APPENDIX C

Biological Assessment/Biological Evaluation and Wildlife and Botany Reports

and

Draft Raptor Conservation Strategy

BIOLOGICAL ASSESSMENT/EVALUATION
and
WILDLIFE AND BOTANY REPORTS
for the
MITSUBISHI SOUTH QUARRY PROJECT
Mountaintop Ranger District
San Bernardino National Forest

San Bernardino National Forest

FOREST SERVICE
DEPARTMENT OF AGRICULTURE

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SUMMARY

This report addresses the potential effects of the proposed project on Threatened, Endangered, Sensitive, and Watchlist species, invasive species, general vegetation, and general wildlife that are known or likely to occur in the Mitsubishi South Quarry analysis area. The purpose and need for the project is to allow Mitsubishi to develop a mine that would produce calcium carbonate mineral resources needed for ongoing production of cement.

Mitsubishi Cement Corporation (MCC) is proposing to develop and reclaim a new limestone quarry to the south of its existing East Pit, its West Pit (under development), and the Cushenbury Cement Plant. The South Quarry would total approximately 153.6 acres consisting of a 128-acre quarry, a 2.7 acre berm, a 22.2-acre haul road 1.8 miles in length, and a temporary construction road of 0.7 acres. The South Quarry and haul road would be located almost entirely (147.0 acres) on 440 acres of unpatented claims owned by MCC on the San Bernardino National Forest (SBNF) with approximately 6.6 acres of the haul road located on MCC fee land where it enters the existing East Pit.

Cushenbury Springs is a small wetland/desert oasis with large cottonwood trees and other wetland associated vegetation; it is outside the proposed quarry and haul road but some of MCC's water source is from wells adjacent to Cushenbury Springs. Cushenbury Springs supports habitat for a number of rare species due to wetland conditions and riparian vegetation. A pumping test was conducted on the wells that would be used to supply water for the project. The hydrology analysis determined that the increased water extraction would not result in changes to surface water or habitat conditions at Cushenbury Springs. Therefore, the increased water extraction for the proposed project is not expected to affect the availability and quality of riparian habitat at Cushenbury Springs. However, hydrogeological systems can change over time in response to climate and fault movements; therefore this document identifies the species that are or may be present at Cushenbury Springs.

Table 1 displays the known and potential occurrences of special status species in the analysis area and summarizes the "Determinations of Effects" for each.

Federally-Listed Species and Designated Critical Habitat

There are occurrences or suitable habitat for four federally-threatened/endangered wildlife species in or near the MCC federal action area (**Table 1**). Long-term monitoring and adaptive management processes are expected to limit the potential effects. No proposed or designated Critical Habitat for any animals occurs within the federal action area. The project would not be expected to affect any Threatened/Endangered animals or result in "take" under the federal Endangered Species Act. The determination of effects for T/E animals is "no effect".

Four federally-listed T/E plant species and their designated critical habitat occur within the federal action area (including quarry, haul road, and habitat reserve) (**Table 1**). No additional listed plant species are known to occur within the federal action area.

The project may affect each of these four T/E plant species and their designated Critical Habitat. The determinations of effects for T/E plant species and designated Critical Habitat is "may affect, likely to adversely affect".

Section 7 Endangered Species Act compliance for T/E species and designated Critical Habitat will be achieved through formal Section 7 consultation.

Forest Service Sensitive Species
A number of Sensitive wildlife species are known or expected in the analysis area. The determinations of effects for all of the Sensitive wildlife species with potential to occur in the analysis area are "may impact individuals and their habitats but not likely to lead in a trend toward federal listing" (**Table 1**).

Three Forest Service Sensitive plant species are known from the analysis area. Seven additional Sensitive species have been documented to occur near the analysis area and have the potential to occur within the analysis area. The determinations of effects for the three Sensitive plant species known to occur in the analysis area are "may impact individuals and their habitats but not likely to lead in a trend toward federal listing", and the determinations for the seven Sensitive plant species known from nearby are "no impact".

