased by 0.22 percent from 2000 to 2011 (NSDO 2011).

Table 3.15. Population Statistics for Humboldt and Lander Counties

Geographic Area	Population Per Year (people)												Percent Change 2000-2011
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
Humboldt County	18,149	16,164	16,308	16,457	16,692	17,293	17,751	18,052	18,014	17,690	18,364	17,135	-0.06
Winnemucca Division*	8,884	7,001	7,234	7,280	7,249	7,401	7,643	7,646	7,659	7,593	7,961	7,839	-0.13
Lander County	6,822	5,761	5,547	5,277	5,357	5,509	5,655	5,747	5,891	6,003	5,992	5,988	-0.14
Battle Mountain Division**	4,066	3,056	2,770	2,623	2,645	2,692	2,740	2,845	2,922	2,967	2,922	3,326	-0.22

Source: NSDO 2011

*Winnemucca Division is located within Humboldt County

**Battle Mountain Division is located within Lander County

Housing

Housing and income statistics for Humboldt and Lander counties for 2010 are provided in Table 3.16. According to the United States Census Bureau, there were 7,123 total housing units available in Humboldt County in 2010. Of the total housing units available, 6,289 units were occupied resulting in an 88 percent occupancy rate. The median family income in 2010 in Humboldt County was $70,236 and per capita income was $25,855 (U.S. Census Bureau 2010a). There were 2,575 total housing units available in Lander County in 2010. Of the total housing units available, 2,213 were occupied resulting in an 86 percent occupancy rate. The median family income in 2010 in Lander County was $70,772 and per capita income was $28,459 (U.S. Census Bureau 2010b).

Table 3.16. Population and Income for Humboldt and Lander Counties

Description	Humboldt County	Lander County
Total housing units	7,123	2,575
Occupied housing units	6,289	2,213
Median household income	$70,236	$70,772
Per Capita income	$25,855	$28,459

Sources: U.S. Census Bureau 2010a and 2010b

Economy

The three largest economic drivers in Humboldt and Lander counties are mining, agriculture, and tourism. Mining and mining services within Humboldt and Lander counties are related mostly to gold mining; however, other types of mining also occur. The Nevada Mining Association (NVMA) summarized tax revenues collected per county in Nevada in 2012. The top highest tax contributors with over 62 percent of tax revenues from Humboldt County and 84 percent of tax revenues and from Lander County were from the mining sector (NVMA 2012a). Direct employment by the mining industry is a key component to the overall economic strength of Nevada. The NVMA reports “while accounting for just one percent of Nevada employment, and five percent of Nevada GDP, the mining industry accounted for 14 percent of jobs added over the last 12 months” (NVMA 2012b). Mining industry employment supports secondary employment in other industries including services, through the spending of workers' wages in the local economy, and through the purchase of goods and services by mining firms. Mining accounts for approximately 34 percent of the labor force in Humboldt County and 36 percent of the labor force in Lander County (U.S. Census Bureau 2010a and 2010b).

Agriculture continues to contribute to the base of economic activity in both Humboldt and Lander counties. In 2007, there were 254 farms and ranches in Humboldt County encompassing approximately 756,313 acres, and 84 farms and ranches in Lander County encompassing approximately 339,091 acres. The livestock industry plays a significant role in both Humboldt and Lander counties, with approximately 61,977 head of cattle in Humboldt County and approximately 22,674 head of cattle in Lander County (USDA 2007).

Tourism has become increasingly important in the economy with the growth in the gaming industry. While these sectors contribute to overall regional economic diversity of the counties, these sectors are ultimately tied to the mining/agriculture economies, and tend to exhibit similar trends in numbers and wages.

Labor Force

Labor force and employment statistics for 2006 through 2011 for Humboldt and Lander counties as well as the state of Nevada are presented in Table 3.17. The employment and unemployment rates in Humboldt and Lander counties, as well as the state of Nevada, were relatively consistent during 2006 and 2007. There was a small increase in the unemployment rate in 2008, as the start of the nation's economic downturn occurred. The year 2009 saw the most substantial increase in unemployment in Humboldt and Lander counties, as well as the state of Nevada overall. The unemployment rate increased again in 2010, and then leveled off in 2011.

Table 3.17. Labor Force Statistics for Humboldt and Lander Counties Compared with the State of Nevada

Geographic Area	Year						
	2006	2007	2008	2009	2010	2011	2012
Humboldt County							
Total Labor (people)	8,016	7,810	8,065	8,683	9,227	9,960	9,644
Employment (people)	7,712	7,521	7,648	8,031	8,477	9,241	9,046
Unemployment (people)	304	289	417	652	750	719	598
Unemployment	4.3%	3.7%	5.2%	7.5%	8.1%	7.2%	6.2%
Lander County							
Total Labor (people)	2,752	3,323	3,603	4,053	4,276	4,458	4,641
Employment (people)	2,640	3,211	3,439	3,810	3,973	4,165	4,397
Unemployment (people)	112	112	164	243	303	293	244
Unemployment	4.5%	3.4%	4.6%	6.0%	7.1%	6.6%	5.3%
State of Nevada							
Total Labor (people)	1,276,387	1,306,180	1,350,246	1,369,852	1,391,600	1,391,602	1,378,876
Employment (people)	1,222,277	1,245,102	1,254,466	1,209,252	1,199,517	1,207,799	1,226,408
Unemployment (people)	54,110	61,078	95,781	160,600	192,084	183,803	152,468
Unemployment	4.2%	4.7%	7.1%	11.7%	13.8%	13.2%	11.1%

Source: NDETR 2013

The composition of each county's economy is shown in Table 3.18, which lists the top 10 employers in each of the county's assessment areas. This table shows the prevalence of mining in the region, specifically within Humboldt and Lander counties where the top number of employers are mining companies. MMC ranked four out of 10 in Humboldt County.

Table 3.18. Top Ten Employers in Humboldt and Lander Counties

County	Company	Number of Employees
Humboldt	Newmont Mining Corporation	600-699
	Humboldt County School District	400-499
	Turquoise Ridge Joint Venture	400-499
	Hycroft Resources & Development Inc.	300-399
	Goldcorp Marigold Mining Company	300-399
	Manpower Temporary Services	200-299
	Wal-Mart Supercenter	200-299
	Humboldt General Hospital	200-299
	Humboldt County	200-299

County	Company	Number of Employees
Lander	Cortez Gold Mines	1,000-1,499
	Newmont Mining Corporation	400-499
	Lander County	400-499
	John Davis Trucking Co.	400-499
	Lander County School District	400-499
	The Industrial Company	400-499
	Battle Mountain General Hospital	400-499
	M-I LLC	400-499
	Bureau of Land Management	400-499

Source: NDETR 2012

Currently, MMC employs approximately 380 people. There are approximately 345 full-time employees at the Marigold Mine and approximately 35 contractors. The total number of employees fluctuates between 10 to 15 people within any given year. Employees and contractors primarily live in and commute from Battle Mountain, Winnemucca, and Valmy. It is anticipated that activities associated with the Plan would require a 10 to 15 percent increase in the workforce at the Marigold Mine over the life of the project. As a result of the Proposed Action, there would be an increase of approximately 57 employees at the Marigold Mine. MMC plans to recruit employees locally and regionally; therefore, many of the people MMC plans on hiring already live in the adjacent communities.

Public and County Services

Public services including electricity, natural gas, wastewater treatment services, and solid waste disposal are available in Humboldt and Lander counties.

Private Utilities

Humboldt County is served by two electric utilities. NV Energy serves the eastern portion of Humboldt County including Winnemucca. Harney Electric Cooperative Inc. serves western Humboldt County including McDermitt, Orovada, and Denio. NV Energy provides the majority of Lander County's electrical service. NV Energy provides electrical service to the Marigold Mine.

Southwest Gas Corporation distributes natural gas to the majority of Humboldt and Lander county residents. Several smaller companies provide heating fuels throughout the remainder of Humboldt and Lander counties.

Wastewater Treatment

Winnemucca Wastewater Treatment Facility (WWTF) is the largest community wastewater treatment facility in Humboldt County. The McDermitt Sewage Ponds, the Paradise Valley WWTF, and the Orovada General Improvement District provide community wastewater treatment services to residents in Humboldt County. In Lander County, municipal wastewater service is provided for Battle Mountain and Austin. Municipal wastewater services are provided for Battle Mountain by Battle Mountain Water and Sewer Department and municipal wastewater services for Austin are provided by Lander County Sewer and Water District #2 (Lander County, 2010). Development outside of the service areas of these treatment facilities is provided by individual sewage disposal systems (septic tanks) (Humboldt County 2010; Lander County 2010). The Marigold Mine maintains its own septic disposal system.

Solid Waste Disposal

The Winnemucca Area Solid Waste Management District provides residential and commercial collection pick-up services in Winnemucca through contracting with two private collection companies. Public solid waste disposal in Humboldt County is provided at the Humboldt County Regional Landfill (Class I) and four rural collection sites in Orovada, Paradise, Denio, and Kings River. A Class I landfill is authorized to accept hazardous waste. The Humboldt county Regional Landfill is 240 acres and is adjacent to land held by the BLM (Humboldt County 2010). According to NDEP, the Humboldt County landfill has a total permitted capacity of 2.01 million cubic yards. The landfill's projected closure date is 2029 (NDEP 2013b).

The Lander County landfill is classified as Expansion Class II with five tons per day allowed. The disposal area is approximately 83 acres with a total disposal capacity of 251,562 cubic yards. The disposal rate is estimated to be a maximum of 16 tons per day on an annual average. The landfill's project closure date is 2060 (Lander County 2010).

The Marigold Mine maintains their own permitted waivered Class III landfill (SWMI-08-41) and transports their hazardous materials to the Class I landfill in Winnemucca.

Public Safety

The Nevada Highway Patrol provides law enforcement protection services along the roads and highways maintained or funded by the State of Nevada and the federal aid primary and secondary road system. The BLM and the Nevada Division of Forestry provide fire protection and suppression activities on federal land within Humboldt and Lander counties.

The Humboldt County Sheriff's Office (HCSO) provides law enforcement services to the unincorporated areas of Humboldt County. The HCSO is located in Winnemucca. There is one substation in McDermitt. The HCSO provides a variety of services including administration support, patrol, detention center, dispatch, animal control, civil services, and search and rescue. Law enforcement services in Winnemucca are provided by the Winnemucca Police Department.

The Winnemucca Volunteer Fire Department (VFD) provides residential and commercial fire protection services within Winnemucca. There are approximately 25 volunteer fire fighters. Equipment at the VFD includes: three Class A pumpers; three brush and wildland trucks; and one equipment van. The Winnemucca Rural Fire Department provides fire protection services to the Grass Valley area of Humboldt County.

Humboldt General Hospital Emergency Medical Services provides 24-hour emergency medical services throughout Humboldt County (HGH 2013). Current staff includes 10 full-time paramedics, two full-time emergency medical technicians (EMTs), and 40 casual call volunteers. Current equipment includes: four advance life support ambulances, one intermediate life support ambulance, two extrication rescue trucks, six delta ambulances, and one HAZ MAT trailer (HGH 2013).

The Lander County Sheriff's Office provides law enforcement services for Lander County. There are two patrol areas within Lander County including the northern patrol area, which serves out of the Battle Mountain headquarters, and the southern patrol area, which serves out of the Austin station. The Lander County Sheriff's Office provides administration, patrol, jail, dispatch, and animal control services in the county (LCSO 2006).

Fire protection services on private land in Lander County are provided by three local volunteer fire departments located in Battle Mountain, Austin, and Kingston. There are approximately

25 fire fighters in Battle Mountain, approximately nine in Austin, and approximately seven in Kingston. Each VFD has at least three mobile fire fighting vehicles (Lander County 2010).

Emergency medical services and transportation in Lander County are provided by the Battle Mountain Ambulance Department and the Austin Volunteer Ambulance Department. The Battle Mountain Ambulance Department has 11 EMTs and two ambulance units. The Austin Volunteer Ambulance Department has one EMT (Lander County 2010).

Health Care

Primary hospitalization services in Humboldt County are provided by Humboldt General Hospital. Additionally, the Nevada State Health Division provides community health nursing services to residents of all ages and incomes in Humboldt County. There is a health center in Winnemucca that provides the following services: family planning, education, counseling, and treatment; health education; cancer screening; immunizations; well-child examinations and healthy kid screenings; sexually transmitted disease education and counseling; HIV/AIDS counseling, education, and testing; communicable disease investigation; tuberculosis screening and education; school health promotion and education; and children's special health care needs referrals (NSHD 2011).

Health care in Lander County is provided from two medical clinics. One clinic is located in Battle Mountain and the other clinic is located in Austin. There is also a community health nurse located in Battle Mountain. Battle Mountain General Hospital provides emergency services, clinical laboratory services, and x-ray services, and includes a large day room for long-term care (Lander County 2009; Battle Mountain General Hospital 2012).

3.19. Soils

The affected environment for soils has been described in previous NEPA documents. This information has been summarized from the 2001 FEIS (pages 3-67 through 3-82), 2003 FSEIS (pages 3-69 through 3-78), and 2005 EA (pages 59 through 60) and has been updated to present day conditions.

The soils in the proposed Plan boundary were formed in alluvial fan deposits or in colluviums and residuum from mixed rocks on hillslopes and crests. In the upland positions, soils are predominantly shallow and moderately deep over bedrock and are gravelly or cobbly. At higher elevations in the southernmost portion of the proposed Plan boundary, cooler seasonal and mean annual soil temperatures prevail relative to the rest of the area. At lower elevations in the northern portion of the proposed Plan boundary, very deep gravelly soils occur on alluvial fan piedmonts and fan skirts. Highly sodic soils occur in the upper fan piedmont positions, and slightly to moderately saline soils occur at somewhat lower elevations on fan skirts and inset fans.

A total of 12 soil mapping units occur in the 2003 authorized Plan boundary (BLM 2001). Nine of these units were described in a detailed Class II soil survey (JBR 1997). The remaining three were identified from NRCS *unpublished Soil Survey for Eastern Humboldt County* (NRCS 1998). A total of 12 soil mapping units also occur in the proposed Plan boundary. Descriptions of these soil units were obtained from the NRCS Web Soil Survey (NRCS 2013). The Trunk-Burrita association in the southern portion of the proposed Plan boundary was mapped as the Soughe gravelly clay loam soil unit in the 1997 survey. In order to maintain consistency with the other soil units identified in the proposed Plan boundary, the Trunk-Burrita association was used in the

analysis for this EA. Soil units and their location within the proposed Plan boundary are displayed on Map 8: Soil Associations and described as follows:

- The Whirlo-Oxcore-Weso association comprises approximately 46.42 percent of the proposed Plan boundary. This association occurs at elevations ranging from 4,300 to 5,000 feet AMSL within the six to eight inch precipitation zone. These soils occur on inset fans, fan remnants, and fan skirts with slopes ranging from zero to eight percent. The soil association is composed of alluvium and alluvium derived from mixed rock. Soils are well drained and available water capacity is low to moderate (between 5.0 to 8.0 inches).

- The Soughe-Hoot association occurs at elevations ranging from 4,600 to 6,400 feet AMSL within the six to 11 inch precipitation zone. These soils occur on mountain summits with slopes ranging from 15 to 50 percent. The soil association is composed of residuum and/or colluvium. Soils are well drained and available water capacity is very low (between 1.1 to 1.2 inches).

- The Trunk-Burrita association occurs at elevations ranging from 4,900 to 6,400 feet AMSL within the eight to 10 inch precipitation zone. These soils occur on mountain backslopes and summits with slopes ranging from four to 50 percent. The soil association is composed of residuum and/or colluvium. Soils are well drained and available water capacity is very low to low (between 1.8 to 4.1 inches).

- The Knott-Sodhouse-Wholan association occurs at elevations ranging from 4,200 to 4,900 feet AMSL and within the six to eight inch precipitation zone. These soils occur on fan remnants and fan skirts with slopes from zero to eight percent. The soil association is composed of alluvium and alluvium derived from mixed rock. Soils are well drained and available water capacity is very low to high (2.3 to 10.9 inches).

- The Broyles very fine sandy loam moderate saline 0 to 2 percent slopes association occurs at elevations ranging from 4,300 to 4,700 feet AMSL within the six to eight inch precipitation zone. These soils occur on fan skirts with slopes from zero to two percent. The soil association is composed of alluvium derived from mixed rocks, loess, and volcanic ash. Soils are well drained and available water capacity is moderate (6.6 inches).

- The Broyles very fine sandy loam association occurs at elevations ranging from 4,300 to 4,800 feet AMSL within the six to eight inch precipitation zone. These soils occur on fan skirts with slopes from zero to two percent. The soil association is composed of alluvium derived from mixed rocks, loess, and volcanic ash. Soils are well drained and available water capacity is moderate (6.6 inches).

- The Dun Glen very fine sandy loam association occurs at elevations ranging from 4,200 to 5,000 feet AMSL within the six to eight inch precipitation zone. These soils occur on inset fans with slopes ranging from zero to two percent. The soil association is composed of alluvium derived from mixed rock. Soils are well drained and available water capacity is high (9.1 inches).

- The Weso silt loam moderately saline zero to two percent slopes association occurs at elevations from 4,300 to 4,700 feet AMSL within the six to eight inch precipitation zone. These soils occur on fan skirts with slopes ranging from zero to two percent. The soil association is composed of alluvium derived from mixed rocks, loess, and volcanic ash. Soils are well drained.

- The Orovada very fine sandy loam association occurs at elevations ranging from 4,300 to 4,800 feet AMSL within the eight to 10 inch precipitation zone. These soils occur on fan skirts with slopes ranging from two to eight percent. The soil association is composed of alluvium derived from mixed rock. Soils are well drained and available water capacity is high (9.2 inches).

- The Ocorcel-Snapp association occurs at elevations between 4,300 and 5,800 feet AMSL within the six to eight inches precipitation zone. These soils occur on fan piedmonts at slops ranging from two to eight percent. The soil association is composed of alluvium from mixed rocks, loess, and volcanic ash. Soils are well drained.

- The Oxcorel-Beoska-Whirlo association occurs at elevations ranging from 4,300 to 5,500 feet AMSL within the six to eight inch precipitation zone. These soils occur on fan remnants with slopes from two to eight percent. The soil association is composed of alluvium. Soils are well drained and available water capacity is low to moderate (6.4 inches).

- The Beoska-Dun Glen association occurs at elevations between 4,600 and 5,000 feet AMSL within the six to eight inches precipitation zone. These soils occur on fan piedmonts at slopes ranging between zero and two percent. The soil association is composed of alluvium derived from mixed rocks, loess, and volcanic ash.

Soil hazard for erosion and fugitive dust and soil suitability factors for reclamation and road construction were obtained from the NRCS Web Soil Survey for land management and are provided in Table 3.19, "Soil Suitability Factors for Mine and Road Construction".

Erosion hazard ratings are based on soil erosion factor K, and slope and range from slight to severe.

- Slight – little or no erosion is likely.

- Moderate – some erosion is likely and roads and areas of disturbance may require occasional maintenance.

- Severe – Significant erosion is expected and roads and areas of disturbance require frequent maintenance, and that costly erosion-control measures may be needed.

Fugitive dust resistance ratings are influenced by size of surface soil particles (texture), rock fragment content, and calcium carbonate equivalent.

- Low – soil features are very favorable for dust formation.

- Moderate – soil features are favorable for dust formation.

Reclamation potential ratings that would affect the ability of the soil to recover from degradation are based upon soil depth, amount of precipitation, and salt and sodic levels.

- Low – soil has one or more features that are unfavorable for recovery; poor performance is expected.

- Moderate – soil has features that are generally favorable for recovery; fair performance can be expected.

Road and trail suitability ratings are based upon slope, rock fragments on the surface, soil strength, and sand content.

- Moderate – one or more soil properties are less than desirable, and fair performance can be expected; some maintenance is needed.
- Severe – one or more soil properties are unfavorable for a natural surface; overcoming the unfavorable property requires special design, extra maintenance, and costly alterations.

Table 3.19. Soil Suitability Factors for Mine and Road Construction

Soil Unit	Erosion Hazard	Fugitive Dust Resistance	Reclamation Potential	Road and Trail Suitability
144 – Beska-Dun Glen association	Slight	Low	Low	Moderate
233 – Dun Glen very fine sandy loam association	Slight	Low	Low	Moderate
406 – Orovada very fine sandy loam association	Moderate	Low	Moderate	Moderate
596 – Trunk-Burrita association	Severe	Moderate	Moderate	Severe
614 – Wesco silt loam moderately saline 0 to 2 percent slopes	Slight	Low	Low	Slight
655 – Soughe-Hoot association	Severe	Moderate	Moderate	Severe
660 – Oxcorel-Beoska-Whirlo association	Moderate	Moderate	Low	Moderate
665 – Oxocerl-Beoska-Whirlo association	Moderate	Moderate	Low	Moderate
773 – Broyles very fine sandy loam moderately saline 0 to 2 percent slopes association	Slight	Low	Low	Slight
774 – Broyles very fine sandy loam 0 to 2 percent slopes association	Slight	Low	Low	Moderate
825 – Whirlo-Oxcorel-Weso association	Moderate	Low	Low	Moderate
1230 – Knott-Sodhouse-Wholan association	Moderate	Moderate	Low	Severe

Source: NRCS 2013

3.20. Special Status Species

The affected environment for sensitive species has been described in previous NEPA documents. This information is summarized from the 2001 FEIS (pages 3-92 through 3-100), 2003 FSEIS (pages 3-93 through 3-98), and 2005 EA (pages 63 through 66), and has been updated to present day conditions.

The BLM's policy for management of special status species is provided in the BLM Manual Section 6840 (BLM 2008b). Special status species include the following:

- Federally Threatened or Endangered Species: Any species that the USFWS has listed as an endangered or threatened species under the ESA throughout all or a significant portion of its range;
- Proposed Threatened or Endangered Species: Any species that the USFWS has proposed for listing as a federally endangered or threatened species under the ESA;
- Candidate Species: Plant and animal taxa that are under consideration for possible listing as threatened or endangered under the ESA;
- BLM Sensitive Species: 1) Species that are currently under status review by the USFWS; 2) Species whose numbers are declining so rapidly that federal listing may become necessary;

3) Species with typically small and widely dispersed populations; or 4) Species that inhabit ecological refugia or other specialized or unique habitats; and

- State of Nevada Listed Species: BLM policy is to provide these species with the same level of protection as provided to candidate species in BLM Manual 6840.

As defined in the BLM Information Bulletin No. NV-2003-097, Nevada-protected species that meet BLM's 6840 policy definition are those species of animals occurring on BLM-managed land in Nevada that are: (1) 'protected' under authority of the NAC; (2) have been determined to meet BLM's policy definition of "listing by a state in a category implying potential endangerment or extinction;" and (3) are not already included as federally listed, proposed, or candidate species.

The proposed Plan boundary was surveyed for special status species using habitat models as well as direct sign surveys. These habitat models are used as a tool to focus field surveys. Parameters used in the models are based on information in the literature that characterizes a species habitat, and then information from public domain sources are used to characterize the area to be surveyed. For example, the pygmy rabbit model is based on the historic literature. Information from NRCS soil mapping, Ecological Site Descriptions, and topographic information used to identify areas with potential for suitable habitat are then added to the model. The model produces a list of areas that can be targeted for focused surveys. Areas that are identified as not having suitable characteristics for a given species are also examined; however, they are not examined to the extent of the habitat where the species is more likely to occur.

The models are always evolving. When a species is found in the course of other field work (i.e., not a baseline survey) where a model was not used to predict the location of a species, those data are entered into the model. If there is some habitat feature that can be entered into the model to increase its accuracy, then the model is modified. The models are used to focus field surveys by identifying a subset of the general survey area where a species is more likely to occur than in other parts of the survey area. If the species is not present in the areas that have the highest suitability, then the species is not likely to be present in the less suitable areas. Referring to the pygmy rabbit, the model is not used to predict the locations of a pygmy rabbit colony; rather it predicts the most suitable habitat within the habitats available in a survey area. These are broad models by intent, so as to not overlook any possible habitat.

In addition to baseline surveys and modeling, consultation letters were sent to USFWS, NDOW, and NNHP requesting information regarding species, specifically threatened, endangered, candidate, sensitive, and other special status species, that or known or have the potential to occur within the proposed Plan boundary. A letter was sent to the USFWS on November 26, 2012. The USFWS response on December 14, 2012 stated "to the best of their knowledge, no listed or proposed species occur in the project area". NDOW provided a list of all known wildlife species within a four-mile radius of the proposed Plan boundary on December 10, 2012. The list included several raptor species protected by state and federal laws. The letter noted that greater sage-grouse (*Centrocercus urophasianus*) habitat in the vicinity of the proposed Plan boundary was primarily categorized as low value habitat/transitional range. NNHP provided a list of documented TES plant and animal taxa on November 29, 2012. There are no "at risk" taxa recorded within the proposed Plan boundary. According to the letter, potential habitat may be present for the winged milkvetch (*Astragalus pterocarpus*), a species determined to be vulnerable by NNHP, and the Lahontan cutthroat trout, a federally-listed threatened species. A copy of the consultation letters with federal and state agencies is provided in Section 6.2.

Federally-Listed Species

Based on consultation with the USFWS and baseline surveys conducted, no federally-listed plant species are known to occur or were identified in the proposed Plan boundary; therefore, federally-listed plant species are not addressed further in this EA. No federally-listed or proposed wildlife species are known to occur within the proposed Plan boundary. One federal candidate wildlife species, the greater sage-grouse, has the potential to occur within the proposed Plan boundary. Greater sage-grouse is also a BLM sensitive species.

Greater Sage-Grouse

Greater sage-grouse is currently a BLM-sensitive species and a State of Nevada-protected game bird managed in accordance with the *Greater Sage-Grouse Conservation Plan for Nevada and Eastern California* (NDOW 2004). The greater sage-grouse is currently a candidate for listing under status review by the USFWS.

Greater sage-grouse are found throughout Nevada in sagebrush-dominated habitats. Sagebrush is a key component of greater sage-grouse habitat on a year-long basis. Sagebrush provides forage, nesting, security, and thermal cover for this species. Moist areas that provide succulent herbaceous vegetation during the summer months are used extensively as brood rearing habitat. Open and often elevated areas within sagebrush habitats usually serve as breeding areas (strutting grounds or lek sites) (USFWS 2006). Greater sage-grouse males begin displaying on leks in March, and hens typically begin nesting in April and May. During winter months, greater sage-grouse often occupy wind-exposed areas where sagebrush is available (e.g., drainages, southern or western slopes, or exposed ridges).

Greater sage-grouse historical habitat distribution data has been kept by NDOW. In March 2012, NDOW updated their greater sage-grouse habitat mapping to include five habitat categories. On March 15, 2012, the BLM issued a White Paper on greater sage-grouse habitat on BLM and United States Forest Service (USFS)-managed land (BLM 2012b). The paper states that the BLM and USFS will focus on two categories of greater sage-grouse habitat including Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH). Areas of PPH or PGH indicate where land-use changes could result in a negative impact to greater sage-grouse population health. The BLM used the NDOW Habitat Categories to determine PPH and PGH habitat types.

PPH consists of NDOW Habitat Category 1 (Essential and Irreplaceable Habitat) and Category 2 (Important Habitat). The NDOW Habitat Categories consist of breeding habitat, lek sites, nesting habitat, brood-rearing habitat, winter range, and movement corridors. Vegetation for sage-grouse primarily consists of sagebrush; however, it can include riparian areas, perennial grassland, agricultural land, and restored land.

PGH consists of NDOW Habitat Category 3 (Moderate Importance). This habitat type is similar to PPH although it typically lacks one or more key components that prevent it from being categorized as primary habitat. For example, sagebrush and understory may be present yet of insufficient height. This habitat type also includes sagebrush communities with pinyon-juniper encroachment, unrecovered burn areas, and areas that lack bird survey and inventory data to support a higher ranking.

NDOW Habitat Category 4 (Low Value Habitat and Transitional Range) consists of areas that contribute very little habitat value to greater sage-grouse other than transitional range from one

seasonal habitat to another or minimal foraging use. These habitat types include salt desert shrub communities, natural pinyon/juniper woodlands, aspen stands, and mountain mahogany stands.

NDOW Habitat Category 5 (Unsuitable Habitat) consists of areas currently in such poor condition that restoration efforts would not be feasible or effective.

The southern one-third of the proposed Plan boundary is located within the Battle Mountain Population Management Unit. This area is located within NDOW greater sage-grouse Habitat Category 4. Habitat Categories 1, 2, and 3 are not present within the proposed Plan boundary; however, they are located within a four-mile radius. No greater sage-grouse leks, greater sage-grouse, or greater sage-grouse sign have been identified within the proposed Plan boundary. There are two known greater sage-grouse leks located approximately three miles south of the proposed Plan boundary (NDOW 2012).

BLM Special Status Wildlife Species

BLM-identified sensitive wildlife species that have the potential to occur or are known to occur in the BLM WD were presented in the *Supplemental Biological Baseline Survey* (JBR 2013c). For the purposes of this EA, species that were identified with the potential to occur within the proposed Plan boundary are described in detail.

Western Burrowing Owl

Western burrowing owls are migratory birds that use habitat within the proposed Plan boundary during their breeding season that occurs from spring to late summer/early fall. Western burrowing owls are small (9 to 10 inches) ground-dwelling owls with long legs, white chin stripe, round head, and stubby tail (NatureServe 2013). They often nest in burrows that have been abandoned by burrowing mammals, and usually in open areas with good surrounding visibility. Western burrowing owls are active throughout the day; however, activity peaks in the morning and evening. They occupy northern Nevada in the spring and summer months and spend winters in the southwestern United States (Udvardy 1994).

Suitable western burrowing owl habitat is located in the northern portion of the proposed Plan boundary where soils become looser and burrows become more abundant. Western burrowing owls and active western burrowing owl burrows have been recorded in this area since 1997.

Golden Eagle

The golden eagle is a BLM sensitive species that is protected by the State of Nevada. The species is protected under the MBTA and the Bald and Golden Eagle Protection Act. The golden eagle is a common permanent resident in the Great Basin. Most golden eagle nests in the Great Basin are located on ledges along canyon walls or on cliff sides (Ryser 1985). Suitable nesting habitat for the golden eagle is present within Battle Mountain and is located south and east of the proposed Plan boundary. The entire proposed Plan boundary provides potential foraging habitat.

During agency consultation, NDOW identified golden eagle nests within a 10-mile radius of the proposed Plan boundary (NDOW 2013). The USFWS indicated a concern for the species and recommended that baseline surveys for nesting golden eagles be conducted within a 10-mile radius of the proposed Plan boundary. An aerial survey for nesting golden eagles was conducted in the spring of 2013 in areas that had not been previously surveyed. This survey incorporated existing data from NDOW and previously conducted golden eagle nesting surveys.

Sixteen golden eagle nests have been identified within the 10-mile radius of the proposed Plan boundary; however, none of these nests are located within the proposed Plan boundary. In 2013, seven golden eagle nests were identified of which two nests were occupied and five nests were inactive. In 2012, nine golden eagle nests were identified. These nine golden eagle nests were not surveyed in 2013; thus, their status for the 2013 nesting season is unknown (JBR 2013b).

Bats

Prior to 2002, there were two known underground mine workings located within the proposed Plan boundary: the Red Rock adit and underground Marigold Mine workings. The underground Marigold Mine workings consisted of multiple levels and entrances. These workings were surveyed in 1997 and subsequently closed and mined through (JBR 1998). Bats were excluded from the approximately 75-foot long Red Rock adit, and the working was closed prior to being mined through in 2002.

There are no maternity roosting, hibernacula, or bachelor roosting habitat within the proposed Plan boundary. The entire proposed Plan boundary serves as potential day roosting and foraging habitat. Bat use of the habitat within the proposed Plan boundary is limited without long-term roosting available. Bat species would be expected to be passing through the proposed Plan boundary in the warm season (late spring to early fall). Species that may occur in the area include Townsend's big eared bat (*Corynorhinus townsendii*), pallid bat (*Antrozous pallidus*), long-legged myotis (*Myotis volans*), fringed myotis (*Myotis thysanodes*), and western small-footed myotis (*Myotis ciliolabrum)* (JBR 1998).

Pygmy Rabbit

Pygmy rabbits are a BLM sensitive species and are a species of special concern for the State of Nevada. This species was not identified during agency consultation; however, pygmy rabbits have been surveyed for and analyzed in previous NEPA documents for the Marigold Mine.

Pygmy rabbits are a year-long resident that are directly tied to sagebrush communities. Pygmy rabbits forage on big sagebrush and burrow in the loose soils created by the roots (NatureServe 2013). Generally, pygmy rabbits burrow in loamy soils deeper than 20 inches. Usually burrows are found in taller and denser big sagebrush stands. The height of the sagebrush can vary enormously, from about one and a half to seven feet. Density can also vary. Various subspecies of sagebrush are used, including Wyoming big sagebrush (*Artemisia tridentata* var. *wyomingensis*), mountain sagebrush (*Artemisia tridentata* var. *vaseyana*), and basin big sagebrush (*Artemisia tridentata* var. *tridentata*) (Ulmschneider 2008).

Pygmy rabbits are found in alluvial fans, swales in rolling landscape, large flat valleys, at the foot of mountains, along creek and drainage bottoms, in basins in the mountains, or other landscape features where soil may have accumulated to greater depths. They are generally on flatter ground, and occasionally on moderate slopes (Ulmschneider 2008).

Pygmy rabbit habitat within the proposed Plan boundary is considered to be marginal to poor. Potential for the species to occur exists in the sagebrush community type, especially in patches of Wyoming big sagebrush and basin big sagebrush. Suitable pygmy rabbit habitat was surveyed in 2011. No individuals or their sign were documented (GBE 2012b). Supplemental pygmy rabbit surveys were conducted in 2013. No individuals or their sign were documented (JBR 2013c).

Lahontan Cutthroat Trout

Lahontan cutthroat trout have been identified by NNHP through consultation as potentially having habitat within the proposed Plan boundary (NNHP 2012). There are no riparian areas or perennially flowing drainages within the proposed Plan boundary; therefore, there is no habitat for the Lahontan cutthroat trout. There is perennially flowing water outside of the proposed Plan boundary to the south that supports brook trout populations (GBE 2012b).

BLM Special Status Plant Species

BLM-identified sensitive plant species that occur or are known to occur in the BLM WD were described in the *Supplemental Biological Baseline Survey* (JBR 2013c). Those species that were identified with the potential to occur within the proposed Plan boundary are described in detail in the following sections. NNHP Watch-list species are also included.

Winged Milkvetch

Winged milkvetch was identified by NNHP as potentially having habitat within the proposed Plan boundary (NNHP 2012). The winged milkvetch is a perennial herb found on light-colored, alkaline, often seasonally moist sandy silt or clay soils of saltgrass meadows, shrubby bottomlands, and low knolls. This species is dependent on wetland margin areas in Nevada. Elevations of known populations range between 4,000 and 4,900 feet AMSL (NNHP 2001). No winged milkvetch plants were identified within the proposed Plan boundary during baseline surveys (GBE 2012b).

Elko Rockcress

Elko rockcress (*Arabis falcifructa*) is a perennial herb known to occur in dry, densely vegetated, relatively undisturbed, light-colored silty soils with a high cover of moss and other soil crust components on moderate to steep north-facing slopes in the sagebrush zone. Elevations of known populations range between 5,300 and 6,100 feet AMSL (NNHP 2001). No Elko rockcress plants were identified within the proposed Plan boundary during baseline surveys. Habitat was marginal due to disturbance associated with livestock trampling (GBE 2012b).

Windloving Buckwheat

Windloving buckwheat (*Eriogonum anemophilum*) is a low perennial herb known to occur on dry, exposed, relatively barren and undisturbed, gravelly limestone or volcanic ridges, outcrops or shallow rocky soils over bedrock. Elevations of known populations range between 4,750 to 9,836 feet AMSL (NNHP 2001). No windloving buckwheat plants were identified within the proposed Plan boundary during baseline surveys. Habitat is marginal due to disturbance associated with livestock grazing (GBE 2012b).

Sagebrush Cholla

Sagebrush cholla (*Grusonia pulchella*) is known to occur on sand dunes, on dry-lake borders, river bottoms, washes, valleys, and in plains with deep sandy soils in the desert. Elevations of known populations range between 3,950 to 6,300 feet AMSL. It is a low, inconspicuous clump-forming cholla cactus that usually blooms from May to June (NNHP 2001). Habitat for the sand cholla within the proposed Plan boundary was marginal as soils were mostly loamy instead of sandy. No sagebrush cholla plants were identified within the proposed Plan boundary during baseline surveys (GBE 2012b).

All cacti and yucca species are protected by Nevada state law (NRS 527.060.120). No species of cacti or yucca were identified within the proposed Plan boundary during baseline surveys.

3.21. Vegetation

The Marigold Mine is located in the Central Great Basin floristic region of the Intermountain physiographic region. This floristic region is characterized by mountain ranges trending north and south with extensive valleys located between the mountain ranges. This region covers approximately 30,250 square miles in central Nevada.

A biological baseline update report was prepared for Marigold Mine in 2012, and included a description of the vegetation communities within the proposed Plan boundary (GBE 2012b). This area is dominated by three major plant communities including sagebrush, salt desert shrub dominated by shadscale, and sagebrush-shadscale early seral stage in previously burned areas (GBE 2012b). Limited riparian areas are present along Trout and Cottonwood creeks. No federal jurisdictional wetlands are located within the proposed Plan boundary (JBR 2012). The distribution of these communities is directly related to the subtle differences in landscape position, aspect, soil texture, and soil moisture. Map 9: Vegetation Communities displays the location of the vegetation community types, and Table 3.20 presents the total acres of each vegetation community type within the proposed Plan boundary. Areas previously disturbed by mining are labeled as authorized mine disturbance.

Table 3.20. Vegetation Communities within the Proposed Plan Boundary

Vegetation Community	Acres	Percent
Sagebrush	4,109	22%
Salt Desert Shrub	8,494	45%
Sagebrush-Shadscale Early Seral Stage	2,035	11%
Authorized Mine Disturbance	4,443	23%
Total	**19,081**	**100%**

The sagebrush community is predominately found in the southern portion of the proposed Plan boundary from approximately 4,740 to 6,040 feet AMSL and accounts for approximately 22 percent of the proposed Plan boundary. This community is characterized by foothills and drainages associated with Battle Mountain. Dominant shrubs include Wyoming big sagebrush and spiny hopsage. Less dominant shrubs include shadscale and green rabbitbrush (*Ericameria teretifolia*). Other species found within this vegetation community include snakeweed (*Gutierrezia* sp.), squirreltail, Indian ricegrass, Thurber's needlegrass, hawksbeard (*Crepis* sp.), arrowleaf balsamroot (*Balsamorhiza sagittata*), daisy (*Eriogonum* sp.), milkvetch (*Astragalus* sp.), western tansymustard (*Descurainia pinnata*), cheatgrass, saltlover, desert parsley (*Lomatium* sp.), globemallow (*Sphaeralcea* sp.), phlox species (*Phlox* sp.), basin wildrye (*Leymus cinereus*), and Great Basin desert buckwheat (*Eriogonum desertorum*) (GBE 2012b).

The salt desert shrub community is found in the northern portion of the proposed Plan boundary from approximately 4,400 to 5,500 feet AMSL and accounts for approximately 45 percent of the proposed Plan boundary. This community is characterized by gentle sloping alluvial fans and dominated by shadscale with lower amounts of bud sagebrush (*Picrothamnus desertorum*), cheatgrass, Indian ricegrass, tansy mustard, and saltlover. Other species found within this vegetation community include black greasewood (*Artemisia nova*), seepweed (*Suaeda* sp.), squirreltail, saltgrass (*Distichlis spicata*), thelypody (*Thelypodium* sp.), prickly Russian thistle (*Salsola iberica*), and saltlover (GBE 2012b).

The sagebrush-shadscale early seral stage community is found in previously burned areas in the western portion of the proposed Plan boundary, and account for approximately 11 percent of the proposed Plan boundary. Information regarding historic fires throughout the state of Nevada does not show any large fires occurring within the project boundary; therefore, knowing the exact years that fire occurred within this boundary is not readily available (BLM 2012c). Fires have occurred and influenced vegetation communities within the proposed Plan boundary. Where fire has occurred, overstory plants consist of shadscale, spiny hopsage, horsebrush (*Tetradymia* sp.), and yellow rabbitbrush (*Chrysothamnus viscidiflorus*) with an understory consisting of Sandberg bluegrass (*Poa secunda*), cheatgrass, western tansymustard, tall tumblemustard (*Sisymbrium altissimum*), clasping pepperweed, and saltlover. Shadscale has increased in the burned areas while bud sagebrush as decreased. The burned areas also have more Sandberg bluegrass and cheatgrass present. Cheatgrass is an annual species that readily invades burned or disturbed areas (GBE 2012b).

There are two naturally occurring springs within the proposed Plan boundary: Mud Spring and an unnamed spring. Heavy trampling and use by livestock has left both springs almost devoid of vegetation. Vegetation that is present consists of foxtail barley (*Hordeum jubatum*), meadow barley (*Hordeum brachyantherum*), annual rabbitsfoot grass (*Polypogon monspeliensis*), rush species, monkeyflower (*Mimulus* sp.), curly dock, common yarrow (*Achillea millefolium*), and curveseed butterwort (GBE 2012b).

The southern portion of Trout Creek located above the dam supports willow species (*Salix* sp.), currant species (*Ribes* sp.), Woods' rose (*Rosa woodsii*), and foxtail barley. The majority of Trout Creek and Cottonwood Creek below the dam are lined with basin big sagebrush with a small amount of riparian vegetation (GBE 2012b).

3.22. Visual Resources

Information detailing visual resources in the proposed Plan boundary is provided in 2001 FEIS (pages 3-118 through 121), 2003 FSEIS (pages 3-115 through 3-117), and 2005 EA (pages 69 through 71), and has been summarized.

Public land within the proposed Plan boundary is subject to BLM jurisdiction, which has guidelines and criteria to assess visual resources and potential impacts. The BLM is required to designate Visual Resource Management (VRM) classes for all areas of BLM land based on three key elements: scenic quality, sensitivity level, and distance zones. These management classes identify various permissible levels of landscape alteration, while protecting the overall visual quality of the regions (BLM 1986a and 1986b). VRM classes are broken down into four levels (Classes I through IV), with Class I designated as most protective of the visual resources. Objectives of these classes vary from very limited modification of the landscape to activity that allows major landscape modification. Short-term (3 to 5 years) exceptions are allowed if the VRM objectives are met in the long-term (10 to 20 years).

Approximately 1,286 acres of the proposed Plan boundary located within three miles of I-80 is classified as a VRM Class III. The remaining portion of the proposed Plan boundary covering approximately 17,747 acres is designated as a Class IV. Mapped VRM Class ratings within the proposed Plan boundary are displayed in Map 10: Visual Resources. The objective for Class III is as follows:

> To provide for management activities that would partially retain the existing character of the landscape. The level of change to the landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape (BLM 1986a).

The objective for Class IV is as follows:

> To provide for management activities that requires major modification of the existing charter of the landscape. The level of change to the characteristic landscape can be high. Management activities (developments, etc) may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the landscape character elements (BLM 1986a).

Description of Visual Elements of the Proposed Plan Boundary

The Marigold Mine is visible for approximately 10 miles along I-80. Maximum visibility of the proposed Plan boundary and the existing mine occurs at the Valmy rest area at the I-80 Interchange at mile marker 216. The Valmy rest area is located approximately three miles northeast of the Marigold Mine. The mine is also visible from the Buffalo Valley Road.

Landscape character gives a geographic area its visual image, and consists of a combination of physical attributes that make each landscape unique or identifiable. Landscape character embodies distinct landscape attributes that exist throughout an area. As defined by BLM, landscape character is the "overall impression created by its unique combination of visual features such as land, vegetation, water, and structures as seen in terms of form, line, color, and texture" (BLM 1986b). The proposed Plan boundary is located in the Great Basin region of the Basin and Range Physiographic Province. The topography in Basin and Range landscape of northern Nevada is typically characterized by broad, open basins bounded by isolated mountain ranges covered by pinyon-juniper and/or sagebrush vegetation. The Marigold Mine is located on the piedmont slopes of Battle Mountain and slopes toward the Humboldt River to the north and east.

Landscape in the proposed Plan boundary is characterized as panoramic, whereas there is little or no "sense of boundary" restriction, and where the foreground and middle ground objects do not substantially impede viewing of background objects. Battle Mountain forms the backdrop for views of the mine site from I-80. The natural forms of the mountains are pyramidal, whereas the foothills tend to be more rolling and smooth. Vegetation in the area, which consists mainly of sagebrush, shadscale, and grasses, provides relatively uniform coverage on the alluvial slopes near the mine development, while shrub coverage on the slope of Battle Mountain is more irregular and patchy. Throughout the year, colors in the landscape are primarily brown hues dotted with green vegetation. Snow is common in the winter months.