SBNF Watchlist Species
No threat to the viability of populations of any of the SBNF Watchlist animals or plants, or other potentially vulnerable species, is expected from the proposed project. The proposed project may affect the viability of the isolated North Slope Nelson's bighorn sheep Cushenbury herd, but is not expected to affect the viability of the metapopulation in the SBNF.

Summary of Determinations
Table 1 provides a summary of species known to occur or with a high probability of occurrence in/adjacent to the analysis area (haul road, quarry, water extraction sites, and maintenance roads), within the reach of potential effects during development and operations, and in the mitigation parcels.

Table 1. Summary Of Effects Determinations - TESW Species In And Near the Analysis Area

Common Name	Occurrence Information [1]	Determinations [2]
Threatened and Endangered Animals		
California condor	Potential foraging and nesting on North Slope	NE
southwestern willow flycatcher (E)	Potential for nesting at Cushenbury Springs	NE
least Bell's vireo	Nesting documented at Cushenbury Springs	NE
desert tortoise	Known from areas around the MCC plant and Cushenbury Springs	NE
Threatened & Endangered Plants		
Cushenbury puncturebract	Known occurrences; Designated Critical Habitat	MA
Cushenbury milk vetch	Known occurrences; Designated Critical Habitat	MA
Parish's daisy	Known occurrences; Designated Critical Habitat	MA
Cushenbury buckwheat	Known occurrences; Designated Critical Habitat	MA
Forest Service Sensitive Animals		
large-blotched ensatina	Y @ Marble Canyon and Arctic Cyn; P @ drainages and Cushenbury Springs	MIIH; NTV
yellow-blotched ensatina	Y @ Marble Canyon and Arctic Cyn; P @ drainages and Cushenbury Springs	MIIH; NTV
California legless lizard	P	MIIH; NTV

Table 1. Summary Of Effects Determinations - TESW Species In And Near the Analysis Area		
Common Name	**Occurrence Information [1]**	**Determinations [2]**
southern rubber boa	P	MIIH; NTV
three-lined boa	P	MIIH; NTV
San Bernardino ringneck snake	P	MIIH; NTV
San Bernardino mountain kingsnake	P	MIIH; NTV
two-striped garter snake	P @ Cushenbury Springs and Marble Canyon	MIIH; NTV
California spotted owl	Y @ upper Marble Canyon	MIIH; NTV
willow flycatcher (migrant)	Y @ Cushenbury Springs; U @ project	MIIH; NTV
gray vireo	Y	MIIH; NTV
Townsend's big-eared bat	Y @ Cushenbury Springs; P @ project	MIIH; NTV
fringed myotis	Y @ Cushenbury Springs; P @ project	MIIH; NTV
pallid bat	Y @ Cushenbury Springs; P @ project	MIIH; NTV
Forest Service Sensitive Plants		
Coville's dwarf abronia	Y @ project	MIIH; NTV
San Bernardino milk-vetch	P	NI
Tidestrom's milk-vetch	P	NI
Parish's brittlescale	H @ Cushenbury Springs; N @ project	NI
Shockley's rockcress	Y @ project	MIIH; NTV
alkali mariposa lily	Y @ Cushenbury Springs; N @ project	NI
San Bernardino Mts. dudleya	Y @ project	MIIH; NTV
Baldwin Lake linanthus	P	NI
Latimer's woodland gilia	P	NI
San Bernardino aster	H @ Cushenbury Springs; N @ project	NI
SBNF Watchlist Animals		
springsnails	P @ Cushenbury Springs	NTV
simple hydroporus diving beetle	P @ Cushenbury Springs	NTV
desert monkey grasshopper	Y	NTV
San Bernardino Mountains silk moth	P	NTV
Andrew's marble butterfly	P – host plants are present	NTV
Monterey ensatina salamander	P @ Cushenbury Spring and Marble Canyon	NTV
red spotted toad	P @ Cushenbury Springs and Marble Canyon	NTV
common chuckwalla	Y	NTV
desert night lizard	Y @ Cushenbury Springs; P @ project	NTV
Mojave black-collared lizard	Y	NTV
zebra-tail lizard	Y	NTV
coast patch-nosed snake	P	NTV
mountain garter snake	P	NTV
southwestern speckled rattlesnake	Y	NTV
turkey vulture (breeding)	P	NTV
sharp-shinned hawk (breeding)	Y @ Cushenbury Springs (migrant); P @ project	NTV
Cooper's hawk (breeding)	Y @ Cushenbury Springs; P @ project	NTV
ferruginous hawk	P (migration; not nesting)	NTV
golden eagle	Y for foraging; Nesting known on North Slope	NTV
American peregrine falcon	P	NTV
prairie falcon	Y (Records from Cushenbury Springs; Burnt Flat, Deep Canyon, Dry Canyon, Crystal Creek)	NTV
western screech owl	P @ analysis area; Y@ Cushenbury Springs	NTV
northern pygmy owl	P	NTV
long-eared owl	Y @ Cushenbury Springs; P @ project	NTV
northern saw-whet owl	P	NTV