The most dominant features of human origin within the surrounding area include I-80, the Valmy rest area, the North Valmy Power Station, the community of Valmy, and WRSAs associated with Newmont Mining Corporation's Lone Tree Mine and MMC's Marigold Mine, which are apparent south along I-80. The Marigold Mine is viewed at a distance of at least 2.5 miles by motorists on I-80, and is not apparent to the casual observer. Upon close inspection, the squat, geometric forms of the reclaimed 8-South WRSA and the tailings dam provide only minor contrast to the

sagebrush dominated foothills of Battle Mountain. These facilities essentially screen views of other mine elements.

Revegetation of the reclaimed 8-South WRSA conforms with the line and color of the surrounding landscape. The reclamation seed mix contained similar species to those in the surrounding landscape. Successful establishment of the vegetation has created soft lines and dull grey tans, browns, and greens that are uniform across the landscape. The visual contrast is minor in the existing environment between natural vegetation and revegetated areas.

Visual resources have been previously defined from two KOPs in locations where the Marigold Mine facilities are most revealing as seen by the casual observer (BLM 2005). KOP 1 is located along I-80 between mile marker 215 and 216 on I-80 near the Valmy rest area and is described in detail below. KOP 2 is located along a segment of the California National Historic Trail approximately 200 to 300 yards to the north of I-80 near a railroad line and frontage road and is described in Section 3.3, "National Historic Trails".

From KOP 1 is located approximately 3.5 miles north of the Marigold Mine, which is located within the middle ground viewing zone. The existing WRSAs and the tailings dam are visible, yet remain subordinate to the view of Battle Mountain, which forms the backdrop. The cover of grasses and shrubs on the reclaimed 8-South WRSA and vegetated portion of the tailings dam also serve to minimize the appearance of these facilities. The uppermost portions of the Top Zone Pit and East Hill Pit highwalls are visible from this KOP and generally are unnoticeable to the casual observer.

3.23. Wildlife

Baseline data collected for the Marigold Mine has been generated over the last 15 years. This section references previous wildlife surveys conducted within the proposed Plan boundary and as well as current baseline surveys conducted for the Proposed Action. The affected environment for wildlife has also been described in previous NEPA documents. This information has been summarized from the 2001 FEIS (pages 3-89 though 3-95), 2003 FSEIS (pages 3-87 through 3-88), and 2005 EA (page 63), and updated to current conditions. With the exception of areas affected by wildland fires and mining, the landscape types and habitats are the same and have not had dramatic changes over time.

Wildlife habitat within the proposed Plan boundary consists of three vegetation communities; sagebrush, salt desert shrub dominated by shadscale, and sagebrush-shadscale early seral stage in previously burned areas (GBE 2012b). The sagebrush community is predominantly found in the southern portion of the proposed Plan boundary from approximately 4,740 to 6,040 feet AMSL. The salt desert shrub community is found in the northern portion of the proposed Plan boundary from approximately 4,400 to 5,500 feet AMSL. The sagebrush-shadscale early seral stage is found in previously burned areas in the western portion of the proposed Plan boundary. All three habitat types are widespread and common throughout the area. Land within the proposed Plan boundary is homogenous and uniform; therefore, it would be unlikely to find a species not identified in previous NEPA or baseline surveys at the Marigold Mine.

Game Species

Wildlife species occurring within the general vicinity of the proposed Plan boundary include those typically found in lower and mid-elevation habitats of the Great Basin. Mule deer distributions

occur in the southern portion and a small portion of the northeastern corners of the proposed Plan boundary and adjacent four-mile radius. The southern end is considered potential mule deer winter range, and the very northern portion is considered mule deer limited range as shown on Map 11: Potential Mule Deer Habitat. Mule deer summer range is located approximately 0.75 miles to the southeast (NDOW 2012).

MMC has been funding radio telemetry studies of mule deer within the vicinity of the Marigold Mine since 2010 to define and refine mule deer ranges in the area. Mule deer are regularly observed on the reclaimed portion of the 8-WRSA, tailings impoundment, and the South WRSA. These facilities provide approximately 300 acres of habitat.

In June 2010, MMC assessed the status of vegetation on reclaimed areas versus vegetation within the proposed Plan boundary, which represents a pre-mining landscape. Four transects were established in non-disturbed areas and six transects were established at various locations within the reclaimed facilities at 8-WRSA, tailings impoundment, and South WRSA. The mean vegetative cover of non-disturbed areas was 24.5 percent for all species and 20 percent for perennial species. The mean vegetation cover at the reclaimed facilities was 41.2 percent for all species and 35.8 for perennial species. Shrub cover in reclaimed areas was more than double the cover at non-disturbed sites. Deer pellets were used to analyze mule deer use in non-disturbed areas versus the reclaimed areas. Densities of deer pellets were higher in the reclaimed areas (GBE 2011).

Pronghorn antelope (*Antilocapra americana*) distributions occur within the southern two thirds of the proposed Plan boundary and the majority of the four-mile radius around the proposed Plan boundary. NDOW considers the area as year-round habitat for pronghorn antelope. Pronghorn antelope have been observed in the vicinity of the Marigold Mine (NDOW 2012); however, this species occur in low numbers (GBE 2012b).

Mountain lion (*Puma concolor*) are also classified as big games species. Mountain lion are fairly common in north-central Nevada and have the potential to occur within the vicinity of the proposed Plan boundary, typically at higher elevations (JBR 1998). They often travel between mountain ranges and valleys depending on prey availability.

No known bighorn sheep (*Ovis canadensis*) or elk (*Cervus elaphus*) distributions exist in the vicinity of the proposed Plan boundary (NDOW 2012).

Upland game birds are not abundant within the proposed Plan boundary; however, there is potential for them to utilize the area. Mourning dove, chukar, and gray partridge (*Perdix perdix*) have been documented within the proposed Plan boundary. Chukar are most commonly observed using the WRSA. California quail also have the potential to occur within the proposed Plan boundary (NDOW 2012).

Small Game and Non-Game

Small game and non-game mammals identified within the vicinity of the proposed Plan boundary include coyote (*Canis latrans*), badger (*Taxidea taxus*) black-tailed jackrabbit (*Lepus californicus*), mountain cottontail (*Sylvilagus nuttallii*), least chipmunk (*Tamias minimus*), golden-mantled ground squirrel (*Spermophilus lateralis*), kit fox (*Vulpes macrotis*), wood rat (*Neotoma* sp.), long-tailed weasel (*Mustela frenata*), deer mouse (*Peromyscus maniculatus*), sagebrush vole (*Lemmiscus curtatus*), yellow-bellied marmot (*Marmota flaviventris*), long-tailed vole (*Microtus longicaudus*), and Townsend's ground squirrel (*Spermophilus townsendii*) (NDOW 2012).

Additional small game and non-game species with the potential to occur within this area include the montane vole (*Microtus montanus*), vagrant shrew (*Sorex vagrans*), and Ord's kangaroo rat (NDOW 2012).

Bats

The area within the proposed Plan boundary contains potential day roosting and foraging habitat for several bat species. All of the bats identified as potentially occurring within the vicinity of the proposed Plan boundary are currently BLM sensitive species and/or Nevada protected species. These species are presented in detail in Section 3.20, "Special Status Species".

Reptiles and Amphibians

Western fence lizards (*Sceloporus occidentalis*) and sagebrush lizards (*Sceloporus graciosus*) commonly occur in the sagebrush vegetation types. Great Basin whiptails (*Cnemidophorus tigris*) occur throughout the area; however, they are more common in the salt desert shrub vegetation, as were desert horned lizards (*Phrynosoma platyrhinos*), gopher snakes (*Pituophis melanoleucus*), and leopard lizards (*Gambelia wislizenii*). Collared lizards (*Crotaphytus insularis* spp. *bicinctores*) are found in the small rocky outcrops in the foothills and Great Basin rattlesnakes (*Crotalus oreganus lutosus*) were found in the Trout Creek canyon at the southern end of the proposed Plan boundary (GBE 2012b). Additional reptile species identified as having the potential to occur in the vicinity of the proposed Plan boundary include Great Basin gopher snake (*Pituophis catenifer deserticola*), gopher snake (*Pituophis catenifer*), and terrestrial garter snake (*Thamnophis elegans*) (NDOW 2012).

No amphibians have been observed within the proposed Plan boundary. Mud Spring and the unnamed spring have been heavily impacted by livestock. There is no habitat for amphibian species; therefore, systematic surveys for amphibian species in the proposed Plan boundary were not conducted (GBE 2012b).

Birds

Non-game birds include a variety of passerine and raptor species including migratory birds species that are protected under the MBTA (16 USC 703-711) and Executive Order 13186 (66 Federal Register 3853). Section 3.5, "Migratory Birds" describes migratory birds, including raptors, in further detail. Pinyon jay, loggerhead shrike, sage thrasher, and Brewer's sparrow are BLM special status species and are discussed in Section 3.20, "Special Status Species". Table 3.21, "Bird Species within the Proposed Plan Boundary"lists common bird species that have been detected or are known to occur in the proposed Plan boundary.

Table 3.21. Bird Species within the Proposed Plan Boundary

Common Name	Scientific Name
Sage Sparrow	*Amphispiza belli*
Black-throated Sparrow	*Amphispiza bilineata*
Cassin's Finch	*Carpodacus cassinii*
House Finch	*Carpodacus mexicanus*
Killdeer	*Charadrius vociferous*
Lark Sparrow	*Chondestes grammacus*
Band-tailed Pigeon	*Columba fasciata*
Common Raven	*Corvus corax*
Horned Lark	*Eremophila alpestris*
Brewer's Blackbird	*Euphagus cyanocephalus*
Common Snipe	*Gallinago gallinago*
Pinyon Jay	*Gymnorhinus cyanocephalus*
Barn Swallow	*Hirundo rustica*
Loggerhead Shrike	*Lanius ludovicianus*
Brown-headed Cowbird	*Molothrus ater*
Long-billed curlew	*Numenius americanus*
Sage Thrasher	*Oreoscoptes montanus*
Black-capped Chickadee	*Parus atricapillus*
Lazuli Bunting	*Passerina amoena*
Cliff Swallow	*Petrochelidon fulva*
Black-billed Magpie	*Pica pica*
Hairy Woodpecker	*Picoides villosus*
Spotted Towhee	*Pipilo maculatus*
Vesper Sparrow	*Pooecetes gramineus*
Ruby-crowned Kinglet	*Regulus calendula*
Rock Wren	*Salpinctes obsoletus*
Say's Phoebe	*Sayornis saya*
American Goldfinch	*Spinus tristis*
Brewer's Sparrow	*Spizella breweri*
Western Meadowlark	*Sturnella neglecta*
American Robin	*Turdus migratorius*
Western Kingbird	*Tyrannus verticalis*
Mourning Dove	*Zenaida macroura*
White-crowned Sparrow	*Zonotrichia leucophrys*

NDOW identified the ruddy duck (*Oxyura jamaicensis*) and western grebe (*Aechmophorus occidentalis*) as have the potential to occur within the vicinity of the proposed Plan boundary (NDOW 2012). The Humboldt River is located approximately 3.5 miles to the northeast and is the nearest open water source that has the potential to support these species.

Raptors

Raptor species observed within or near the proposed Plan boundary are migratory birds and are discussed in Section 3.5, "Migratory Birds". Western burrowing owl and golden eagle are BLM special status species and are discussed in Section 3.20, "Special Status Species".

Fish

All drainages within the proposed Plan boundary are intermittent or ephemeral. The lack of riparian habitat and perennially flowing water prohibit the existence of a fishery within these

drainages. The upper reaches of Trout Creek, located south of the proposed Plan boundary, are perennial and support brook trout populations (BLM 1998; GBE 2012a).

Invertebrates

The following mollusks have the potential to occur within the vicinity of the proposed Plan boundary: glass physa (*Physa skinneri*); rock fossaria *(Fossaria modicella*); and tadpole physa (*Physella gyrina*) (NDOW 2012). None of these species was observed during baseline surveys (JBR 1997 and 2013; GBE 2012b).

Chapter 4. Environmental Effects

4.1. Direct and Indirect Impacts

The following sections describe the direct and indirect environmental consequences that would result from authorization of the Proposed Action and the No Action Alternative.

Direct effects are those that are caused by the action and occur at the same time and place. Indirect effects are those impacts that are caused by the action and occur later in time or further removed in distance; however, they are still reasonably foreseeable. Indirect impacts may include growth-inducing effects such as changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects resulting from actions may have beneficial or detrimental effects, even if on balance the agency believes that the effect would be beneficial (40 CFR 1508.8).

Review of the environmental consequences identified both direct, indirect, temporary, and permanent impacts resulting from the Proposed Action and No Action Alternative. The Proposed Action for each resource includes implementation of the EPMs identified in Section 2.1.8, "Environmental Protection Measures". Mitigation measures, in addition to the EPMs, are recommended where actions may be taken to further minimize potential adverse effects to the resources.

Supplemental Authorities

4.1.1. Air Quality

Given the remote nature of the project, the primary indicator of air quality impacts for Criteria pollutants would be the Nevada and EPA NAAQS. The EPA-defined increment would also be used as indicators for Class I and Class II airsheds (there are no Class I areas within 100 kilometers of the proposed Plan boundary). These are enforced through Nevada air permitting requirements to protect public health. The facility is currently operating under the required Class II Air Quality Operating Permit, AP1040-0158.

The Nevada and EPA NAAQS define air pollutant concentrations that are not to be exceeded in ambient air. Significant impact levels are quantitatively defined in EPA regulations for both major, Class I areas, and minor, Class II areas. The significant impact levels are applicable for PM_{10} and SO_2 since the air basin was triggered as a PSD minor source on March 2, 1977. The baseline date makes the significant contribution levels for those pollutants enforceable at Class I areas or any other area in the vicinity of the Marigold Mine. Table 4.1, "Modeling Significance Levels and Ambient Air Quality Standards" lists the defined EPA and BAPC impact thresholds and impact limits for criteria air pollutants. For this analysis, ambient air quality impacts are considered minor when predicted impacts are below the Class II Significant Impact Levels (SILs), moderate when predicted impacts exceed the SILs but remain below the national and Nevada NAAQS, or major when predicted impacts exceed the national or Nevada NAAQS.

The EPA has supported development of a set of air quality dispersion models to estimate ambient air quality impacts in areas surrounding air pollutant emission sources. The EPA recommends the use of the model most appropriate for the application based upon the nature and extent of the emission sources, the distance to potential off-site receptors, and the intervening terrain.

To assess ambient air quality impacts off-site as a result of the Proposed Action, an analysis on the change in emissions due to the Proposed Action was conducted. The EPA-preferred model AERMOD was applied in the FSEIS in 2003 and revised in the 2005 EA (NV-020-05-EA-011). The technical specification of the modeling effort is documented in those documents.

Table 4.1. Modeling Significance Levels and Ambient Air Quality Standards

Pollutant	Averaging Period	EPA-Defined Class II Maximum Allowable Increase (µg/m³)	NAAQS (µg/m³)	NEVADA AAQS (µg/m³)
Nitrogen Oxide	Annual	25	100	100
	1-hr	NA	188	NS
Sulfur Dioxide	Annual	20	NA	80
	24-hr	91	NA	365
	3-hr	512	1300	1300
	1-hr	NA	196	NS
Carbon Monoxide	8-hr	NA	10,500	10,500[1]
	1-hr	NA	40,500	40,500
PM_{10}	Annual	17	NA	50
	24-Hr	30	150	150
$PM_{2.5}$	Annual	4	15	NA
	24-Hr	9	35	NA
Lead	Quarterly	NA	1.5	1.5
Ozone	8-hr	NA	146.9	NS
	1-hr	NA	NA	235[2]

NA = Not applicable
NS = No state standard formally adopted
[1]7,000 µg/m³ at areas equal to or greater than 5,000 feet AMSL
[2]195 in Lake Tahoe Basin

Proposed Action

For the purposes of analyzing the air quality impacts, the Proposed Action includes the proposed Plan boundary, re-designating the Section 30 Heap Leach Facility to the Target 3 Pit, exchanging equipment with larger and more efficient models, and increasing the yearly-mined material quantity from 60 million tons to a maximum of approximately 150 million tons.

Typical modeling analyses using the EPA approved air dispersion modeling software, AERMOD, will result with the greatest concentrations at a point along the property boundary and decreasing concentrations outward from the property boundary due to particle deposition. The expansion of the proposed Plan boundary for the facility is expected to lower the maximum overall impacts for each pollutant emitted at the site. The reduction in emissions is not quantifiable in impact levels without an in-depth modeling exercise and a reduction does not warrant such an exercise.

Emissions typically seen at a heap leach facility include unloading of ore from haul trucks, fugitive dust from dozing the material into place, and the associated combustion from the hauling and dozing equipment. Emissions from these sources are not calculated under the assumption that the pit will include additional dozing and loading to offset the re-designation of the area.

The Target 3 Pit will be assimilated into the Target 1 and Target 2 Pits to form one single pit. There will be no additional equipment utilized in the larger pit, but some of the older equipment will be replaced with larger and more efficient models. The increase of material throughput will increase

in-pit activities such as drilling, blasting, and loading of material. The mine will utilize higher benches and deeper drilling to increase the material throughput while remaining at one blast per day, on average. Explosive detonation will increase by approximately 30 percent to account for the deeper drill holes. Ore loading is currently provided with two, wheeled loaders, which will be replaced with electric shovels. Fugitive emissions from the wheeled loaders are assumed to equal that of the electric shovels, but a net decrease of emissions will be seen from the reduction in combustion. Table 4.2 provides a summary of the change in emissions due to blasting.

Table 4.2. Blasting Emissions (tons/year)

Source Category	CO	NOx	SO_2
Current	407.0	103.3	1.2
Proposed Action	529.1	134.3	1.6
Net Change	**+122.1**	**+31.0**	**+0.36**

Hauling at Marigold Mine is currently provided with six 320-ton Tier 1 haul trucks, six 320-ton Tier 2 haul trucks, and ten 185-ton Tier 1 haul trucks. The increase in material throughput would be handled by replacing the 185-ton Tier 1 haul trucks with more efficient 320-ton Tier 2 haul trucks. Emissions are calculated for both the fugitive and combustion to show the net change. Table 4.3 provides a summary of the change in fugitive emissions due to hauling or ore and waste.

Table 4.3. Fugitive Emissions (tons/year)

Source Category	TSP	PM_{10}	$PM_{2.5}$
Current	14.4	3.3	0.3
Proposed Action	17.1	4.0	0.4
Net Change	**+2.7**	**+0.6**	**+0.1**

TSP = Total Suspended Particulate

Table 4.4 provides a summary of the change in combustion emissions from the change in equipment including haul trucks, loaders, and electric shovels.

Table 4.4. Combustion Emissions (tons/year)

Source Category	TSP	PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2
Current	144.8	139.0	130.3	2,981.8	2,693.7	2.5
Proposed Action	110.9	106.4	99.8	2,141.5	2,494.5	2.8
Net Change	**-33.9**	**-32.6**	**-30.5**	**-840.3**	**-199.3**	**+0.3**

The total change in emissions for the Proposed Action is shown in Table 4.5. The table shows a net decrease in emissions from TSP, PM_{10}, $PM_{2.5}$, CO, and NO_x. The SO_2 emissions are increasing by 0.7 tons per year due to the increased haul truck size and the increase in ammonium nitrate explosives used at the mine. NDEP requires an increase of 10 tons per year of a single pollutant in order to necessitate a modeling analysis, therefore the increase in SO_2 emissions at the mine is considered to be a minor impact. No modeling was determined to be necessary for the impact analysis (Jones 2013).

Table 4.5. Proposed Action Net Change in Emissions (tons/year)

Source Category	TSP	PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2
Proposed Action	-31.2	-31.9	-30.5	-718.2	-168.3	+0.7

Greenhouse Gas Emissions

Recent scientific evidence suggests there is a direct correlation between global warming and emissions of GHGs. GHGs include carbon dioxide, methane, nitrogen oxide, and ozone. Although many of these gases occur naturally in the atmosphere, man-made sources have substantially increased the emissions of GHGs over the past several decades. Of the man-made GHGs, the greatest contribution currently comes from carbon dioxide emissions. The EPA has developed a method to convert all GHGs to the carbon dioxide equivalent (CO_2e) in order to readily compare the various GHG emissions.

GHG emissions associated with the proposed action would be associated with the consumption of fuel from the haul trucks and loaders. Explicit emissions were calculated for emissions of GHGs from current equipment and the new proposed equipment. The results are included in Table 4.6.

Table 4.6. Direct Project GH Emissions (tons/year)

Source Category	CO_{2e}
Current	62,917.5
Proposed Action	71,526.2
Net Change	**+8,608.8**

Hazardous Air Pollutant Emissions

Toxic air pollutants, also known as Hazardous Air Pollutants, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. The EPA is working with state, local, and tribal governments to reduce air toxics releases of 187 pollutants to the environment. Examples of toxic air pollutants include benzene, which is found in gasoline; perchloroethylene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries. Examples of other listed air toxics include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds.

People exposed to toxic air pollutants at sufficient concentrations and durations may have an increased chance of developing cancer or experiencing other serious health effects. These health effects can include damage to the immune system, as well as neurological, reproductive (e.g., reduced fertility), developmental, respiratory and other health problems. In addition to exposure from breathing air toxics, some toxic air pollutants such as mercury can deposit onto soils or surface waters, where they are taken up by plants and ingested by animals and are eventually magnified up through the food chain. Like humans, animals may experience health problems if exposed to sufficient quantities of air toxics over time.

Sources of hazardous air pollutants (HAPs) for the proposed action include hydrocarbon combustion from the haul trucks and loaders. Emissions of HAPs for the proposed action were calculated using AP-42 emissions factors. The total changes in HAP emissions for the Proposed Action are summarized in Table 4.7, “Proposed Action Net Change in HAP Emissions (tons/year)”.

Table 4.7. Proposed Action Net Change in HAP Emissions (tons/year)

Pollutant	Emissions
Benzene	0.0408
Toluene	0.0148
Xylenes	0.0102
Formaldehyde	0.00415
Acetaldehyde	0.00133
Acrolein	0.000415
Naphthalene	0.00684
Total Net Change in HAPs	**0.0785**

Ambient Air Quality Impacts

Dispersion modeling was conducted for the criteria air pollutants ($PM_{2.5}$, PM_{10}, CO, NO_x, SO_2, and ozone) proposed to be emitted from the mine in the FSEIS in 2003 and updated in the 2005 EA (NV-020-05-EA-011). The EPA-approved model AERMOD was applied, consistent with NDEP and EPA guidance to assess dispersion of those pollutants and potential impacts beyond the area in the aforementioned documents.

An Air Emissions Analysis Report was submitted to the BLM on May 31, 2013, which provided an analysis of the model impacts for each averaging period for which a NAAQS existed; model sources were modeled under a scenario consistent with maximum operations at that time (JBR 2013d). The analysis for the Proposed Action is based on the results from the previous modeling exercise and the emission calculations expected to occur due to the Proposed Action as per the guidance from the BLM (Jones 2013). As seen in Table 4.5, "Proposed Action Net Change in Emissions (tons/year)", there is a net reduction in emissions of all criteria pollutants with the exception of SO_2.

Table 4.8 is a summary of the impacts that were assessed in the FSEIS for each NAAQS averaging period with the background concentrations included. In addition, the table also includes the net change in emissions due to the Proposed Action. The NAAQS have been updated since the modeling exercise was completed, but impacts from similarly modeled constituents show relatively low impacts with regards to the current NAAQS. The BLM determined that modeling for those new averaging periods was not warranted (Jones 2013).

Table 4.8. Model-Predicted Maximum Impacts and the Proposed Action Emissions

Pollutant	Averaging Period	Class II Increment (µg/m³)	NAAQS (µg/m³)	NEVADA AAQS (µg/m³)	Modeled Impact	Emissions Difference (ton/year)
Nitrogen Oxide	Annual	25	100	100	0.90	-168.3
	1-hr	NS	188	NS	NM	-168.3
Sulfur Dioxide	Annual	20	NS	80	0.00	+0.7
	24-hr	91	NS	365	0.00	+0.7
	3-hr	512	1300	1300	0.00	+0.7
	1-hr	NS	196	NS	NM	+0.7
Carbon Monoxide	8-hr	NS	10,500	10,5001	59.8	-718.2
	1-hr	NS	40,500	40,500	175.2	-718.2
PM_{10}	Annual	17	NS	50	12.5	-31.9
	24-Hr	30	150	150	53.3	-31.9
$PM_{2.5}$	Annual	4	15	NA	NM	-30.5
	24-Hr	9	35	NA	NM	-30.5

Pollutant	Averaging Period	Class II Increment (µg/m³)	NAAQS (µg/m³)	NEVADA AAQS (µg/m³)	Modeled Impact	Emissions Difference (ton/year)
Lead	Quarterly	NS	1.5	1.5	NM	NM
Ozone	8-hr	NS	146.9	NS	NM	NM
	1-hr	NS	NS	235	3.55	NM

NM = Not Modeled
NS = No Standard

With the exception of 24-hr PM_{10}, all modeled pollutants were below the EPA Class II Increment in the FSEIS. This would suggest a minor impact on air quality resources for those pollutants. For 24-hr PM_{10}, the impacts modeled remain well below the NAAQS, so their impacts would suggest limited, moderate effects. With the change in emissions for the Proposed Action, the impacts have a potential to be further reduced, with the exception of SO_2 impacts. Due to the low modeled impacts, 0.00, for all previously modeled SO_2 averaging periods and the low level of emissions increase, SO_2 impacts are considered to be minor. It should be noted that modeling was not completed for all averaging periods for which Nevada Air Quality Standards and EPA Class II increments exist. This is due to the recent changes to the NAAQS and the resulting averaging period discrepancies between the NAAQS and the other threshold standards. However, based on the previous dispersion modeling results and the net change in emissions, the Proposed Action would result in predominately minor impacts for air resources with moderate particulate impacts. These impacts would be limited to the immediate region surrounding the proposed Plan boundary and would not produce long-range impacts.

Recommended Mitigation Measures

No mitigation measures would be required for air quality beyond the current standard operating procedures utilized at Marigold Mine such as speed limits, watering of roads, and concurrent reclamation.

No Action Alternative

This alternative would not result in any increase in ambient pollutant emissions and would therefore provide no impact on air resources beyond the current baseline conditions.

4.1.2. Cultural Resources

Proposed Action

The Proposed Action would have an adverse affect on one historic property site (26Hu4342) determined to be eligible for listing in the NRHP under Criteria D because of its research potential. No impacts to currently known or unknown cultural sites are expected due to the EPMs (Section 2.1.8, "Environmental Protection Measures") that requires all work to cease when an inadvertent discovery of cultural sites is made until a determination is made by the BLM and SHPO. Under the Treatment Plan, MMC would voluntarily excavate five sites being degraded due to natural erosion processes; however, these five sites would not have been impacted by the Proposed Action. The Treatment Plan would excavate the one site that would potentially be affected by the Proposed Action.

Recommended Mitigation Measures

The Treatment Plan developed by KEC with input from Dr. Patrick Haynal of the BLM and approved by Nevada SHPO was designed to mitigate adverse effects to the historic property affected by the Proposed Action. The Treatment Plan would be implemented at the six sites prior to ground disturbance associated with the Proposed Action (BLM 2013).

No Action Alternative

Under the No Action Alternative, the mine boundary would not expand, the Section 30 heap leach facility would remain authorized and could be potentially develop as such, the utility corridor would not be added, and the Trout Creek diversion channel would not be rerouted. One eligible site would not be impacted and voluntary excavation of five sites would not be conducted.

Under the No Action Alternative, inadvertent discoveries would continue to be protected through the Cultural Resources Protection Program and EPMs and mitigation measures identified through previous NEPA.

4.1.3. National Historic Trails

The proposed facilities that have the potential to impact visual resources from the California National Historic Trail include:

- Extension of the North-West Expansion WRSA;
- Addition of a new utility corridor.
- The Trout Creek diversion channel and extension of the boundary fence around the North-West Expansion WRSA would not be visible from KOP 2.

Waste rock placed on the North-West Expansion WRSA would be from existing pits that would mimic the color of the surrounding landscape. Since the majority of the Proposed Action is within background views, the final landform appearance (grades, slopes, etc.) would not represent a deviation from the current visual setting. The contrast rating for color and form for these facilities would be considered weak.

The Proposed Action would require the removal of vegetation at varying levels of degree. Any removal of vegetation would expose bare soil of lighter color and smoother texture than the surrounding areas. This would superimpose visible lines and openings. Existing mine disturbance at Marigold Mine currently shows exposed soils, visible lines, and openings. Visual contrast of color and texture associated with vegetation removal is considered weak since these disturbances replicate current landscape features.

The structure within the utility corridor would consist of 60-foot treated wood poles with approximately 10,175 feet of overhead transmission line. The contrast rating for the transmission line would be considered weak. The transmission line would be minimally visible from KOP 2, and this structure replicates similar type structures currently observed in the landscape.

KOP 1

Analysis of KOP 1 is provided in Section 4.1.21, “Visual Resources”.

KOP 2

Users of the trail would have opportunities for extended views of the proposed Plan boundary. From this viewpoint, the transmission line and power poles are the only proposed features that would introduce additional visual contrast to the landscape. KOP 2 is located approximately six miles from the proposed Plan boundary. Visual contrast as a result of the Proposed Action would be weak due to the distance of the Proposed Action to KOP 2. The nature and location of this type of mining appears to reasonably mimic the form, line, color, and texture of the surrounding landscape.

The VRM objectives outlined in Section 3.22, "Visual Resources" would be met given the nature and appearance of the Proposed Action. While the objective for VRM Class III calls for partially retaining the existing character of landscape, the proposed changes to the landscape would not represent a deviation from what is present or that would be noticeable to the casual observer.

Implementation of EPMs described in Section 2.1.8, "Environmental Protection Measures" would reduce impacts to visual resources from the California National Historic Trail. During mining closure activities, WRSAs would continue to be graded to eliminate the benches between lifts, reduce the side slopes to an approximate 3H:1V grade, and round-off top benches to approximate more natural contours. After slopes are stabilized and graded, growth media would be applied, and WRSAs would be seeded. These efforts would reduce moderate contrasts in land forms and lines associated with the Marigold Mine to weak contrasts as vegetation establishes and matures. Impacts to National Historic Trails associated with the Proposed Action would be negligible; therefore, this resource is not analyzed further in this document.

Recommended Mitigation Measures

There are no recommended mitigation measures for the California National Historic Trail.

No Action Alternative

Under the No Action Alternative, the visual resources would remain the same as current conditions. The current conditions are in conformance with the VRM objectives. There would be no impacts to the California National Historic Trail as a result of currently authorized activities at Marigold Mine.

4.1.4. Invasive-Nonnative Species

Proposed Action

The North-West Expansion WRSA, Trout Creek diversion channel, and the new transmission line are in close proximity to known invasive non-native species located along portions of Trout Creek, Cottonwood Creek, the Terry Zone, and 8-Pit. Proposed disturbance associated with the Proposed Action would increase the potential for spreading invasive non-native species in the proposed Plan boundary.

EPMs discussed in Section 2.1.8, "Environmental Protection Measures" state that MMC would continue active management of noxious weed controls at the site. Noxious and invasive weed controls would be implemented through vegetation establishment to minimize competition from weedy species and to maximize the establishment native vegetation species on disturbed sites. MMC would use chemical control on new or established infestations of noxious weeds. If

herbicides are used to control noxious weeds, the application rates and methods would conform to BLM standards, thereby avoiding potential risks to human health and the environment.

Use of existing roads and avoidance of known weed infestations would minimize the spread of weed species. MMC has an active Integrated Weed Management Plan that would be used within areas of the Proposed Action. Noxious weed occurrences on public land adjacent to the proposed Plan boundary would be reported to the BLM. Based on the EPMs and the use of the Integrated Weed Management Plan, any spread of invasive non-native species as a result of the Proposed Action would be minimal and therefore this resource is not be carried forward for further analysis.

Recommended Mitigation Measures

With the establishment of the EPMs described in Section 2.1.8, "Environmental Protection Measures", there are no recommended mitigation measures for invasive non-native species.

No Action Alternative

Under the No Action Alternative, the potential for weed invasion in areas of disturbance and transport of weeds by humans and vehicles would continue; however, any impacts associated with the extension of the North-West Expansion WRSA, the Trout Creek diversion channel reroute, and the new transmission line would not occur. Hoary cress is expected to remain as the most prevalent noxious weed and cheatgrass is expected to remain as the most prevalent invasive species in disturbed open areas, along roadsides, and where native vegetation is sparse or previously disturbed. Weed management would continue in conformance with MMC's Integrated Weed Management Plan (JBR 2013a).

4.1.5. Migratory Birds

Proposed Action

The Proposed Action would temporarily remove 379.9 acres of migratory bird habitat for the development of the North-West Expansion WRSA (approximately 359 acres), the new transmission line (approximately 4.4 acres), and infill (approximately 16.5 acres). The Proposed Action would permanently remove approximately 7.3 acres of habitat for construction of the Trout Creek diversion channel. Construction and operation activities have the potential to destroy active nests and disturb the breeding behavior of migratory bird species; however, implementation of the EPMs presented in Section 2.1.8, "Environmental Protection Measures" would minimize any direct impacts to migratory birds. The permanent loss of approximately 7.3 acres of habitat is an indirect effect that is unavoidable under the Proposed Action. Destruction of a migratory bird nest would be considered a "take", and is not allowed under the MBTA. MMC would have a qualified biologist conduct migratory bird nest surveys prior to surface disturbance during the avian breeding season from the beginning of March to the end of July. If active nests are identified or if other evidence of nesting (i.e. mated pair, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size of which would depend on the requirements of the species as determined by the BLM) would be delineated and the buffer area avoided to prevent destruction or disturbance to birds or nests until the young have successfully fledged. MMC and its contractors would observe posted speed limits to reduce the potential for wildlife-vehicle collision, including migratory bird species. MMC would reclaim areas of exploration disturbance as soon as possible or within three to five years after mining operations cease (MMC 2012).

Recommended Mitigation Measures

The establishment of EPMs identified in Section 2.1.8, "Environmental Protection Measures" would minimize impacts to migratory birds; therefore, there are no recommended mitigation measures for migratory birds.

No Action Alternative

Under the No Action Alternative, exploration activities may continue on the mining claims authorized through previous NEPA analysis within the authorized Plan boundary. No additional surface disturbance would occur that is not already previously authorized for the currently permitted operations. Impacts to migratory birds in the area would remain the same. MMC would continue to conduct migratory bird surveys prior to new surface disturbance during the migratory bird nesting season as described in Section 2.1.8, "Environmental Protection Measures".

4.1.6. Native American Religious Concerns

Proposed Action

The BLM notified the Native American tribes in the area (Battle Mountain Tribal Council, South Fork Band Council and Elko Band Council, and Winnemucca Indian Colony) of the Proposed Action as described in Section 3.6, "Native American Religious Concerns". In response to an email dated April 16, 2013, a consultation meeting occurred between the Battle Mountain Band and the BLM on May 30, 2013. The tribal council voiced its opposition to the excavation of any sites within the proposed Plan boundary. They felt the sites were sacred since they had been left by the ancestors and were also opposed to the storage of any artifacts in the museum in Carson City. As of the release of this document for public comment, the BLM and the Tribe are trying to arrange a tour of the six sites that are proposed to be excavated. The BLM has since sent email requests to the designated representative for the Battle Mountain Band on June 24, 2013, July 16, 2013, and July 31, 2013.

If previously unidentified human remains or archaeological sites are discovered, MMC would immediately cease activities within 300 feet of the discovery, ensure that the discovery is appropriately protected, and immediately notify the BLM by telephone, followed with written confirmation. Work would not resume, and the discovery would be protected until the BLM Authorized Officer issues a notice to proceed. Based on this EPM, no impacts to Native American concerns are anticipated and this resource is therefore dismissed from further analysis.

The Proposed Action would temporarily remove access to approximately 75 acres of public land and requires the excavation of one NRHP eligible site. The public would be restricted from public land proposed for the North-West Expansion WRSA (approximately 71 acres) and the Trout Creek diversion channel (approximately 4.4 acres). Access to these areas would be temporary and would be restored after mining activity has ceased and closure activities have been completed. A loss of 75 acres of access in the area would have result in a negligible impact. Land in the surrounding area is homogenous and similar. No access to Trout Creek would be restricted.

Recommended Mitigation Measures

There are no recommended mitigation measures for Native American religious concerns.

No Action Alternative

Under the No Action Alternative, the North-West Expansion WRSA and Trout Creek diversion channel would not be constructed; therefore, access to these areas would not be restricted. Adjacent areas currently authorized through previous NEPA analysis within the authorized Plan boundary would continue to be restricted. Access to these areas would be temporary and would be restored after mining activity has ceased and closure activities have been completed (BLM 2003 and 2005).

4.1.7. Wastes, Hazardous or Solid

Proposed Action

The Proposed Action would not result in any change in the use of or methods used to handle hazardous materials at Marigold Mine. Implementation of the Proposed Action would result in an increase of ammonium nitrate used for blasting. Currently, MMC is mining 60 million tons per year with approximately 243 million pounds of ammonium nitrate. It is expected that ammonium nitrate use would increase by approximately 30 percent to approximately 316 million pounds per year. Ammonium nitrate use would increase due to an increased depth of drill holes to be blasted. Current operation procedures for storage and use would remain the same. As a result of the Proposed Action, there may be a minor change in the amount of diesel fuel used; however, it is more likely there would be a trade-off between the decrease in diesel fuel use for the electric shovel versus wheeled loader and an increased use of diesel fuel for the larger haul trucks. Previous NEPA documents evaluated the risk of an accident from the transportation of diesel fuel, which was identified as one of the three most hazardous materials used and transported to the Marigold Mine. Calculations were based on life of mine estimated quantities that would be used and the Hazardous Materials Transportation Risk Analysis (Rhyne 1994). It was estimated that there would be approximately 0.058 accidents involving the release of diesel fuel as a result of delivering to Marigold Mine over the life of the project.

There have been no CERCLA reportable releases of any substances during transportation and mine operation to date. The probability of an accident involving a release of one or more of the hazardous materials over the life of the project is relatively small, and the emergency response measures for responding and containing any spills, either at the mine site or during transportation, are in place under applicable law. The hazardous substances to be used would be handled as recommended on the manufacturer's Material Safety Data Sheet. With the design features and operational practices in place, the probability of a reportable release occurring at Marigold Mine is low.

In the event of a major or minor spill occurring on-site, MMC would follow established procedures presented in the ERP for preventing, controlling, and reporting environmental releases within or from facilities located at the site. All spills, including transportation and loading/unloading related spills occurring on-site, would be cleaned up or neutralized and reported, as required, to the Nevada Division of Emergency Management, the BMRR, the EPA, the National Response Center, the BLM, the Humboldt County Department of Public Works, and Lander County Emergency Planning.

Residual adverse effects from the continued use of hazardous materials at Marigold Mine for the Proposed Action would depend on the substance, quantity, timing, location, and response involved in an accidental spill or release. Operation in accordance with the facility's ERP and prompt cleanup of spills minimizes the possibility of residual adverse effects due to hazardous materials. MMC experiences some spills each year. Most are related to equipment failures, such as a break in a hydraulic line, radiator hose, or engine malfunction. Small spills associated with the fuel docks may also occur. MMC records all spills, regardless of quantity. Due to the containment features at fuel docks and storage areas, adverse effects to the environmental are minimal. Due to the measures in the spill prevention plan and ERP, spills that occur outside of containment are quickly contained and the contaminated material is removed to the bioremediation pad or to a hazardous material disposal facility, as appropriate. Additional monitoring is employed to ensure the efficiency of the remediation measures, as necessary. Consequently, spills and releases have previously occurred at Marigold Mine, and have been contained and cleaned up with no environmental consequences.

Recommended Mitigation Measures

With the establishment of the EPMs described in Section 2.1.8, "Environmental Protection Measures", there are no recommended mitigation measures for waste, hazardous or solid.

No Action Alternative

Under the No Action Alternative, there would be no changes in the use, storage, amount, or transportation of hazardous materials. MMC would continue to manage hazardous material under MMC's Hazardous Materials Plan and ERP. Solid waste would be disposed of at MMC's waivered Class III landfill located on-site. The No Action Alternative would not result in any additional impacts as a result of waste, hazardous and solid.

4.1.8. Water Quality (surface and ground)

Proposed Action

The Proposed Action has the potential to transport sediments and pollutants through surface runoff from the North-West Expansion WRSA, Trout Creek diversion channel, and disturbed areas into Trout Creek and Cottonwood Creek. The potential impacts to groundwater are discussed under Geochemistry in Section 4.1.11, "Geochemistry".

Implementation of MMC's EPMs for water quality is expected to minimize potential degradation of surface water resources at Marigold Mine. At a minimum, EPMs would include preventative maintenance, periodic visual inspections of project components, material handling practices that minimize the exposure of pollutants to stormwater, organized spill prevention and response procedures, sediment and erosion controls, and stormwater controls. Each of these practices would be carried out under a managed program of pollution prevention in accordance with state regulations and MMC's Water Pollution Control Permit NEV88040.

EPMs would be used to limit erosion and reduce sediment in stormwater runoff from project facilities and disturbed areas during construction and operation in accordance with MMC's General Stormwater Permit NVR300000. EPMs may include, but are not limited to, accepted engineering practices such as diversion ditches, ponds, and the placement of erosion control devices such as sediment traps and rock and gravel cover.

Surface waters would be managed to avoid excessive sediment loading to runoff outside the proposed Plan boundary. Temporary diversions would be used under Marigold Mine's Stormwater General Permit NVR300000. Permanent diversion structures would be completed when a component, such as a WRSA, are at final design stages to ensure the structures are appropriately sized and located.

Revegetation of disturbed areas would reduce the potential for wind and water erosion. Following construction activities, areas such as cut and fill embankments, temporary construction roads, and growth media stockpiles would be seeded as soon as practical. Concurrent reclamation would be maximized to the extent practical to accelerate revegetation of disturbed areas. Vegetated areas absorb water and reduce runoff velocity, which prevents water erosion of soils. No impacts to water quality as a result of the Proposed Action are expected.

Trout Creek Diversion Channel

MMC would reroute a portion of the Trout Creek diversion channel around the North-West Expansion WRSA. Outflow would continue to be directed into the Cottonwood Creek drainage in Section 36 as shown on Map 4: Proposed Action. No impacts to water quantity in this channel or dam overflow ability are expected as a result of the Proposed Action. EPMs would be used during construction to prevent unnecessary sedimentation and degradation of surface water quality. Sedimentation would be the greatest following construction, and is expected to diminish as the channel becomes stabilized. The riprap lining in the channel is expected to provide long-term stability for the design flow. The long-term stability of the Trout Creek diversion channel would be continuously monitored and maintained.

MMC would continue all quarterly monitoring as described in Section 2.1.8, "Environmental Protection Measures". EPMs to control erosion, sediment runoff, stormwater flow, and maintain water quality are provided in Section 2.1.8, "Environmental Protection Measures". Overall, impacts to water quality and quantity beyond what has been authorized through previous projects at the mine site (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy") would be negligible. This resource is not further analyzed in this document.

Recommended Mitigation Measures

With the establishment of the EPMs described in Section 2.1.8, "Environmental Protection Measures", there are no recommended mitigation measures for water quality or quantity.

No Action Alternative

Under the No Action Alternative, there would be no reroute of the Trout Creek diversion channel, and surface disturbance as a result of the Proposed Action would not occur. Current stormwater management practices and monitoring would continue as approved. The No Action Alternative would not result in any additional impacts to water quality.

4.1.9. Wetlands and Riparian Zones

Proposed Action

The Proposed Action would have no affect on wetlands or riparian zones. Ames Spring, Mud Spring, and the unnamed spring are located outside of proposed disturbance. MMC would reroute a portion of the Trout Creek diversion channel around the North-West Expansion WRSA. Outflow

would continue to be directed into the Cottonwood Creek drainage in Section 36 as shown on Map 4: Proposed Action. This area is not considered to be a wetland or riparian zone; therefore, there would be no associated impacts to this resource.

Recommended Mitigation Measures

No mitigation measures would be necessary for wetlands and riparian zones.

No Action Alternative

Under the No Action Alternative, there would be no change in the Trout Creek diversion channel, and surface disturbance as a result of the Proposed Action would not occur. The No Action Alternative would not result in any additional impacts to wetlands and riparian zones.