Table 1. Summary Of Effects Determinations - TESW Species In And Near the Analysis Area		
Common Name	**Occurrence Information [1]**	**Determinations [2]**
common nighthawk	P	NTV
Mexican whip-poor-will	P	NTV
calliope hummingbird	P @ Cushenbury Springs; P @ project	NTV
Nuttall's woodpecker	P @ analysis area; Y @ Cushenbury Springs (breeding)	NTV
gray flycatcher	Y @ Cushenbury Springs (migrant); P @ project	NTV
California horned lark (breeding)	Y @ Cushenbury Springs (breeding); U @ project	NTV
tree swallow	Y @ Cushenbury Springs (migrant); P @ project	NTV
pinyon jay	Y @ Cushenbury Springs (migrant); P @ project	NTV
Swainson's thrush	Y @ Cushenbury Springs; P @Marble Canyon	NTV
hermit thrush (breeding)	Y @ Cushenbury Springs (migrant) ; P @ project	NTV
Bendire's thrasher	P	NTV
LeConte's thrasher	Y @ Cushenbury Springs (breeding); P @ project	NTV
loggerhead shrike	P @ analysis area; Y @ Cushenbury Springs	NTV
Cassin's vireo	P	NTV
plumbeous vireo	P	NTV
warbling vireo	Y @ Cushenbury Springs; P @ project	NTV
Virginia's warbler (breeding)	P @ Cushenbury Springs; P @ project	NTV
yellow warbler	Y @ Cushenbury Springs (breeding) ; P @ project	NTV
MacGillivray's warbler	P @ Cushenbury Springs; P @ project	NTV
common yellowthroat	Y @ Cushenbury Springs; U @ project	NTV
Wilson's warbler	Y @ Cushenbury Springs; P @ project	NTV
yellow-breasted chat	Y @ Cushenbury Springs; U @ project	NTV
hepatic tanager	P	NTV
summer tanager	Y @ Cushenbury Springs; U @ project	NTV
black-chinned sparrow	Y	NTV
Lincoln's sparrow	P @ Cushenbury Springs; P @ project	NTV
tri-colored blackbird	Y @ Cushenbury Springs; U @ project	NTV
Lawrence's goldfinch	P	NTV
spotted bat	P	NTV
western small-footed myotis	P	NTV
long-eared myotis	P	NTV
little brown myotis	Y @ Cushenbury Springs; P @ project	NTV
long-legged myotis	Y @ Cushenbury Springs; P @ project	NTV
Yuma myotis	Y @ Cushenbury Springs; P @ project	NTV
western mastiff bat	Y @ Cushenbury Springs; P @ project	NTV
pocketed free-tailed bat	Y @ Cushenbury Springs; P @ project	NTV
golden-mantled ground squirrel	P	NTV
lodgepole chipmunk	P	NTV
San Diego pocket mouse	Y @ Cushenbury Springs; P @ analysis area	NTV
southern grasshopper mouse	Y @ Cushenbury Springs; P @ analysis area	NTV
San Diego desert woodrat	Y	NTV
porcupine	P	NTV
ringtail	Y	NTV
American badger	P	NTV
western spotted skunk	P	NTV
mountain lion	Y	NTV