Additional Affected Resources

4.1.10. Access, Land Use, and Realty

Proposed Action

Access

Public access to the active mining and processing areas would continue to be precluded to the maximum extent permitted by law for safety and security reasons. The Proposed Action would preclude a total of 387.2 acres, approximately 91.2 acres of which are located on public land. The public would be temporarily excluded from the North-West Expansion WRSA (approximately 71 acres of public land), the new transmission line (approximately 1.3 acres of public land) and infill (approximately 14.9 acres of public land). The public would permanently lose access to the area where the Trout Creek diversion channel would be located (approximately four acres of public land).

Access to any of the perennial reaches of Trout Creek would not be restricted. Public access to all other portions of Trout Creek would remain available via the Buffalo Valley Road. Public access to Ames Spring, Mud Spring, and the unnamed spring would remain unchanged. Overall, impacts to the public access beyond what has been authorized through previous projects at the mine site (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy") would be negligible.

Land Use

The Proposed Action would be in conformance with the BLM WD SGMFP, which makes all public land and federally-owned minerals available for exploration and mineral development. Mining activities on private land would be consistent with the Humboldt County Zoning Ordinance, provided that expansion on private land complies with special use permit requirements of the county. The Proposed Action would not conflict with adopted plans and policies of government entities that regulate land use. No changes in land use are anticipated.

Realty

The Proposed Action would not affect any of the existing ROW grants, and MMC is not proposing any activities within the boundary area north of the I-80 corridor.

Access, land use, and realty are not further analyzed in this document.

Recommended Mitigation Measures

No mitigation measures would be necessary for access, land use, and realty.

No Action Alternative

Under the No Action Alternative, MMC would not have the opportunity to develop the mineral resource associated with the Target 3 Pit. Access to the site would remain the same. The No Action Alternative would not result in any additional impacts to access, land use, and realty.

4.1.11. Geochemistry

Proposed Action

The potential impacts to groundwater and surface water is from the infiltration of precipitation through the North-West Expansion WRSA and the creation of a pit-lake in the Target 3 Pit. The analysis was based on whether or not the conditions necessary for mobilization of geochemical constituents would be created by the Proposed Action. The conditions necessary for geochemical impacts include the following:

- The occurrence of constituents in sufficient quantity to pose a risk;
- A favorable environment for constituent mobilization; and
- The presence of a transport system (e.g. contact with water).

Target 3 Pit Lake Formation and Water Quality

The proposed Target 3 Pit floor would be at or above the static groundwater level in the bedrock.. The planned Target 3 Pit floor elevation is 4,680 feet AMSL, where groundwater is at approximately 4,508 feet AMSL. As a result, it is unlikely that any pit lake would be formed.

The sulfur content of rocks associated with the proposed Target 3 Pit has been found to be low, which is consistent with the rock descriptions summarized in the 2001 FEIS, 2003 FSEIS, and 2005 EA. Lithologies of the proposed Target 3 Pit are extensions of the lithologies in the Antler, Basalt, Target 1, Target 2, and Terry Zone pits mined at the Marigold Mine, which consists of low-sulfur, non-acid generating, oxide deposits hosted in the Valmy, Antler, and Havallah formations. The concentration of sulfide and total sulfur in the Valmy Formation, Battle Formation, and Antler Peak Limestone are near or below the detection limit (0.01 weight percent) and slightly higher in the Havallah Formation and Edna Mountain Formation (Geomega 2012).

Based on the lithological and ABA similarities of the Target 3 Pit rock to waste from the Antler, Basalt, Target 1, Target 2, and Terry Zone pits, leached concentration from the Target 3 Pit materials should be similar to the distribution of materials already mined from those pits. MWMP leachate from the Antler, Basalt, Target 1, Target 2, and Terry Zone pits is nearly neutral, with a pH ranging from 6.5 to 8.8. Measurable alkalinity, ranging from 4.6 to 209 T/kT CaCO3 and

averaging 87 T/kT CaCO3, demonstrates the net neutralizing nature of the materials (Geomega 2012).

Analysis has shown that groundwater and surface water have maintained consistent chemistry over the life of the mine, and that mining activities associated with Marigold Mine have not adversely affected waters of the State of Nevada. Consequently, the Proposed Action is not anticipated to adversely affect waters of the State of Nevada.

Infiltration through the pit floor may result from seasonal accumulation of water; however, the potential to degrade the groundwater quality is low, even if sufficient infiltration occurs to reach the groundwater.

Infiltration of North-West Expansion Waste Rock Storage Area

Groundwater ranges from 350 to 970 feet below ground surface throughout the site. Depth to groundwater beneath the North-West Expansion WRSA is approximately 950 feet. As a result, it is unlikely that any potential leaching from the North-West Expansion WRSA would migrate to the groundwater. This likelihood is also supported by the inert nature of the waste rock (Geomega 2012).

Analysis of the WRSA reclamation for the Millennium Expansion Project (BLM 2003) indicated that a growth media cover of at least six inches in depth with vegetation establishment was sufficient to minimize infiltration through the WRSAs. This same reclamation is proposed for the WRSAs associated with the Target 3 Project. The amount of infiltration would be limited given the elevation and climate regime within the Great Basin Region. Modeling and extrapolation of the partially saturated flow systems used at the Marigold Mine show that infiltration would take close to 100 years to move 100 feet through the cover and placed waste rock (BLM 2003).

Seepage from the North-West Expansion WRSA would be expected to leave at the base and enter the alluvium. This has been previously analyzed for Marigold Mine, and models suggest that there would be limited percolation below the active evaporative zone within the profile of the WRSA. This results in a low probability of net infiltration. As a result, the potential to mobilize weathering products out of the WRSAs would be low.

Upon final mine closure, the extension of the North-West Expansion WRSA would be regraded to 3H:1V slopes, recontoured, and crowned to prevent water ponding. Flat benches would be ripped and/or scarified to produce a rough surface for anchoring of reapplied growth media. Growth media would be distributed on the tops and portions of the WRSA slopes. Disturbed areas would be reseeded with the approved seed mixture.

There are no apparent impacts to groundwater in the vicinity of or downgradient from the WRSAs. This is supported by the absence of solute concentration shifts, which are indicative of anthropogenic impacts (Geomega 2012).

Recommended Mitigation Measures

No mitigation measures would be necessary for geochemistry; however, groundwater monitoring would continue to be conducted on a quarterly basis in compliance with the Water Pollution Control Permit as described in Section 2.1.8, “Environmental Protection Measures”.

No Action Alternative

Under the No Action Alternative, the Target 3 Pit would not be developed and there would be no additional requirements for WRSAs and potential exposure of leached material to the environment. Disturbance outlined in the Proposed Action would not occur and MMC would continue with currently permitted operations. Waste rock would continue to be tested and characterized, and if the performance criteria identifies that waste rock has the potential to be acid generating, this material would be managed in accordance with the management requirements of the Sulfide Plan. The No Action Alternative would not result in any additional impacts to geochemistry.

4.1.12. Geology and Mineral Resources

Proposed Action

The Proposed Action would extract and displace geological materials from their original setting. Approximately 190 million tons of waste rock and 52 million tons of ore would be removed. Mining in the Target 3 Pit is scheduled to occur for approximately five years. Waste rock and spent ore would be placed in the North-West Expansion WRSA or used as pit backfill. The grade levels of ore are expected to be similar or slightly lower than past mining activities.

Alluvial and bedrock material would be excavated to accommodate the realignment of the Trout Creek diversion channel to Cottonwood Creek. The realignment of Trout Creek would displace geologic materials from their original setting. Some additional riprap material may be needed to armor the rerouted channel, which would result in an indirect use of a non-renewable geologic resource.

A slope stability analysis was conducted for the proposed Target 3 Pit (Golder 2011). MMC would take the slope stability recommendations from the slope stability analysis into consideration for the final pit design and construction. Development of the Target 3 Pit would present a low risk of slope instability to the adjacent private property. Recommendations for the Target 3 Pit included a minimum setback of at least 125 feet from MMC land holdings boundary to mitigate any risk related to unexpected engineering geologic conditions to adjacent private property to the west. No impact is anticipated from structural damage or failure of a facility caused by seismic loading by earthquakes.

The Proposed Action would result in an incremental increase in the irreversible and irretrievable impacts to geology and minerals because of the further removal and loss of mineral resources in the Battle Mountain Mining District.

Recommended Mitigation Measures

There are no recommended mitigation measures for geology and mineral resources.

No Action Alternative

Under the No Action Alternative, MMC would not have the opportunity to develop the mineral resource associated with the Target 3 Pit. The Section 30 heap leach pad would remain designated as a heap leach pad. There would be no removal of geologic resources associated with the Target 3 Pit. MMC would continue to mine the currently approved pit areas. The No Action Alternative would not result in any additional impacts to geology and mineral resources.

4.1.13. Noise

Proposed Action

Blasting during the life of the Proposed Action would occur during daylight hours, and noise experienced at any one site would be of very short duration (approximately 0.5 seconds). Blasting would occur below ground level, and noise from blasting would largely be attenuated by the surrounding terrain and distance between the Target 3 Pit and noise receptors including residences in Valmy. No changes in the frequency of blasts or method of detonation from the existing blasting program are anticipated. Other mining activities would continue within the open pit and construction equipment (i.e., drills, bulldozers, loaders, and haul trucks) would operate 24 hours per day. The mine is projected to be in operation until approximately 2027.

The Proposed Action would not be expected to result in a long-term increase in traffic over current levels. Consequently, the proposed project would not contribute to an increase in roadway noise during the extended life of mining operations.

Noise levels associated with mine closure and reclamation activities would not be expected to differ from those described for mining operations since the primary noise sources would be from the use of existing bulldozers and other currently used heavy equipment. These noise-generating activities would occur during daylight hours. Blasting would cease with mine closure. After the reclamation period, noise in the vicinity of the mine site would return to pre-Marigold mining levels. Current noise associated with the Proposed Action would be the same as current noise associated with actions authorized under previous project authorizations (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy").

Recommended Mitigation Measures

There are no recommended mitigation measures for noise.

No Action Alternative

Under the No Action Alternative, there would be no change in the noise currently generated by Marigold Mine as noise levels, type, frequency, and occurrence of blasts and equipment use would remain the same as current mining activities. The No Action Alternative would not result in any additional impacts to noise.

4.1.14. Paleontology

Proposed Action

No established fossil-collecting localities or significant deposits have been previously identified in the proposed Plan boundary. No direct or indirect impacts are anticipated for paleontological resources as a result of the Proposed Action; therefore, this resource is not carried forward for further analysis.

Recommended Mitigation Measures

There are no recommended mitigation measures for paleontology.

No Action Alternative

Under the No Action Alternative, MMC would not conduct surface disturbance associated with the Proposed Action. MMC would continue mining operations in currently authorized areas. The No Action Alternative would not result in any additional impacts to paleontology.

4.1.15. Range Resources

Proposed Action

A permanent loss of approximately 150 acres of grazing land on public land would result from the Target 3 Pit development, which may be partially backfilled but would not be reclaimed for grazing use after mine closure and reclamation. These 150 acres are currently within the authorized Plan boundary, and a temporary loss of AUMs was reported in the FSEIS for Glamis Millennium Expansion project (BLM 2003). The average stocking rate for the North Buffalo Allotment is approximately 16 acres per AUM. The permanent loss of 150 acres disturbance would result in a permanent loss of 10 AUMs, which represents less than one percent of the active grazing preference.

The Proposed Action would extend the length of the existing fence around the North-West Expansion WRSA by approximately 8,300 feet and exclude approximately 288 acres of private land and approximately 71 acres of public land. The exclusion of livestock from an additional 71 acres of public land would result in the temporary loss of approximately four AUMs. The active grazing preference within the North Buffalo Allotment would drop from the current 3,447 AUMs to 3,443 AUMs. The loss of four AUMs represents less than one percent of the active grazing preference.

Construction of the range perimeter fence may interfere with some seasonal movements of livestock; however, this minor interference would not restrict access to adjacent rangeland within the allotment during the life of the mine. Private land that is not under MMC control would not be included in the fenced perimeter; therefore, impacts to grazing on private land would not occur in these sections.

The relocation of Trout Creek around the south side of the North-West Expansion WRSA would result in a permanent loss of grazing land since the diversion structure would remain in place as part of the post mine use. The diversion structure would result in a loss of approximately 7.3 acres, approximately four of which are located on public rangeland. A loss of four acres would result in a loss of less than one AUM. The loss of less than one AUM represents less than one percent of the active grazing preference.

The Trout Creek diversion channel would extend to the west around a small hill and divert overflow from the previously authorized and constructed retention basin to Cottonwood Creek. Even though this area would be fenced for an additional approximately 2,000 feet, there would be no change in the quantity of water available for livestock use. Ames Spring, Mud Spring, the unnamed spring, and the perennially flowing portion of Trout Creek would remain available to livestock and would not be affected by the Proposed Action. MMC currently mitigates for loss of livestock access to water by providing a trough outside the fenced mine boundary, which is supplied by the mine supply well. Livestock permittees also have access to this trough to fill their water trucks.

As a result of the Proposed Action, there would be a temporary loss of approximately four AUMs and a permanent loss of approximately 10 AUMs. The loss of these AUMs would result in a negligible to minor affect on rangeland resources within the North Buffalo and Copper Canyon allotments. The Proposed Action would not affect any planned range improvements.

With the establishment of the EPMs described in Section 2.1.8, "Environmental Protection Measures", impacts to range resources as a result of the Proposed Action would be negligible.

To prevent access by livestock to mining operations, a BLM-approved range control fence would be constructed. Areas associated with proposed surface disturbance would be enclosed, and areas within the proposed Plan boundary not associated with proposed surface disturbance would remain available for livestock use. MMC could continue to enforce a speed limit of 15 miles per hour around facilities and 35 miles per hour on haul roads to prevent vehicle collisions with livestock.

MMC currently mitigates for loss of livestock access to water by providing a trough outside the fenced mine boundary, which is supplied by the mine supply well. Livestock herders would continue to have access to this trough to fill their water trucks.

Recommended Mitigation Measures

There are no recommended mitigation measures for range resources.

No Action Alternative

Under the No Action Alternative, management of the allotments would remain the same as current conditions and there would be no additional loss of AUMs. The No Action Alternative would not result in any additional impacts to range resources.

4.1.16. Recreation

Proposed Action

The Proposed Action would affect approximately 359 acres of land that would be fenced around the North-West Expansion WRSA of which approximately 288 acres are located on public land. Approximately 7.3 acres of land associated with the Trout Creek diversion channel would be disturbed of which approximately four acres are located on public land. Land associated with MMC's mining claims would not be available for dispersed recreation during active mining, which is expected to continue until 2027. These areas would be reopened to the public as soon as the mine reclamation and closure have been completed as approved by BLM and NDEP. The noise and visual disturbance from these activities may temporarily reduce the quality of the recreation experience for certain users in or near the proposed Plan boundary. For example, noise could affect the distribution or abundance of wildlife species available for hunting or viewing.

The Proposed Action would have a minimal effect on recreation. No parks, concentrated recreational use areas, designated wilderness areas, WSAs, or special recreation managed areas would be directly affected by the Proposed Action. An increase of approximately 57 employees required for the mine expansion would have little or no adverse affect on the projected use of developed recreational facilities at the Chimney Reservoir, Winnemucca Mountain, Water Canyon, or Pine Forest/Blue Lakes Recreation Areas. There are no proposed changes to haul or access roads that would affect public access to dispersed recreation opportunities.

Recommended Mitigation Measures

There are no recommended mitigation measures for recreation.

No Action Alternative

Under the No Action Alternative, there would be no change in MMC's fence boundary and the area of land available for dispersed recreation would remain the same. The No Action Alternative would not result in any additional impacts to recreation.

4.1.17. Social Values and Economics

Proposed Action

The work force at the Marigold Mine is expected to increase from the current 380 employees by approximately 57 employees. Many of the potential employees already reside in Winnemucca, Battle Mountain, and Valmy; therefore, there would be little change in the work force that would affect housing and the need for additional public services. The majority of MMC employees carpool or ride mine-provided buses to Marigold Mine. There would be little or no change in the number of vehicles on the road during peak commuting times. MMC is not projecting any change in the amount or delivery of supplies to the mine site as a result of the Proposed Action that would affect travel on local roads.

Recommended Mitigation Measures

There are no recommended mitigation measures for social values and economics.

No Action Alternative

Under the No Action Alternative, the work force at the mine is expected to remain the same and there would be no change in the need for public services. The No Action Alternative would not result in any additional impacts to social values and economics.

4.1.18. Soils

Proposed Action

Soils suitable for growth media would be salvaged in the areas proposed for construction of the North-West Expansion WRSA, Trout Creek diversion channel, and transmission line access road. The salvaged growth media would be added to existing stockpiles or located such that mining operations would not disturb them as described in Section 2.1.7, "Reclamation". The North-West Expansion WRSA and transmission line would be reclaimed when mining ceases, which would result in a temporary disturbance of 363.4 acres. The Trout Creek diversion channel would remain for stormwater conveyance from the water impoundment to Cottonwood Creek, and there would be a permanent change in soil conditions where vegetation would be converted to a riprap channel on 7.3 acres.

An access road would be required along the new transmission line for use during line construction and maintenance. Approximately 1.4 miles of an existing road is available for use and approximately 4.4 miles of new road would be required. Use of the access road for construction would be short term. Long-term use of the road for maintenance would be infrequent and

typically for one maintenance vehicle. Soils in these areas are rated as severe for erosion and dust hazard. Fugitive dust is created by the erosion and breakdown of soil particles into very fine material that can be suspended in the air. These fine particles can be lifted into the air by wind and vehicle traffic. The soil properties that affect fugitive dust are the size of surface soil particles, rock fragment content, calcium carbonate equivalent, and aggregate stability. Vehicle road traffic can pulverize soil particles and weak rock fragments into very fine particles known as "bug dust". Due to the limited use of the new access road along the 4.4-mile section of the transmission line, soil erosion and generation of bug dust would not be expected to be a problem. Following limited use, supplemental water would be applied to recreate surface crust and to stabilize surface soils including bug dust.

Implementation of EPMs described in Section 2.1.8, "Environmental Protection Measures" would reduce impacts to soils. Stormwater containment berms would reduce soil erosion. Revegetation of disturbed areas would capture and prevent sediment runoff. Revegetation would also stabilize soils and prevent wind erosion. Overall, impacts to soils would be negligible. This resource is not further analyzed in this document.

Recommended Mitigation Measures

There are no recommended mitigation measures for soils.

No Action Alternative

Under the No Action Alternative, no new areas other than what has been authorized for surface disturbance (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy") would be affected. Wind and water erosion would continue to occur and potential impacts to the soils would be minimized through implementation of existing EPMs and compliance with the approved reclamation plan. The No Action Alternative would not result in any additional impacts to soils.

4.1.19. Special Status Species

Proposed Action

The Proposed Action would directly affect approximately 370.7 acres of habitat including Wyoming big sagebrush community (approximately 366.3 acres) and salt desert shrub community (approximately 4.4 acres) (Table 3.20, "Vegetation Communities within the Proposed Plan Boundary"). Approximately 363.4 acres would be affected for the short-term through removal of vegetation for the North-West Expansion WRSA (359 acres) and the new transmission line (4.4 acres). Approximately 7.3 acres would be permanently disturbed where the proposed Trout Creek diversion channel would be located. The stabilized Trout Creek diversion channel and stormwater channels would remain after the completion of mining with the diverted creek water flowing into established drainages.

The Target 3 Pit has been previously authorized as a heap leach facility that would have been reclaimed to post-mining condition for grazing land under the previous authorization. The Target 3 Pit may be partially backfilled but it would not be reclaimed to a post-mining condition for rangeland under the Proposed Action resulting in a permanent loss of an additional 150 acres of habitat.

Sixteen golden eagle nests have been identified within the 10-mile radius of the proposed Plan boundary; however, none of these nests are located within the proposed Plan boundary. In 2013, seven golden eagle nests were identified of which two nests were occupied and five nests were inactive. In 2012, nine golden eagle nests were identified. These nine golden eagle nests were not surveyed in 2013; thus, their status for the 2013 nesting season is unknown (JBR 2013b). Approximately 97 percent of the available habitat within the proposed Plan boundary would not be disturbed as a result of the Proposed Action. It is not expected that permanent disturbance associated with the Proposed Action would adversely affect the foraging quality for golden eagles in the proposed Plan boundary and surrounding areas. Habitat within the area is widespread and common throughout the basin and range.

The proposed Plan boundary is located in an area, identified as NDOW Habitat Category 4 for greater sage-grouse. No greater sage-grouse leks, greater sage-grouse, or greater sage-grouse sign has been identified within the proposed Plan boundary. Therefore, no direct impacts to breeding or nesting greater sage-grouse would be anticipated from the Proposed Action.

Western burrowing owls are migratory species and are protected under the provisions of the MBTA. Surveys for active burrows are conducted as part of MMC's compliance with the MBTA and EPMs required by BLM. Western burrowing owls have been previously identified within the proposed Plan boundary; however, with established EPMs for migratory birds, direct impacts to this species would be negligible. No burrows would be impacted as a result of the Proposed Action.

The ground survey conducted in 2013 for pygmy rabbits verified that pygmy rabbit habitat within the proposed Plan boundary is marginal to poor (JBR 2013c). No pygmy rabbit or pygmy rabbit sign (burrows, pellets) were observed during the survey. Therefore, direct or indirect impacts to pygmy rabbits are not anticipated.

There are no maternity roosting, hibernacula, or roosting habitat for bat species within the proposed Plan boundary. The entire area serves as potential day roosting (e.g., trees and crevices) and foraging habitat. Bat species use of the habitat would be limited exclusively to foraging without long-term roosting available; therefore, the potential for impacts to bat species is low.

Residual affects identified for BLM sensitive species would be limited to habitat loss for raptors and burrowing owls. No sensitive plant species were observed during the baseline surveys conducted (GBE 2012b); therefore, impacts to sensitive plant species are not expected to occur.

With the establishment of EPMs as described in Section 2.1.8, "Environmental Protection Measures", there would be no impacts to special status species.

Recommended Mitigation Measures

There are no recommended mitigation measures for special status species.

No Action Alternative

Under the No Action Alternative, existing conditions would remain the same regarding wildlife habitat and presence of BLM sensitive species in the area. It is expected that golden eagles and bats would continue to use the area for foraging. The No Action Alternative would not result in any additional impacts to special status species.

4.1.20. Vegetation

Proposed Action

The Proposed Action would result in surface disturbance of approximately 387.2 acres of undisturbed vegetation. Vegetation would be removed during the development or expansion of the North-West Expansion WRSA, reroute of a portion of the Trout Creek diversion channel, and the new transmission line as shown in Table 4.9. Surface disturbance would affect approximately 366.3 acres of sagebrush and 20.9 acres of the salt desert shrub communities.

Table 4.9. Acres of Vegetation Disturbance

Proposed Facility	Acres of Vegetation Disturbance		
	Sagebrush	Salt Desert Shrub	Total Disturbance
North-West Expansion WRSA	359.0	0	359.0
Trout Creek Diversion Channel	7.3	0	7.3
New Transmission Line	0	4.4	4.4
Infill	0	16.5	16.5
Total	**366.3**	**20.9**	**387.2**

Mining of the Target 3 Pit (150 acres) and the portion of the new transmission line (1.4 acres) located along the existing access road would occur within an area previously authorized for disturbance; therefore, there would be no change in the number of acres of affected vegetation related to these activities. The proposed Target 3 Pit location has been previously cleared and grubbed. This work was analyzed in the 2005 EA.

Successful revegetation of disturbed land is anticipated to occur approximately three to five years after reclamation (MMC 2012). Reclamation activities would consist of the grading of final slopes, ripping of compacted soil, application of growth media and/or soil amendments, and broadcasting of seed. The stabilized stormwater channels would remain after the completion of mining, and flows would continue to report to established drainages. The reclaimed vegetation communities would likely consist of adequate herbaceous plant cover with sufficient diversity to substantially reduce the potential for soil erosion and provide forage for use by livestock and wildlife within three to five years. Shrub species would also establish during this period and become more prevalent as the vegetation communities matured. The temporary loss of vegetation on the North-West Expansion WRSA and the new transmission line would be reestablished as a result of reclamation on 379.9 acres of disturbance. Approximately 7.3 acres of the Trout Creek diversion channel would remain without vegetation. This would result in a small but permanent loss of vegetation in the sagebrush vegetation community; however, it is not expected to affect the plant cover and other beneficial uses of vegetation such as wildlife habitat at a larger scale within the proposed Plan boundary. The Target 3 Pit was originally identified as a heap leach facility, which would have been reclaimed under the previous authorization. The Target 3 Pit may be partially backfilled but would not be reclaimed to a post-mining condition for rangeland under the Proposed Action resulting in a permanent loss of an additional 150 acres.

Indirect impacts would occur over the time required for plant species, such as sagebrush, to establish. During this period, potentially 10 years, the reclaimed areas would have different plant composition than the existing plant communities and the structural complexity of the reclaimed plant communities is likely to be less complex than the adjacent undisturbed vegetation. The additional plant species and early seral stages created by the reclamation would increase the overall regional plant diversity and community structure.

Root contact with spent ore or waste rock could expose plants to elevated levels of metals or other constituents that could cause adverse effects to plant growth. This was evaluated in the 2003 SEIS and overall risk to vegetation was noted as low (BLM 2003). The plant growth on the 8South WRSA, tailings impoundment, and Antler WRSA is robust to date where run-of-mine waste rock and alluvium were used for growth media. In June 2010, MMC assessed the status of vegetation on previously reclaimed areas versus vegetation in the proposed Plan boundary that represents a pre-mining landscape. Four transects were established in non-disturbed areas in the proposed Plan boundary and six transects were established at various reclaimed facilities including the 8-South WRSA, tailings impoundment, and Antler WRSA. The mean vegetative cover of non-disturbed areas was 24.5 percent for all species and 20 percent for perennial species. The mean vegetation cover at the reclaimed facilities was 41.2 percent for all species and 35.8 for perennial species. Shrub cover in reclaimed areas was more than double the cover at non-disturbed sites (GBE 2011).

The waste rock generated from the Proposed Action would be similar in rock characterization to those areas previously mined, and vegetation establishment does not appear to be limited by constituents in the waste rock or spent ore.

Under the Proposed Action, areas of temporary disturbance would be reclaimed immediately should the area no longer be needed for any planned activity or within three to five years after mining ceases (MMC 2012). These areas would be revegetated and monitored for vegetation establishment.

Revegetation of disturbance areas would be conducted as soon as practical to reduce the potential for wind and water erosion. Following construction activities, areas such as cut-and-fill embankments and growth media stockpiles would be seeded. Concurrent reclamation would be conducted to the extent practical and safe to accelerate revegetation of disturbance areas. Sediment and erosion control measures and revegetated areas would be inspected periodically to ensure long-term erosion control and successful reclamation.

Reclamation would be completed to control runoff, reduce erosion, provide forage for wildlife and livestock, and reduce visual impacts. Prior to seeding, disturbance areas would be recontoured, surfaces would be ripped or scarified (where conditions warrant), and growth media would be redistributed. Following the placement of growth media, the final surface would be contour scarified, where conditions warrant, to promote water retention, reduce erosion, and prepare the final seed bed. Seedbed preparation may be performed immediately prior to seeding to allow seed placement prior to soil re-compaction. Seedbed preparation and seeding would typically be conducted in the fall to take advantage of winter and spring moisture.

Seeding would be conducted by a number of methods (e.g., rangeland drill, mechanical broadcast seeder and harrow, hydroseeding, etc.) depending upon accessibility and success. The seed mix presented in Table 2.4, "Seed Mix Species and Rates" was developed by the BLM and are based on the species' effectiveness in providing erosion protection, the ability to grow within the constraints of the low annual precipitation experienced in the region, the species' suitability for site aspect, and the site elevation and soil type. These mixtures would provide forage and cover species similar to the pre-disturbance conditions, facilitating the post-mining land uses of livestock grazing and wildlife habitat. These mixes include native and non-native species.

Vegetation establishment success would be subject to BLM approval following BLM review of submitted monitoring results and field compliance visits. With the establishment of the EPMs described in Section 2.1.8, "Environmental Protection Measures", impacts to vegetation would be negligible.

Recommended Mitigation Measures

There are no recommended mitigation measures for vegetation.

No Action Alternative

Under the No Action Alternative, no new areas other than what has been previously authorized for surface disturbance would be cleared of vegetation. The heap leach facility in Section 30 would be reclaimed as planned. The No Action Alternative would not result in any additional impacts to vegetation.

4.1.21. Visual Resources

Proposed Action

In order to determine whether the Proposed Action meets the objectives of VRM Class IV, the proposed facilities were evaluated for modifications in visual qualities, namely landform, vegetation, and structure. There are no proposed disturbances within the Class III portions of the proposed Plan boundary. No permanent water resources are present within the proposed Plan boundary; therefore, it was not included in this analysis. The principal measure for assessing the degree of visual change is measured through a contrast rating. Based upon the criteria of form, line, color, and texture, this analysis uses the contrast rating as a guide for evaluating changes to the landscape associated with the Proposed Action. Contrast ratings are noted as being none, weak, moderate, and/or strong depending on the degree of change.

Proposed actions having the potential to impact visual resources include:

- Expansion of the North-West Expansion WRSA;
- Addition of a new utility corridor; and
- The adjustment of a portion of the Trout Creek diversion channel around the North-West Expansion WRSA and extension of the fence around the North West Expansion WRSA would not be visible from I-80.

Waste rock placed on the North-West Expansion WRSA would be from existing pits that would mimic the color of the surrounding landscape. The Trout Creek diversion channel would be constructed to the same specifications and design previously approved and would remain similar to the existing landform appearance. Since the majority of the Proposed Action is within background views, the final landform appearance (grades, slopes, etc.) would not represent a deviation from the current visual setting. The contrast rating for color and form for these facilities would be considered weak.

The Proposed Action would require the removal of vegetation at varying levels of degree. Any removal of vegetation would expose bare soil of lighter color and smoother texture than the surrounding areas. This would superimpose visible lines and openings. Existing mine disturbance at Marigold Mine currently shows exposed soils, visible lines, and openings. Visual contrast of color and texture associated with vegetation removal is considered weak since these disturbances replicate current landscape features.

The structure within the utility corridor would consist of 60foot treated wood poles with approximately 10,175 feet of overhead transmission line. The contrast rating for the transmission

line would be considered weak. The transmission line would be minimally visible from KOP 1, and this structure replicates similar type structures currently observed in the landscape.

KOP 1

Travelers on I-80, where the speed limit is 75 miles per hour, would see the proposed Plan boundary for a relatively short time in the middle-ground and background. The project elements that would be added to the existing human-made landscape would partially, if at all, be viewed by travelers. Users of the rest area as well as residents and patrons of Valmy would have opportunities for extended views of the proposed Plan boundary. Viewers accustomed to these views may notice the additional transmission lines and power poles in the middle-ground views. Transmission lines and power poles are currently a component of the existing environment; therefore, additional lines and poles replicate existing landscape features. Due to the topography and distance from the proposed Plan boundary, the expanded WRSA would not attract attention by the casual observer and the contrast rating would be weak.

KOP 2

Analysis of KOP 2 is provided in Section 4.1.3, "National Historic Trails".

Impacts to visual resources associated with the Proposed Action would be negligible; therefore, this resource is not analyzed further in this document.

Recommended Mitigation Measures

There are no recommended mitigation measures for visual resources.

No Action Alternative

Under the No Action Alternative, the visual resources would remain the same as current conditions. The current conditions are in conformance with the VRM objectives.

4.1.22. Wildlife

Proposed Action

The Proposed Action would directly affect approximately 370.7 acres of vegetation including approximately 366.3 Wyoming big sagebrush community and approximately 4.4 acres of salt desert shrub community. Short-term removal of vegetation for the North-West Expansion WRSA (approximately 359 acres), the transmission line (approximately 4.4 acres), and long-term disturbance associated with the Trout Creek diversion channel (approximately 7.3 acres) would occur. The stabilized Trout Creek diversion channel and stormwater channels would remain after the completion of mining with flows reporting to established drainages. The Target 3 Pit was originally authorized as a heap leach facility that would have been reclaimed under the previous authorization. The Target 3 Pit may be partially backfilled but would not be reclaimed to post-mining use for rangeland under the Proposed Action resulting in a permanent loss of an additional 150 acres.

Approximately 550 acres of potential mule deer winter habitat and 95 acres of mule deer limited range is located within the proposed Plan boundary. Pronghorn antelope distributions occur within the southern two thirds of the proposed Plan boundary. Habitat is currently available for mule deer and pronghorn antelope, and would not be fenced under the Proposed Action except

for the area around the North-West Expansion WRSA. There would be a permanent loss of 7.3 acres of wildlife habitat associated with the relocation of the Trout Creek diversion channel in the sagebrush vegetation community. Reclamation of the North-West Expansion WRSA is expected to improve mule deer habitat similar to study results of habitat conditions observed on the 8–South WRSA (GBE 2012b).

Implementation of the Proposed Action could result in the limited mortality of less mobile species and the displacement of animals from the proposed Plan boundary into adjacent habitats during initial construction and ground-clearing activities. Displaced animals would have a tendency to increase intra-specific competition on adjacent land. It is not anticipated that the Proposed Action would eliminate any local population of any species known to occur in the region.

Recommended Mitigation Measures

With the establishment of the EPMs described in Section 2.1.8, "Environmental Protection Measures", there are no recommended mitigation measures for wildlife.

No Action Alternative

Under the No Action Alternative, existing conditions would remain the same regarding wildlife habitat and presence of wildlife in the area. It is expected that mule deer would continue to be seen regularly in the proposed Plan boundary and observations of the pronghorn antelope would remain low. The No Action Alternative would not result in any additional impacts to wildlife

4.2. Cumulative Impacts

As required under NEPA and CEQ regulations for implementing NEPA, this section analyzes potential cumulative impacts from past, present, and reasonably foreseeable future actions (RFFAs) combined with the Proposed Action Cumulative Effects Study Area (CESA) specific to the resources for which cumulative impacts may be anticipated.

The CEQ regulations that implement NEPA define a cumulative impact as "the impact which results from the incremental impact of the action, decision, or project when added to other past, present, and RFFAs, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). This analysis focuses on cumulative impacts of the Proposed Action and other actions within and outside of the Proposed Action area. Major past and present land uses and disturbances within the resource CESAs that are projected to continue into the future include mineral development and exploration, oil and gas development, utilities, infrastructure and public purpose, roads, wildfires, livestock grazing, and agriculture. Dispersed recreation including hunting, fishing, and off-highway vehicle use and residential development also occur in portions of the CESAs.

Sizes and boundaries of the CESAs typically vary by resource. Cumulative impacts of the Proposed Action should be evaluated in terms of the specific resource, ecosystem, and human community being impacted. To determine the size of the CESAs, each resource was analyzed to determine the extent to which the environmental effect from the project could be reasonably detected and then include the geographic areas of resources that could be affected. For simplicity, ease of cumulative effect analysis, and in an attempt to avoid having only slightly different CESAs for a number of resources, CESA boundaries were left identical for multiple resources where it seemed reasonable and conservative to do so.

Information utilized in the cumulative impacts analysis was gathered from the following sources: BLM's Land and Mineral Legacy Rehost 2000 System (LR2000) reports ran in January 2013, the Nevada Atlas and Gazetteer, Geographic Information System (GIS) shape files provided by BLM, USFS, and Nevada Bureau of Mines and Geology, aerial photography, Lander County, and Humboldt County. The BLM LR2000 database was queried for authorized multiple land use activities, pending ROW grants, mineral and non-mineral exploration and mining permits, and natural catastrophic events.

4.2.1. Assumptions for Cumulative Analysis

A cumulative impacts analysis was conducted on the following resources based on the direct and/or indirect effects identified in Section 4.1, "Direct and Indirect Impacts":

- Cultural resources;
- Geology and mineral resources;
- Soils;
- Vegetation including noxious and non-native species; and
- General wildlife, migratory birds (including raptors), and special status species.

A cumulative impacts analysis was not conducted on the following resources because no direct or indirect impacts were identified in Section 4.1, "Direct and Indirect Impacts": air resources; Native American religious concerns; wastes hazardous or solid; water quality; wetlands and riparian zones; access, land use, and realty; geochemistry; noise; range resources; recreation; social values and economics; and visual resources.

The geographical areas considered for the analysis of cumulative effects are illustrated on Map 12: CESA Boundaries. Table 4.10, "Cumulative Effects Study Area by Affected Resource" outlines each resource analyzed, associated CESA boundary selected, and its size. For the purposes of this analysis and under federal regulations, "impacts" and "effects" are assumed to have the same meaning and are interchangeable.

Table 4.10. Cumulative Effects Study Area by Affected Resource

Resource	CESA Boundary	CESA Name	Private Land (acres)	Public Land (acres)	Total (acres)	Map
Cultural resources	Proposed Plan boundary	Cultural Resources CESA	8,320	10,761	19,081	12
Geology and mineral resources; Soils; Vegetation including noxious and non-native species; and General wildlife, migratory birds	Copper Canyon and North Buffalo Allotments	Natural Resources CESA	106,645	100,553	207,198	12

Resource	CESA Boundary	CESA Name	Private Land (acres)	Public Land (acres)	Total (acres)	Map
(including raptors), and special status species.						

4.2.2. Past and Present Actions

Past actions were analyzed up to the point where LR2000 records begin for land actions and disturbances. Present actions are considered those actions that have current disturbance associated with them, are operational, and ongoing.

The reclamation acres for past and present disturbance acres displayed in Table 4.10 have been subtracted from the total disturbance acreage. For roads, the acres of disturbance within each resource CESA is combined for each road type (i.e. U.S. Highways, State Routes, etc). The acres of disturbance within each CESA boundary are displayed in Table 4.10.

Past and present actions within the CESA boundaries include the following: sand and gravel material sites; mineral exploration and mining operations; oil and gas development; rangeland management and livestock grazing; wildland fire; ROWs; communication (telephone lines and communication ROWs); power lines; transportation networks including Federal aid-highways, roads, and railroads; recreation; and water and irrigation facilities.

A brief summary of each action is presented below.

Sand and Gravel Material Sites

Aggregate operations within the CESAs include sand and gravel sites and asphalt plants. There are approximately 1,779 acres of disturbance associated past and present mineral material sites within the Natural Resources CESA. There are approximately 518 acres associated with past and present mineral material sites within the Cultural Resources CESA.

Mineral Exploration and Mining Operations

Brass Ring Resources, Newmont Mining Corporation, Fairmile Gold, Uranerz USD, Inc., Glamis Mining Company, Western Exploration, and other operators have performed exploration and mining activities within the Natural Resources CESA, which has resulted or is currently resulting in surface disturbances. Prominent activities include mineral mining at the Lone Tree Mine (approximately 4,730 acres), Marigold Mine (approximately 4,443 acres), Phoenix/Reona Project (approximately 7,091 acres), and North Peak and Valmy pits of the Trenton Canyon mine (approximately 2,682 acres). Past and present mineral exploration and mining account for approximately 19,918 acres of disturbance within the Natural Resources CESA.

True North Inc., Welcome North Mines, Newmont Mining Corporation, and Hecla Mining Company have conducted mineral activities within the Cultural Resources CESA. A portion of Newmont Mining Corporation's Trenton Canyon project is located within the Cultural Resources CESA (approximately 823 acres). Other authorized disturbances include MMC's Marigold Mine (approximately 4,443 acres). Past and present mineral exploration and mining account for approximately 5,290 acres of disturbance within the Cultural Resources CESA.

Oil and Gas Development

Past disturbance associated with oil and gas development within the Natural Resources CESA includes approximately 28,044 acres of land leased for oil and gas development. Several companies have conducted oil and gas development including Paiute Gas Company, Tenneco Oil Company, Southwest Gas Corporation, Murchison Exploration Company, and Sonat Exploration Company. Southwest Gas Corporation is currently authorized for 278 acres of disturbance within the Natural Resources CESA.

Past disturbance associated with oil and gas development within the Cultural Resources CESA includes approximately 4,736 acres of land leased for oil and gas development; however, according to LR2000 records it does not appear as though surface disturbance occurred. There are no authorized oil and gas projects within the Cultural Resources CESA.

Rangeland Management and Livestock Grazing

There are two grazing allotments within the vicinity of Marigold Mine. The North Buffalo and Copper Canyon allotments are managed by the BLM Battle Mountain District Office. Four permittees graze cattle and/or sheep in these allotments.

The Natural Resources CESA is located within the North Buffalo and Copper Canyon allotments, and the Cultural Resources CESA is located within the North Buffalo Allotment.

Wildland Fire

Wildland fires burned approximately 13,324 acres from 1985 to present day within the Natural Resources CESA according to GIS data provided by NDOW and BLM and baseline surveys (GBE 2012).

Approximately 2,035 acres of wildland fires have burned areas within the Cultural Resources CESA as documented in baseline surveys (GBE 2012).

Rights-of-Way

Fifty-seven ROW authorizations are located within the Natural Resources CESA. Fifteen are associated with mineral sites, 18 are associated with power facilities, seven are associated with roads, six are associated with communication, two are associated with recreation, one is associated with railroad, one is associated with oil and gas pipeline, and seven are associated with water facilities.

Sixteen ROW authorizations are located within the Cultural Resources CESA. Three are associated with roads, five are associated with power facilities, three are associated with communication, three are associated with mineral sites, one associated with railroad, and one is associated with water and irrigation.

Communication (Telephone lines and Communication ROWs)

Communication sites include telephone lines and communication ROWs. Approximately 36 acres of past disturbance and 1,420 acres of present disturbance are associated with communication sites within the Natural Resources CESA. There are approximately 394 acres of present disturbance associated with communication sites within the Cultural Resources CESA.

Power Lines

There are approximately 337 acres of past disturbance and 4,312 acres of present disturbance associated with power lines within the Natural Resources CESA. There are approximately 433 acres of authorized disturbance within the Cultural Resources CESA.

Transportation Networks including Federal Aid-highways, Roads, and Railroads

Transportation networks within the CESAs include roads, Federal aid-highways, and railroads. Federal aid-highways are those that are eligible for construction, reconstruction, or improvement with federal monies. There are approximately 1,393 acres of paved roads and approximately 462 miles of unpaved roads within the Natural Resources CESA. Paved roads include I-80 and State Route 305.

There are approximately 315 acres of paved roads and 67 acres of unpaved roads within the Cultural Resources CESA. Paved roads include I-80.

There are approximately 613 acres of authorized disturbance within the Natural Resources and Cultural Resources CESA boundaries.

Recreation

Dispersed recreation occurs throughout the CESAs; however, there are no data on the level of use. Data within LR2000 regarding disturbance acres for recreation includes disturbance acres associated with establishment of interactive kiosks, trail maintenance, and recreational infrastructure.

Approximately 988 acres of past and present disturbance associated with the Battle Mountain Golf Course, baseline diamonds, the Battle Mountain School District, and the Battle Mountain Athletic Park have occurred within the Natural Resources CESA. No quantifiable disturbance associated with recreation has occurred within the Cultural Resources CESA.

Water and Irrigation Facilities

There are approximately 762 acres of past disturbance and 70 acres of present disturbance associated with water and irrigation facilities within the Natural Resources CESA. Past and present facilities have been developed by Independence Gold-Silver Mines, Filippini Ranching, Battle Mountain Gold Company, Newmont Mining Corporation, Long Tree Mining Inc., and Lander County. There are no records of disturbance associated with water and irrigation facilities within the Cultural Resources CESA.

4.2.3. Reasonably Foreseeable Future Actions

The reasonably foreseeable estimated timeframe for the cumulative impact analysis includes the life of the Marigold Mine and associated reclamation.

Activities that are expected to continue to occur within the CESAs includes livestock grazing, mineral exploration and mining operations, sand and gravel material sites, wildland fire, transportation networks, and dispersed recreation.

RFFA's within the Natural Resources CESA include approximately 100 acres of exploration at Newmont's Copper Basin project, approximately 1,500 acres associated with Newmont's Buffalo Valley Mine, approximately 50 acres associated with the Independence Mine, and approximately

369 acres associated with mineral exploration claims, and approximately eight acres of road improvements.

RFFA's within the Cultural Resources CESA include approximately 23 acres associated with mineral development and approximately 10 acres associated with a ROW for a transmission line.

Table 4.11. Past, Present, and Reasonably Foreseeable Future Actions within the Cumulative Effects Study Areas

CESAName	Types of Activity										
	Communication (Telephone lines and Communication ROWs)	Federal Aid-Highways	Roads	Sand and Gravel Material Sites	Mineral Exploration and Mining Operations	Oil and Gas Development	Power Lines	Railroads	Recreation	Water / Irrigation Facilities	Wildland Fire
Past and Present Actions – Surface Disturbance Acres											
Cultural Resources CESA	394	315	67	518	5,290	0	433	613	0	0	2,035
Natural Resources CESA	1,456	1,393	462	1,779	19,918	28,322	4,649	613	988	832	13,324
Reasonably Foreseeable Future Actions – Surface Disturbance Acres											
Cultural Resources CESA	0	0	0	0	23	0	10	0	0	0	0
Natural Resources CESA	0	0	8	0	2,019	0	0	0	0	0	0

4.2.4. Cumulative Impacts to Affected Resources

Impacts associated with past, present, and RFFAs are generally created by ground- or vegetation-disturbing activities that effect natural and cultural resources in various ways. Of particular concern is the accumulation of these impacts over time. This section of the EA considers the nature of the cumulative effect and analyzes the degree to which the Proposed Action and No Action Alternative contribute to the collective impact.