Table 1. Summary Of Effects Determinations - TESW Species In And Near the Analysis Area		
Common Name	**Occurrence Information [1]**	**Determinations [2]**
Nelson's bighorn sheep	Y	NTV for SBNF metapopulation; VT for Cushenbury herd
Other Special Status Animals		
San Diego coast horned lizard	Y	NVT
Swainson's hawk	P @ project; Y @ Cushenbury Springs	NVT
Yellow-headed blackbird	P @ Cushenbury Springs	NVT
Olive-sided flycatcher	Y @ Cushenbury Springs; P @ project	NVT
Black-tailed gnatcatcher	Y @ Cushenbury Springs; P @ project	NVT
California leaf-nosed bat	P	NVT
Western red bat	P	NVT
Silver-haired bat	P	NVT
Hoary bat	P	NVT
Mojave ground squirrel	U	NVT
Mule deer	Y	NVT
SBNF Watchlist Plants And Other Rare/Vulnerable Plants		
Parish's onion	Y - Known @ project	NTV
Bear Valley woollypod	Y - Known @ project	NTV
Fremont barberry	H @ Cushenbury Springs; N @ project	NTV
Lincoln rockcress	P	NTV
desert bird's beak	P	NTV
purple-nerve cymopteris	P	NTV
San Bernardino Mountains buckwheat	Y - Known @ project	NTV
Parry's sunflower	Y - Known @ project	NTV
crowned muilla	P	NTV
frosted mint	H @ Cushenbury Springs; N @ project	NTV

[1] *Occurrence Codes:*
Y = Species is known to occur.
P = Occurrence of the species is possible; suitable habitat exists and it is within the distribution of the species.
H=Historic record.

[2] *Determination Codes:*
Threatened/Endangered Species:
NE=No Effect;
NLAA = May Affect, But Not Likely To Adversely Affect;
MA= may affect, likely to adversely affect
Sensitive Species:
NI=No Impact;
MIIH = may impact individuals and habitat but not likely to lead to a trend to Federal listing for Sensitive species.
Watchlist Species:
Determinations are not made for Watch species – this is simply documentation of an occurrence.
All:
NTV=No threat to viability
VT=Viability threat

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Acronyms and Abbreviations Used	
BA	Biological Assessment for species and habitats designated under the Endangered Species Act
BE	Biological Evaluation for Forest Service Sensitive species
BLM	Bureau of Land Management
BMP	Best management practices
BO	Biological Opinion rendered by U.S. Fish and Wildlife Service
Caltrans	California Department of Transportation
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife (formerly Cal. Dept. Fish and Game)
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNDDB	California natural diversity database
CNPS	California native plant society
DAU	Deer assessment unit
DBH	Diameter at breast height
E	Endangered species (listed under the federal Endangered Species Act)
EIS	Environmental impact statement
FSH	Forest service handbook
FSM	Forest service manual
GIS	Geographic information system
GPS	Global positioning system
HRC	Home Range Core for California spotted owl
Forest Plan or LMP	San Bernardino National Forest Land Management Plan (2006)
LOP	Limited operating period
NFS	National Forest System
NRCS	Natural resource conservation service
NRIS	Natural resource inventory system
NS	Nest Stand for California spotted owl
P	Proposed – species proposed for listing under the Endangered Species Act
PAC	Protected activity center for California spotted owl
RCA	Riparian conservation area
S	Forest Service Sensitive species (Regional Forester List)
SBCM	San Bernardino County Museum
SBNF	San Bernardino National Forest
SCE	Southern California Edison
T	Threatened species (listed under the federal Endangered Species Act)
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
W	Watchlist species for the San Bernardino National Forest

PART I: INTRODUCTION

This document contains analysis of potential effects to plants and animals from the proposed Mitsubishi Cement Corporation South Quarry project. It has six parts:

- **Part I** is an introduction with the project description, methods, and management direction.
- **Part II** describes the existing environment in the project area and addresses general potential effects to species and habitats in the project area. Subsequent sections of this document may refer to the general effects discussion in Part II.
- **Part III** is a Biological Assessment (BA) of potential effects to federally-listed Threatened (T), Endangered (E), Proposed (P), and Candidate (C) plant and animal species and Critical Habitat.
- **Part IV** is a Biological Evaluation (BE) of potential effects to species that are on the Regional Forester's Sensitive (S) species list.
- **Part V** contains the Botany and Wildlife Reports that address viability of SBNF Watchlist species, other rare species, and other species of special interest.
- **Part VI** is a Non-Native Species Risk Assessment.

These reports are required for all Forest Service funded, executed, authorized, or permitted programs and activities.

I-1.0 – METHODS

Species Considered and Species Accounts: Each chapter of this report contains the current list of special status species considered during the surveys and in the analysis of potential effects. Those species with known occurrences or considered to have a high likelihood of occurrence in the analysis area are discussed in depth in this analysis. Scientific nomenclature and common names for species referred to in this report follow those used in the LMP.

Species Accounts for the current SBNF Threatened, Endangered, Proposed, Candidate, Sensitive and Watch (TEPCSW) lists are contained in the SBNF LMP, and are periodically updated and on file at the SBNF. These species accounts include information on status of populations and habitat, natural history, risks, conservation considerations, and viability analyses. These species accounts are incorporated by reference into this analysis and are not repeated in full. Where new information is available about a species or occurrences, species account information is updated in the species-specific discussions.

Pre-Field Reviews: Pre-field reviews were conducted to determine which species are known from the area or have suitable habitat present and could potentially occur. Data regarding biological resources on the analysis area were obtained through literature review, existing reports, and field investigations. Sources reviewed include California Natural Diversity Data Base (**CNDDB 2013**), California Native Plant Society (**CNPS 2013**), California Consortium of Herbaria **(CCH 2013)**, SBNF and NRIS occurrence database, results from previous species-specific surveys in the area, field guides and other project-related analyses. Bird observations from E-Bird and Rare Bird Alerts have also been incorporated.

In addition, data from project-related surveys and analyses done near the analysis area in the past 10-15 years (*e.g.*, exploratory drilling, fuels reduction projects, recreation residence tract surveys, mining claim surveys, restoration project surveys, engineering project surveys, small mammal and herptile studies, etc.) were also considered in this analysis.

Botanical Surveys and Survey Limitations: Field surveys for botanical resources were conducted during 2009, 2010 and 2011 by Forest Service botanists Scott Eliason, Christine Craig, Gina Richmond, Krissy Day, Thomas Stoughton, and Emma Williams. Additional Surveys were performed by Aspen Environmental botanists Scott White, Justin Wood, and Dustin Ray under contract with Mitsubishi (**Wood 2011**). All surveyors who performed project surveys were trained and overseen by Scott White (Aspen crew) or Scott Eliason (FS crew). Surveys covered all proposed ground disturbance areas within the analysis area and all carbonate habitat mitigation lands. Where slopes were too steep to safely traverse, areas were assessed for vegetation and habitat suitability from accessible vantage points. **Table 2** displays information about surveys conducted.