4.2.4.1. Cultural Resources

Relevant CESA

The CESA boundary for cultural resources includes the full extent of the proposed Plan boundary (Map 12: CESA Boundaries). The total area of this CESA is 19,081 acres, and includes BLM and private land. This CESA boundary was chosen because it covers the area where cultural resources would be affected.

Introduction

Cultural resources potentially vulnerable to cumulative effects include prehistoric sites, historic sites, historic structures, and TCPs. The incremental degradation of the resources reduces the information and interpretive potential of historic properties.

Approximately 10,761 acres of the CESA are managed by the BLM. This equates to approximately 56 percent of the CESA under federal regulatory oversight. The remaining land includes 8,320 acres (approximately 44 percent) of private land, which are generally not subject to Section 106 of NHPA.

Past and Present Actions

Past and present disturbances to cultural resources in the CESA are the result of mining, road construction and maintenance, utilities, ranching/livestock grazing, residential and community development, fire, and potentially vandalism and/or unauthorized artifact collection. The past and present land uses in the CESA could result in the loss, disturbance, theft, and burial of cultural artifacts and sites, as well as the modification and alteration of the setting of cultural sites and resources. The incremental degradation of cultural resources reduces the information and interpretive potential of historic properties. Erosion also has the potential to degrade cultural artifacts and sites.

Development on state and federal lands requires that cultural resource surveys be conducted to determine the presence of cultural resource sites eligible for listing on the National Register; there is no such requirement for disturbance on private lands unless there is a federal or state nexus. As directed by Section 106 of the NHPA, National Register-eligible sites are generally avoided or mitigated if avoidance is not possible for projects with a federal or state nexus. Projects/development disturbances conducted prior to 1966 (i.e., prior to NHPA) and/or those without a federal or state nexus generally did not identify/quantify cultural resource sites or impacts to them.

Sites that have been determined to be ineligible for the National Register did not require avoidance, have been discharged from management, and therefore could be impacted by the

activities requiring the cultural resource inventory (i.e., development, utility installation, fence projects, road construction, etc.).

Past and present actions have disturbed approximately 9,665 acres (approximately 51 percent) of the CESA.

Mineral exploration and mining operations have disturbed the most area within the CESA for a total of 5,290 acres. Second to mineral exploration and mining operations is wildland fire with a total disturbance of approximately 2,035 acres. Approximately 518 acres of disturbance associated with sand and gravel operations has occurred within the CESA.

Approximately 394 acres of surface disturbance associated with communication facilities and 433 associated with power lines has occurred within the CESA.

There are approximately 315 acres of disturbance associated with federal aid-highways, 67 acres of disturbance associated with roads, and 613 acres of disturbance associated with railroads.

Reasonably Foreseeable Future Actions

Foreseeable future disturbances within the CESA include approximately 23 acres associated with mineral development and 10 acres associated with a transmission line ROW. Future disturbance that could have an impact on cultural resources is expected to occur from OHV use, dispersed recreation, livestock grazing, and mineral exploration.

The amount of wildland fire that will occur within the reasonably foreseeable future within the CESA is unknown and not quantifiable; therefore, it was not considered for this analysis.

Proposed Action

The CESA for cultural resources is 19,081 acres. Approximately 9,698 acres of disturbance to geology and mineral resources is associated with past, present, and RFFAs, which accounts for approximately 51 percent of the CESA. The Proposed Action would increase disturbance within the CESA by approximately 387.2 acres for a total of 10,085.2 acres of disturbance. The Proposed Action would account for an additional increase approximately two percent of disturbance to cultural resources within the CESA.

Current and future development will contribute to the cumulative effects, both direct and indirect, on prehistoric and historic cultural resources in the CESA. All proposed, reasonably foreseeable developments would be completed under the oversight of Section 106 of NHPA if there were a federal or state nexus and thus project impacts would be individually addressed. Impacts to specific cultural resources would depend on the exact project location and extent of ground disturbance, as well as land jurisdiction. Section 106 of the NHPA requires avoidance and/or mitigation of impacts to NRHP-eligible cultural resources by federal undertakings. However, cumulative impacts to cultural resources from reasonably foreseeable projects would mostly result from ground disturbance related to new residential, commercial, or industrial developments on private lands without regulatory oversight.

Development of the Proposed Action would be 2.0 percent of the CESA. Previous surveys have identified that the Proposed Action would result in the loss of one NRHP-eligible historic property. MMC will implement a Treatment Plan to mitigate the adverse effects to this site in accordance with the research objectives reviewed and accepted by the BLM and SHPO in a MOA signed on April 1, 2013.

Data recovery of NRHP-eligible sites that could not be avoided would expand the regional database and knowledge of prehistoric and historic contexts. The mitigation measures developed to avoid direct impacts to cultural resources would also minimize contributions to cumulative effects. Cumulative impacts to cultural resources from past, present, and reasonably foreseeable future activities would be minor.

However, the cultural resource inventories conducted in support of the proposed project and others expand the regional database and knowledge of prehistoric and historic contexts.

No Action Alternative

Potential impacts to this resource as a result of the No Action Alternative were analyzed in Section 4.1.2, "Cultural Resources". Based on this impacts analysis, there would be no additional impacts to prehistoric or historic resources other than those already authorized. However, the cultural resource inventories conducted in support of the Proposed Action and others expand the regional database and knowledge of prehistoric and historic contexts.

4.2.4.2. Geology and Minerals

Relevant CESA

The CESA boundary for geology and minerals includes the full extent of the Copper Canyon and North Buffalo allotments (Map 12: CESA Boundaries). The total area of this CESA is 207,198 acres, and includes BLM and private land. This CESA boundary was chosen because it covers the areas of each allotment where geology and mineral resources would be affected.

Introduction

Mining and exploration activities typically have large impacts on geology and mineral resources because they contribute to mineral resource depletion, removal of mineral resources, and topographic changes. Mining and exploration activities also have the potential to affect geotechnical stability. Other activities such as sand and gravel extraction operations, utility lines, roads, and recreation projects have the potential to disturb surface acreage; however, they typically conform closely to the local topography and have negligible, if any, impacts on geology and mineral resources. Disturbance associated with communication, roads, power lines, railroads, recreation, water and irrigation facilities, and wildland fire are not included in the disturbance calculations presented below because the impacts are not directly related to geology.

Past and Present Actions

Oil and gas development has disturbed the most area within the CESA for a total of 28,322 acres. Second to oil and gas development is mineral exploration and mining operations with a total disturbance of approximately 19,918 acres. Mineral exploration and mining operations within the CESA consists of mine sites and exploration drilling areas. Approximately 1,779 acres of disturbance associated with sand and gravel operations is located within the CESA.

Approximately 1,456 acres of surface disturbance associated with communication facilities, 4,649 associated with power lines, and 832 associated with water and irrigation facilities has occurred within the CESA. These actions are surface disturbances and have little to no impact on geology and minerals; therefore, they are not considered in further analysis on this resource.

There are approximately 1,393 acres of disturbance associated with federal aid-highways, 462 acres of disturbance associated with roads, and 613 acres of disturbance associated with railroads. These disturbances are included in total disturbed acreage in Table 4.10, "Cumulative Effects Study Area by Affected Resource"; however, such disturbances are generally limited to surface disturbances, and therefore do not have an impact on geology and mineral resources. In addition, there are numerous roads in the CESA that are not designated as local, county, BLM, or USFS roads. These are generally private, and are not included in disturbance acre calculations.

Approximately 13,324 acres has previously burned within the CESA. These actions are surface disturbances and have no impact on geology and minerals; therefore, they are not considered in further analysis on this resource.

Reasonably Foreseeable Future Actions

Foreseeable future disturbances within the CESA include approximately eight acres associated with road improvements and 2,019 acres associated with mineral exploration and mining operations. Pending mineral development and exploration projects within the CESA include approximately 1,500 acres associated with Newmont's Buffalo Valley Mine, approximately 50 acres associated with the Independence Mine, and approximately 369 acres associated with mineral exploration claims.

Proposed Action

The CESA for geology and mineral resources is 207,198 acres. Approximately 52,038 acres of disturbance to geology and mineral resources is associated with past, present, and RFFAs, which accounts for approximately 25.1 percent of the CESA. The Proposed Action would increase geology and mineral disturbance within the CESA by approximately 387.2 acres for a total of 52,425.2 acres of disturbance. The Proposed Action would account for an additional increase of less than one percent of disturbance to geology and mineral resources within the CESA.

Gold-bearing ore would be removed from reserves as part of the Proposed Action; however, compared to total gold reserves available in the CESA, this would be a minor loss.

The Proposed Action would contribute to the global depletion of gold reserves, which is a finite resource; however, this would be a small percentage of the global reserve. Considering past, present, and RFFA disturbances in the CESA that may affect geology and minerals combined with the Proposed Action, cumulative disturbance effects on geology and mineral resources would be less than one percent of the CESA and minor.

No Action Alternative

Potential impacts to this resource as a result of the No Action Alternative were analyzed in Section 4.1.12, "Geology and Mineral Resources". Based on this impacts analysis, there would be no cumulative impacts as a result of the No Action Alternative when added to the past action, present actions, and RFFAs.

4.2.4.3. Soils

Relevant CESA

The CESA boundary for soils includes the full extent of the Copper Canyon and North Buffalo allotments (Map 12: CESA Boundaries). The total area of this CESA is 207,198 acres, and

includes BLM and private land. This CESA boundary was chosen because erosion of soils and sedimentation associated with the Proposed Action would be limited to this area.

Introduction

The CESA covers the area of past minerals activities as well as those that would be affected by the Proposed Action. The main impact to soils is surface disturbance and the extent of the impact depends primarily on land use. Primary sources of surface disturbance within the CESA include mineral exploration, OHV use, and livestock grazing.

Past and Present Actions

Oil and gas development has disturbed the most area within the CESA with a total of 28,322 acres. Second to oil and gas development is mineral exploration and mining operations with a total disturbance of approximately 19,918 acres. Mineral exploration and mining operations within the CESA consists of mine sites and exploration drilling areas. Impacts of past and present mineral development and exploration can be long-term. Soil is physically removed and then replaced during reclamation, and if an area is not reclaimed, or soils are not salvaged, existing soils may be buried. The primary effect of mining on soil resources is increased soil erosion, which subsequently results in increased sediment in downstream surface waters and wind born dust.

Approximately 1,456 acres of surface disturbance associated with communication facilities, 1,779 acres associated with sand and gravel operations, 4,649 associated with power lines, and 832 associated with water and irrigation facilities has occurred within the CESA. Disturbance to soil resources associated with utility projects involves construction of access roads, which leads to soil compaction and removal of vegetation.

Impacts to soils may vary from minor surface disturbance to complete disturbance of the soil profile from mining and road construction activities. Overland travel and livestock grazing may have affected the surface soil properties and function due to soil compaction, reduced vegetation cover and exposure to wind and water erosion. Mining and road construction activities and salvage of the upper soil for plant growth media can result in a change in the soil physical and chemical properties that would affect reclamation activities such as structure, texture, intermixing of rock fragments, soil hydraulics, and loss of organic surface material.

There are approximately 1,393 acres of disturbance associated with federal aid-highways, 462 acres of disturbance associated with roads, and 613 acres of disturbance associated with railroads. Road and railroad construction has a long-term effect on soil resources from compaction of the ground or burial of soils. Roads and railroads alter water flow on the soil surface and create impervious surfaces that concentrate runoff and increase the potential for erosion of adjacent soils.

Soil disturbance within the CESA has occurred from off road travel and dispersed recreation. There are approximately 988 acres of disturbance associated with recreation within the CESA. While there are no specific data that quantify impacts from linear disturbances or activities associated with dispersed recreation, these types of activities would impact soil surfaces through trampling, displacement, or modification.

Approximately 13,324 acres has previously burned within the CESA. Vegetation clearing activities and removal of the organic layers of the soil increase the risk of soil erosion. Extremely hot fires have the ability to change the top layers of the soil by altering the soil structure, productivity, chemistry, and hazard of erosion.

Reasonably Foreseeable Future Actions

Foreseeable future disturbances within the CESA include approximately eight acres associated with road improvements and 2,019 acres associated with mineral exploration and mining operations. Pending mineral development and exploration projects within the CESA include approximately 1,500 acres associated with Newmont's Buffalo Valley Mine, approximately 50 acres associated with the Independence Mine, and approximately 369 acres associated with mineral exploration claims. Future soil disturbance is expected to occur from OHV use, dispersed recreation, livestock grazing, and mineral exploration. Impacts associated with the RFFAs would be similar to the impacts described for past and present actions.

The amount of wildland fire that will occur within the reasonably foreseeable future within the CESA is unknown and not quantifiable; therefore, it was not considered for this analysis.

Proposed Action

The CESA for soil resources is 207,198 acres. Approximately 73,736 acres of disturbance is associated with past, present, and RFFAs, which accounts for approximately 35.6 percent of the CESA. The Proposed Action would increase the surface disturbance within the CESA by approximately 387.2 acres for a total of 74,123.2 acres of surface disturbance. The Proposed Action would account for an additional increase of less than one percent of surface disturbance within the CESA.

Historic past actions are generally not subject to any reclamation activities; however, present actions and RFFAs associated with mineral exploration and mining operations are subject to reclamation requirements, which would minimize impacts to soil resources. The effects on soil resources would be the same as described for past actions. Implementation of the proposed EPMs is expected to minimize potential impacts to soil resources that would result from implementation of the Proposed Action.

Soil disturbance from past, present, and RFFAs have not affected soil quality on a large spatial or temporal scale within the CESA. The project would result in few additional impacts to soil resources; therefore, there would be little or no incremental increase in cumulative effects under the project.

No Action Alternative

Potential impacts to this resource as a result of the No Action Alternative were analyzed in Section 4.1.18, "Soils". Based on this impacts analysis, there would be no cumulative impacts as a result of the No Action Alternative when added to the past action, present actions, and RFFAs.

4.2.4.4. Vegetation (including Noxious and Non-Native Species)

Relevant CESA

The CESA boundary for vegetation including noxious and non-native species includes the full extent of the Copper Canyon and North Buffalo allotments (Map 12: CESA Boundaries). The total area of this CESA is 207,198 acres, and includes BLM and private land. This CESA boundary was chosen because it encompasses the area within and near the proposed Plan boundary where most of the impacts would occur from the Proposed Action.

Introduction

Disturbance within the CESA primarily includes mining and exploration, oil and gas development, sand and gravel extraction operations, utility lines, roads, and wildland fires. Disturbance associated with these actions involves vegetation clearing, which promotes the establishment of noxious and non-native species. Vegetation species within the CESA are common and widespread throughout Nevada.

Past and Present Actions

Oil and gas development has disturbed the most area within the CESA with a total of 28,322 acres. Second to oil and gas development is mineral exploration and mining operations with a total disturbance of approximately 19,918 acres. Mineral exploration and mining operations within the CESA consists of mine sites and exploration drilling areas. Impacts of past and present mineral development and exploration can be long-term. Vegetation is physically removed and then reseeded during reclamation, and if an area is not reclaimed, noxious and non-native species have the opportunity to establish. The primary effect of mining on vegetation is the direct removal of the resource. Impacts of mineral development and exploration can be long-term; however, reclamation of vegetation species, whether natural or man-made, will eventually occur. Noxious and non-native species are more likely to establish in disturbed areas; therefore, successful reclamation assists to limit the spread of these species.

Approximately 1,456 acres of surface disturbance associated with communication facilities, 1,779 acres associated with sand and gravel operations, 4,649 associated with power lines, and 832 associated with water and irrigation facilities has occurred within the CESA. Disturbance to vegetation associated with utility projects involve construction of access roads, which leads to soil compaction and removal of vegetation. While these types of disturbances do not typically result in a loss of land access, vegetation clearing from construction of utilities and access roads increases the likelihood of noxious and non-native species establishment. After construction of these projects, some access roads remain maintained, which creates a minor, long-term impact to vegetation in the CESA. These roads may be also utilized by those who would not have otherwise traveled to these locations (i.e., recreational use), which may lead to the spread and establishment of noxious and non-native species.

There are approximately 1,393 acres of disturbance associated with federal aid-highways, 462 acres of disturbance associated with roads, and 613 acres of disturbance associated with railroads. Soil disturbance within the CESA has occurred from off road travel and dispersed recreation. There are approximately 988 acres of disturbance associated with recreation within the CESA. There are no specific data that quantify impacts from linear disturbances or activities associated with dispersed recreation. Establishment of roads effects vegetation for the long-term. Areas disturbed by vehicles are often slower to reestablish because the soils have been compacted. Noxious and non-native species are typically the first species to establish, especially along road corridors and where vehicles travel off road. Vehicles that travel off road spread seeds of noxious and non-native species. Roads create access into areas that might not otherwise be accessible. This increases the risk of OHV use, which has a greater likelihood of spreading seeds of noxious and non-native species.

Approximately 13,324 acres has previously burned within the CESA. Vegetation clearing activities and removal of the organic layers of the soil increase the risk of soil erosion. Burned areas result in patched landscapes that create natural fire breaks and diversify habitat for wildlife; however, burned landscapes often become dominated by noxious and non-native species.

Reasonably Foreseeable Future Actions

Foreseeable future disturbances within the CESA include approximately eight acres associated with road improvements and 2,019 acres associated with mineral exploration and mining operations. Pending mineral development and exploration projects within the CESA include approximately 1,500 acres associated with Newmont's Buffalo Valley Mine, approximately 50 acres associated with the Independence Mine, and approximately 369 acres associated with mineral exploration claims.

Future disturbance to vegetation is expected to occur from OHV use, dispersed recreation, livestock grazing, and mineral exploration. Impacts associated with the RFFAs would be similar to the impacts described for past and present actions.

The amount of wildland fire that will occur within the reasonably foreseeable future within the CESA is unknown and not quantifiable; therefore, it was not considered for this analysis.

Proposed Action

The CESA for soil resources is 207,198 acres. Approximately 73,736 acres of disturbance is associated with past, present, and RFFAs, which accounts for approximately 35.6 percent of the CESA. The Proposed Action would increase the surface disturbance within the CESA by approximately 387.2 acres for a total of 74,123.2 acres of surface disturbance. The Proposed Action would account for an additional increase of less than one percent of surface disturbance within the CESA.

Historic past actions are generally not subject to any reclamation activities; however, present actions and RFFAs associated with mineral exploration and mining operations are subject to reclamation requirements, which would minimize impacts to vegetation resources. The effects on vegetation resources would be the same as described for past actions. Implementation of the proposed EPMs is expected to minimize potential impacts to vegetation resources that would result from implementation of the Proposed Action.

Disturbance to vegetation from past, present, and RFFAs have not affected vegetation quality on a large spatial or temporal scale within the CESA. The project would result in few additional impacts to vegetation resources; therefore, there would be little or no incremental increase in cumulative effects under the project.

No Action Alternative

Potential impacts to these resources as a result of the No Action Alternative were analyzed in Section 4.1.20, "Vegetation" and Section 4.1.4, "Invasive-Nonnative Species". Based on the impacts analysis, there would be no cumulative impacts as a result of the No Action Alternative when added to the past action, present actions, and RFFAs.

4.2.4.5. General Wildlife (including Migratory Birds and Special Status Species)

Relevant CESA

The CESA boundary for general wildlife including migratory birds and special status species includes the full extent of the Copper Canyon and North Buffalo allotments (Map 12: CESA

Boundaries). The total area of this CESA is 207,198 acres, and includes BLM and private land. This CESA boundary was chosen because it encompasses the wildlife habitat within and near the proposed Plan boundary where most of the impacts would occur from the Proposed Action.

Introduction

Past and present actions within this area would likely result in both beneficial and negative impacts, at various levels on general wildlife, migratory birds, which includes raptors, and special status species. The foremost effect to these species within the area has been habitat changes associated with past and present mineral development and exploration activities, wildland fires, and livestock grazing. The entire CESA (207,198 acres) provides year-round habitat for general wildlife species. Additional impacts include historic mineral development and exploration, noise disturbance/displacement from mineral development and exploration, roads, and dispersed recreation.

Past and Present Actions

Oil and gas development has disturbed the most area within the CESA with a total of 28,322 acres. Second to oil and gas development is mineral exploration and mining operations with a total disturbance of approximately 19,918 acres. Mineral exploration and mining operations within the CESA consists of mine sites and exploration drilling areas. Impacts of past and present mineral development and exploration can be long-term. Mineral exploration operations and oil and gas development have the potential to create habitat fragmentation and degradation for wildlife species. Fragmentation within the CESA has not been quantified by the land management agencies as quantification is difficult to ascertain. Additionally, surface disturbance results in a direct loss of forage and cover of vegetation resources that would otherwise by utilized by wildlife. These disturbance activities also increase the likelihood of noxious and non-native species establishment, which reduces the amount of available forage vegetation.

Approximately 1,456 acres of surface disturbance associated with communication facilities, 1,779 acres associated with sand and gravel operations, 4,649 associated with power lines, and 832 associated with water and irrigation facilities has occurred within the CESA. Disturbance to vegetation resources associated with utility projects involve construction of access roads, which leads to soil compaction and removal of vegetation. Past and presents disturbances from utility line and maintenance have resulted in disruption of certain wildlife populations and their habitats including raptors. The area that has been impacted by these past and present activities would likely result in minor and temporary impacts. Fragmentation effects within the CESA have not been quantified by the land management agencies as quantification is difficult to ascertain.

There are approximately 1,393 acres of disturbance associated with federal aid-highways, 462 acres of disturbance associated with roads, and 613 acres of disturbance associated with railroads. Road construction and use tends to fragment wildlife habitats and leads to increased mortalities for certain species; however, some positive impacts may be realized by those species, such as raptors and scavengers, that benefit from increased carrion (i.e., road kill) within their habitats. In general, roads lead to direct mortality from vehicle collisions. Unpaved roads in the proposed Plan boundary and vicinity are infrequently traveled compared to nearby highways. Additionally, speeds of vehicles on the unpaved roads in the proposed Plan boundary and vicinity are less than compared to those on the highways. Therefore, direct impacts to general wildlife, migratory birds (including raptors), and special status species are expected to be low on unpaved roads within the CESA compared to impacts along highways located in the CESA.

Disturbance within the CESA has occurred from off road travel and dispersed recreation. There are approximately 988 acres of disturbance associated with recreation within the CESA. There are no specific data that quantify impacts from linear disturbances or activities associated with dispersed recreation. Human presence tends to disturb many species of wildlife throughout their habitats. Past and present recreational uses within the CESA are difficult to quantify and include OHV use, camping, and hunting. Human disturbance during periods of the year when wildlife are otherwise stressed, due to lack of forage and/or harsh weather, can further stress wildlife and may increase mortality.

Approximately 13,324 acres has previously burned within the CESA. Like other surface disturbances, wildland fire removes resources that would otherwise be used by wildlife such as forage and cover. Although this disturbance is temporary, establishment of noxious and non-native species after wildland fire would result in poor available forage vegetation.

Essentially, wildlife is affected by livestock grazing due to competition for forage and habitat removal/conversion in the lower elevations of the CESA. Reduction to grass understory can also impacts nesting success, predation, and wildlife regimes. Proper rotation and stocking rates can minimize impacts to wildlife; however, competition for resources with livestock that forage in the CESA does occur. Total past and present disturbance accounts for approximately 35.6 percent of the Natural Resources CESA.

Reasonably Foreseeable Future Actions

Foreseeable future disturbances within the CESA include approximately eight acres associated with road improvements, and 2,019 acres associated with mineral exploration and mining operations. Pending mineral development and exploration projects within the CESA include approximately 1,500 acres associated with Newmont's Buffalo Valley Mine, approximately 50 acres associated with the Independence Mine, and approximately 369 acres associated with mineral exploration claims. Fragmentation effects within the CESA have not been quantified by the land management agencies as quantification is difficult to ascertain. Removal of vegetation to construct roads results in a direct loss of vegetation that would otherwise be available for wildlife use.

Additional reasonable foreseeable future disturbances within the CESA are expected to occur from dispersed recreation, livestock grazing, mineral exploration, and existing ROWs and associated maintenance. Disturbance as a result of many of these activities is difficult to quantify due to the dispersed nature of these activities.

The amount of wildland fire that will occur within the reasonably foreseeable future within the CESA is unknown and not quantifiable.

Proposed Action

The CESA for general wildlife including migratory birds, raptors, and threatened, endangered, candidate, sensitive, and special status species is 207,198 acres. Approximately 73,736 acres of disturbance is associated with past, present, and RFFAs, which accounts for approximately 36.6 percent of the CESA. The Proposed Action would increase the surface disturbance within the CESA by approximately 387.2 acres for a total of 74,123.2 acres of surface disturbance. The Proposed Action would account for an additional increase of less than one percent of surface disturbance within the CESA. EPMs presented in Section 2.1.8, "Environmental Protection

Measures" would be implemented to ensure that there is no significant impact to wildlife as a result of the Proposed Action.

Impacts from past, present, and RFFA in conjunction with the Proposed Action to general wildlife, migratory birds (and raptors), and special status species would result in cumulative displacement and habitat fragmentation. The Proposed Action would result in minor modification to wildlife habitat, but would incorporate wildlife protection measures and habitat restoration measures during and following operations to reduce impacts to wildlife. Based on the above analysis, incremental impacts to general wildlife, migratory birds (and raptors), and special status species as a result of the Proposed Action when added to the past and present actions and RFFAs are expected to be minor.

No Action Alternative

Potential impacts to these resources as a result of the No Action Alternative were analyzed in Section 4.1.5, "Migratory Birds", Section 4.1.19, "Special Status Species", and Section 4.1.22, "Wildlife". Based on the impacts analysis, there would be no cumulative impacts as a result of the No Action Alternative when added to the past action, present actions, and RFFAs.

Chapter 5. Recommended Mitigation and Monitoring

Proposed Action

The following section describes the mitigation measures recommended beyond the EPMs committed to by MMC in Section 2.1.8, "Environmental Protection Measures". The EPMs would be incorporated into the Proposed Action and are summarized below as a reference. Reclamation is considered part of the EPMs and would be completed pursuant to the final closure plan submitted to the BLM and NDEP for approval. Disturbed areas would be reclaimed immediately following disturbance or within three to five years after mining operations cease. Concurrent reclamation would be conducted to the extent practical to accelerate revegetation of disturbed areas. Post-reclamation monitoring and maintenance would be performed as necessary until the revegetation requirements and bond release criteria have been met. A complete description of reclamation procedures is provided in Section 2.1.7, "Reclamation". MMC currently provides and would continue to provide environmental education for all employees and contractors on-site. This training includes information on management practices incorporated into the operation of the facility to minimize impacts to the environment and ensure compliance with environmental permit criteria.

Air Quality

Mitigation

There are no required mitigation measures for air quality.

Environmental Protection Measures

MMC has incorporated a number of EPMs into the existing operation through previous authorizations (Table 1.1, "Marigold Mine NEPA Documents and Documentation of NEPA Adequacy") to control particulate emissions. These measures would continue to be incorporated into the proposed operation. To control fugitive dust, water or chemical stabilizers would be applied to haul and access roads within the proposed Plan boundary. Speed restrictions would be enforced to further minimize particulate emissions from roadways. Concurrent reclamation during the life of the operation, as mine components are completed, would reduce the acreage of disturbed lands, thereby reducing fugitive dust. MMC maintains an Air Quality Operating Permit (AP1040-0158).

Cultural Resources

Mitigation

The Treatment Plan developed by the BLM and Nevada SHPO was designed to mitigate adverse effects to the historic property affected by the Proposed Action. The Treatment Plan would be implemented at the six sites prior to ground disturbance associated with the Proposed Action (BLM 2013).

Environmental Protection Measures

Protection measures have been incorporated into the existing operation to prevent and to minimize potential impacts to cultural and paleontological resources. These measures, as identified below, also would provide protection of resources during development and operation of the Proposed Action. MMC has developed the Proposed Action with regard to the location of sites known to be eligible for inclusion on the NRHP. MMC has a Cultural Resources Protection Program previously authorized under NEPA for the Marigold Mine that includes the following:

- Employee and equipment access within the proposed Plan boundary would be prohibited in known eligible cultural sites to prevent the potential for direct impacts to resources;
- Mine exploration and operations equipment would be limited outside of the proposed Plan boundary;
- Employee access to known archaeological and paleontological sites on public and private land in the vicinity of the mine would be prohibited;
- Per the 2003 SEIS, a 100-foot buffer zone around the eligible site boundary would be established by installing a two-strand smooth wire fence with signage "No Off-Road Travel". The buffer zone would be established by a qualified, third-party archaeologist approved by the BLM;
- If a previously undocumented or unidentified cultural (archaeological or historical) resources, subsurface components of documented sites, human remains, burial sites, or vertebrate paleontological resources are discovered during exploration, construction, operation, or reclamation activities, MMC would immediately cease activities within 300 feet of the discovery, ensure that the discovery is appropriately protected, and immediately notify the BLM by telephone followed with written communication. Work would not resume until a BLM Authorized Officer issued a notice to proceed. If resources are identified as eligible for the NRHP, impacts would be mitigated through an appropriate Treatment Plan approved by the BLM, SHPO, MMC, and the Advisory Council, or through site avoidance;
- If fossiliferous deposits, specifically vertebrate fossil deposits, are located during exploration construction, operation, or reclamation activities, the BLM would be notified, and measures would be taken to identify and preserve or avoid the fossils;
- MMC would be responsible for ensuring that employees, contractors, or others associated with the Marigold Mine do not damage, destroy, or vandalize archaeological, historical, or vertebrate paleontological sites or the artifacts/fossils within them. Should damage to cultural or paleontological resources occur within in or near the Proposed Action during the period of construction, operation, or rehabilitation due to unauthorized, negligent, or inadvertent actions of MMC or other mine personnel, MMC would be responsible for costs of rehabilitation or mitigation. Individuals involved in illegal activities could be subject to penalties under the Archaeological Resources Protection Act (16 U.S.C 470ii), FLPMA, the Native American Graves and Repatriation Act (16 U.S.C. 1170) and other applicable statutes;
- Known site locations would be avoided by exploration activities. Secondary effects to eligible sites resulting from road and drill site construction and use would be minimized through the implementation of erosion control measures, such as waterbars, double sumps for drill water, and appropriate road design; and
- The entire Area of Potential Effect has been inventoried at the Class III level.

Invasive, Non-Native Species

Mitigation

There are no recommended mitigation measures for invasive non-native species.

Environmental Protection Measures

MMC would continue active management of noxious weed controls at the site as described in MMCs Integrated Weed Management Plan (JBR 2013a). Noxious and invasive weed controls would be implemented through vegetation establishment to minimize competition from weedy species and to maximize the establishment of disturbed sites, and chemical control of new or established infestations of noxious weeds. If herbicides are used to control noxious weeds, the application rates and methods would conform to BLM standards, thereby avoiding potential risks to human health and the environment. Noxious weed occurrences on public lands adjacent to the proposed Plan boundary would be reported to the BLM.

Migratory Birds

Mitigation

There are no recommended mitigation measures for migratory birds.

Environmental Protection Measures

MMC would continue to use a qualified biologist to conduct breeding bird surveys within all suitable habitats prior to ground disturbance, if construction activities were to occur from March to the end of July. This survey would identify either breeding adult birds (i.e., by territorial defense behavior) or nest sites within the areas to be disturbed. If active nests are present, MMC would coordinate with the BLM to develop appropriate protection measures for these sites, which may include avoidance, construction constraints, buffer establishment, etc. An option to conducting breeding bird surveys would be to avoid ground disturbance activities from the beginning of March to the end July, allowing construction to proceed outside of the breeding season without clearance surveys.

Additional EPMs for migratory and raptor bird species would include the following:

- Protect active raptor nests in undisturbed areas within 0.25 miles of areas proposed for vegetation conversion using species-specific protection measures provided by the BLM, NDOW, and USFWS.
- Limit permitted activities from May 1 to the end of July within 0.25 miles of raptor nest sites unless the nest site has been determined to be inactive for at least the previous five years.

Waste, Hazardous or Solid

Mitigation

There are no required mitigation measures for waste, hazardous or solid.

Environmental Protection Measures

Management of solid waste and hazardous materials would continue to be managed under MMCs integrated ERP, to address the potential release of fluids from mine facilities. The section of the ERP that addresses chemical releases contains procedures for the control of leaks or spills. Continued operation in accordance with the ERP would assist in keeping spills localized and contained to allow for efficient cleanup. MMC has the necessary spill containment and cleanup equipment and trained personnel available at the site to quickly respond to minor releases.

Hazardous substances are handled in accordance with applicable MSHA or OSHA regulations (Titles 30 and 29 of the CFR).

Non-hazardous solid waste generated on the site is disposed in an approved Class III waivered on-site landfill. Used tires are either recycled by the suppliers or buried in the WRSAs. Used equipment, such as batteries, alternators, starter motors, etc., is recycled for remanufacture. Used petroleum products, antifreeze, and Freon are transported off-site to approved recycling facilities.

Water Quality (Surface and Ground)

Mitigation

With the establishment of the EPMs described in Section 2.1.8, "Environmental Protection Measures", there are no recommended mitigation measures for water quality or quantity.

Environmental Protection Measures

Authorized EPMs would continue to be used to control sediment in precipitation runoff from project facilities and disturbed areas during construction and mine operations. EPMs may include, but are not limited to, diversion and routing of stormwater using accepted engineering practices, such as diversion, ponds, sediment traps, and rock and gravel cover.

Temporary stormwater diversions would be installed where appropriate and armored where flow velocities exceed approximately four feet per second, dependent upon channel material. Temporary diversions would be employed under the site's Stormwater General Permit (NVR 300000) and would be maintained and modified on an annual basis. Permanent diversion structures would be completed when a component, such as a tailings facility or a WRSA, are at final design limits, to ensure the structure is appropriately sized and located. Permanent diversions are designed to contain the 100-year, 24-hour storm event. A typical ditch is about 10 feet in width and four feet in depth; however, the dimensions vary based on topography and watershed size.

Surface waters would continue to be managed to avoid excessive sediment loading to runoff outside of the proposed Plan boundary.

The various stormwater diversion and sediment control structures would be monitored by visual inspection to ensure integrity. If necessary, precipitation accumulated within process component containment areas after major storm events would be removed by pumping and disposing of in the heap leach processing facilities. Stormwater diversion structures at the WRSAs would be visually inspected after major storm events and during spring snowmelt to verify the integrity of the diversion structures and to remove accumulated debris that could impede water flow. These monitoring efforts comply with the requirements in the General Stormwater Permit (NVR 300000). Monitoring data would be reported to the NDEP Bureau of Water Pollution Control on an annual basis. Additional monitoring and control technologies would be further specified as part of state permitting activities (i.e., General Stormwater Permit), which includes applications and reviews for the Stormwater General Discharge Permit and the Water Pollution Control Permit (NEV88040).

Groundwater monitoring would continue to be conducted on a quarterly basis in compliance with the water pollution control permit. Water quality samples would be collected from the existing monitoring points. The samples would be analyzed for the constituents specified in the site's water pollution control permit. Monitoring data would be submitted to NDEP and BLM on a quarterly and annual basis.

Geochemistry

Mitigation

There are no required mitigation measures for geochemistry.

*Environmental Protection Measure*s

Waste rock from the Target 3 Pit would be tested and characterized, and if the performance criteria identifies that waste rock has the potential to be acid generating, this material would be managed in accordance with the management requirements of MMC's Sulfide Plan.

Soils

Mitigation

There are no required mitigation measures for soils.

Environmental Protection Measures

Revegetation of disturbed areas would continue to reduce the potential for wind and water erosion. Following construction activities, areas such as cut-and-fill embankments and growth media stockpiles would be seeded as soon as practical and safe. Concurrent reclamation would be maximized to the extent practical to control soil erosion.

Vegetation

Mitigation

There are no recommended mitigation measures for vegetation.

Environmental Protection Measures

MMC would continue to use established EPMs to prevent impacts to vegetation. WRSA and roads would be ripped and or/scarified to produce a rough surface for anchoring of reapplied growth media and seeded with the approved seed mix. Placement of growth media would be a minimum of approximately six inches. Seed bed preparation may be performed immediately prior to seeding to allow seed placement prior to soil re-compaction. Seed bed preparation and seeding would typically be conducted in the fall to take advantage of winter and spring moisture.

Visual Resources

Mitigation

There are no required mitigation measures for visual resources.

Environmental Protection Measures

During mining closure activities, WRSAs would continue to be graded to eliminate the benches between lifts, reduce the side slopes to an approximate 3H:1V grade, and round-off top benches to approximate more natural contours. After slopes are stabilized and graded, growth media would be applied, and WRSAs would be seeded. These efforts would reduce moderate contrasts in land forms and lines associated with the Marigold Mine to weak contrasts as vegetation establishes and matures.

Wildlife and Livestock

Mitigation

There are no required mitigation measures for wildlife or livestock.

Environmental Protection Measures

A BLM-approved range control fence would be placed around the perimeter of mine facilities as needed to prevent access by wildlife and livestock to mining operations.

MMC currently manages livestock access to water by providing a trough outside the fenced mine boundary, which is supplied by the mine supply well. Livestock herders would continue to have access to this trough to fill their water trucks.

Additional protection measures that have been incorporated into the Proposed Action for the protection of wildlife and livestock include:

- Enforced speed limit of 15 miles per hour around facilities and 35 miles per hour on haul roads;
- Proper management of the waivered-Class III landfill; and
- Formalized procedures for verbal and written reporting of wildlife mortalities to the NDOW.

Employee Training

MMC currently provides and would continue to provide environmental education for all employees and contractors on site. This training includes information on management practices incorporated into the operation of the facility to minimize impacts to the environment and ensure compliance with environmental permit criteria.

No Action Alternative

Authorized mitigation and EPMs for the No Action Alternative would remain the same as for the current conditions.

Chapter 6. Tribes, Individuals, Organizations, or Agencies Consulted

6.1. Native American Consultation

The Treatment Plan and a request for consultation on the plan were sent to the following tribes on April 11, 2012: Battle Mountain Tribal Council, South Fork Band Council, Fort McDermitt Paiute and Shoshone Tribe, Elko Band Council, and Winnemucca Indian Colony. The certified letter to the Elko Band Council was returned as undeliverable on April 13, 2012. The BLM forwarded the Treatment Plan to the Fort McDermitt Paiute and Shoshone on March 15, 2013, as requested with the stipulation that it was not negotiable since they had over six months to comment on it and the plan had just been approved by SHPO. The BLM presented the Treatment Plan to the Fort McDermitt Reservation in a consultation meeting on March 18, 2013. The Fort McDermitt Reservation informed the BLM on April 15, 2013 that they were deferring their interest in the project to the Battle Mountain Tribal Council.

Certified letters requesting consultation meetings on the project were mailed to the following tribes on February 11, 2013: Battle Mountain Tribal Council, South Fork Band Council, Fort McDermitt Paiute and Shoshone Tribe, and Elko Band Council. The certified letter to the Elko Band Council was returned as undeliverable on February 21, 2013.

6.2. Coordination and/or Consultation

NNHP – On November 28, 2012, a letter was sent to NNHP requesting information on endangered, threatened, candidate, and at risk plant and animal species recorded within or near MMC's Target 3 Project in Humboldt County, Nevada. NNHP responded on November 29, 2012 and identified that no at risk species have been recorded within the proposed Plan boundary. Habitat may be available for the winged milkvetch, a species determined to be vulnerable by the NNHP and the Lahontan cutthroat trout, a federally-threatened species.

NDOW – On November 28, 2012, a letter was sent to NDOW requesting information on known or potential occurrence of wildlife species in the vicinity of MMC's Target 3 Project located in Humboldt County, Nevada. NDOW responded on December 10, 2012 and identified that occupied mule deer and pronghorn antelope distributions exist within the proposed Plan boundary and four mile radius of the area. Greater sage-grouse habitat in the proposed Plan boundary is primarily categorized as low value habitat/transitional range. There are no known greater sage-grouse lek sites in the vicinity of the proposed Plan boundary. NDOW provided a list of various species of raptors and other known wildlife resources known to reside in the vicinity of the proposed Plan boundary. Per the Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols and Other Recommendations in Support of Golden Eagles Management and Permit Issuance the USFWS has extended the survey area for golden eagles to 10 miles of the proposed Plan boundary.

NDOW – On January 11, 2013, a letter was sent to NDOW requesting information on known raptor and golden eagle nests locate within a 10-mile radius of MMC's Target 3 Project located in Humboldt County, Nevada. NDOW responded on January 15, 2013 with the requested information.

USFWS – On November 28, 2012, a letter was sent to USFWS requesting a species list for the MMC's Target 3 Project, Humboldt County, Nevada. USFWS responded on December 13, 2012 and identified that no listed or proposed species occur in the proposed Plan boundary. The greater sagegrouse is a candidate species that may occur in the proposed Plan boundary. The project should consider potential impacts to the bald and golden eagle within 10 miles of the proposed

Plan boundary and any land clearing activities within the proposed Plan boundary that would affect migratory birds, which are protected under the MBTA.

The BLM has consulted with SHPO pursuant to 36 CFR part 800.

6.3. Individuals and/or Organizations Consulted

The following persons, groups, and agencies were contacted during the preparation of this document.

Goldcorp Mining Corporation

Matt Zietlow Environmental Manager

Nevada Department of Wildlife

Mark Freese Western Region Supervising Habitat Biologist
Timothy Herrick Conservation Aid III
Kenny Pirkle Biologist
Chet VanDellen GIS Coordinator

Nevada Natural Heritage Program

Eric Miskow Biologist

U.S. Fish and Wildlife Service

Edward D. Koch State Supervisor
Chris Nicolai Biologist

6.4. Public Outreach/Involvement

The BLM HRFO held an initial internal scoping meeting on January 9, 2013, to determine resources that may be affected by the Proposed Action. A public scoping letter was issued on December 18, 2012. The BLM released a public announcement of the Proposed Action in the Humboldt Sun on January 11, 2013. Copies of this EA can be obtained at the BLM Humboldt River Field Office and on the Winnemucca District website at:

http://www.blm.gov/nv/st/en/fo/wfo/blm_information/nepa0.html

Chapter 7. List of Preparers

7.1. BLM

The following persons at the United States BLM assisted in the preparation of this EA.

Table 7.1. List of Preparers — BLM

Name	Responsible for the Following Section(s) of this Document
Eric Baxter	Invasive, non-native species
Jeanette Black	Geology and Hydrology
Sandra Brewer	Wildlife, Fish and T&E species
Rob Bunkall	GIS
Rob Burton	Soils and Vegetation
John Callan	Solid Waste and Hazardous Materials
Joey Carmosino	Visual Resource Management
Mark Hall	Project Lead/Native American Religious Concerns
Pat Haynal	Cultural and Paleontological Resources
Casey Johnson	Rangeland Management
David C. Jones	Air Quality Specialist
Greg Lynch	Fisheries
John McCann	Wetlands and Riparian
Julie McKinnon	Realty
Derek Messmer	Humboldt River Field Office Manager
Zwaantje Rorex	NEPA Coordinator
Jason Spence	Rangeland Management
Julie Suhr Pierce	Economics and Social Values
Mark Turney	Public Outreach: Press Release

7.2. Cooperating Agencies

Humboldt County – On January 29, 2013 a letter inviting Humboldt County to be a cooperating agency on the EA was sent by the BLM to Humboldt County Board of Commissioners. On February 21, 2013, Humboldt County accepted co-operating agency status for participation on the proposed Plan modification.

7.3. Third Party Consultants

This EA was prepared by JBR Environmental Consultants, Inc. under the technical direction of the BLM HRFO, Winnemucca, Nevada. Assistance was provided by BLM resource specialists and through consultation with other local, state, and federal agency resource personnel, review of company and agency files, field reconnaissance, and review of supporting documentation.

Table 7.2. List of Preparers — JBR Environmental Consultants, Inc.

Name	Responsible for the Following Section(s) of this Document
Kat Bartle	GIS Analyst
Terri Covert	Environmental Analyst
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Aaron Hoberg	Air Quality
Colleen Lavery	NEPA Specialist
Michele Lefebvre	Senior Review

Name	Responsible for the Following Section(s) of this Document
Kristi Schaff	Supervisor
Jason Trook	GIS Analyst
David Worley	Biologist
Lawrence Young	Project Manager

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Chapter 9. Maps

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Appendix A.

Sulfide Waste Management Plan (March 23, 2000)