Table 2. Summary of Surveys

Survey Area	Botanical Survey Dates and Personnel	Wildlife Survey Dates and Personnel
South Quarry project area - quarry, overburden, haul road, access road	6/18/09: S. Eliason and Craig. 10/20-11/2/2009: S. Eliason, Stoughton, Craig, and Day. 5/18-20/2010: S. Eliason, Craig, Richmond, Day. 7/19-21/2010: S. Eliason, Craig, Richmond, Day. 8/31/10: Craig, Richmond. 6/14-15/2010 and 8/31/2010: Wood and Ray.	10/16/2008, 10/23/2008 – Farr, Rimbenieks, and Pawlowski; 7/14-15/2009 – Pawlowski, Farr, Rimbenieks, Stamer. 7/20/2010 – Farr; 5/10/13 – Farr and R. Eliason; 6/14-15/2010 and 8/31/2010 – Justin Wood and Dustin Ray (Aspen)
Cushenbury Springs	9/17-18/1992 – J. Wear, N. Moorhatch (Lilburn)	12/17/2005 – S. Myers, B. Deep, A. Garcia; 9/17-18/1992 – J. Wear, N. Moorhatch (Lilburn); 5/29-30/1992 – R. McKernan; 9/25-26/1992 – R. McKernan; 10/14-15/1992 – R. McKernan; 5/10/13 – Farr and R. Eliason
Mitigation Claim # 7P	6/10/11: Wood and Ray. 6/15/11: Wood and Ray. 6/20/11: Wood and Ray. 6/23/11: Wood and Ray.	6/10/11: Wood and Ray. 6/15/11: Wood and Ray. 6/20/11: Wood and Ray. 6/23/11: Wood and Ray.
Mitigation Claim # 9	6/15/10: Richmond, Williams. 5/16/11: S. Eliason and Williams. 6/15-16/11: Richmond and Williams. 6/21/11: Richmond and Williams. 6/27-28/11: Richmond and Craig. 6/30/11: Craig. 7/6/11: Richmond, Craig and Williams.	6/9/11, 6/30/11, 7/3/11 – Farr
Mitigation Claim # 15	6/28/10: Richmond, Williams. 5/31/11, 6/2/11: S. Eliason, Richmond, Williams. 6/6-7/11: Richmond and Williams. 6/9/11 Wood and Ray. 6/21/11: Richmond, Williams and Craig. 7/8/11: Richmond and Williams.	6/2/11, 6/9/11, 6/20-21/11, 6/23/11 – Farr; 11/6/13 – R. Eliason and Farr; 12/2/13 – R. Eliason
Mitigation Claim # 16A	6/3/11: S. Eliason, Richmond and Williams. 6/13/11: Richmond and Williams. 6/15-16/11: Richmond and Williams. 6/20-21/11: Richmond, Williams and Craig. 6/23/11: Richmond,	6/16/11, 6/20/11, 6/23/11- Farr

Table 2. Summary of Surveys		
Survey Area	**Botanical Survey Dates and Personnel**	**Wildlife Survey Dates and Personnel**
	Williams and Craig. 6/27/11: Richmond and Craig.	
Other Surveys in Analysis Area Vicinity	May – July 2000 – Scott White, Brian Leatherman, Kent Hughes, Tasha LaDoux, and Paul Kielhold; 5/12-26/2008 – Pamela MacKay and Timothy Thomas; 5/26/11Wood and Ray. 6/9-10/11: Wood and Ray. 6/13/11: Wood and Ray. 6/20/11: Wood and Ray. 9/15 and 9/30/11: Wood and Ray. 8/9-10/2012-Justin Wood and Tracy Valentovich	May – July 2000 – Scott White, Brian Leatherman, Kent Hughes, Tasha LaDoux, and Paul Kielhold; May 12-26, 2008 – Pamela MacKay and Timothy Thomas; 10/16/2008 - Pawlowski, Farr (Claim 17A+B)

Field studies were conducted and focused on a number of primary objectives: 1) recording of dominant vegetation communities, 2) floristic plant surveys, 3) focused rare plant surveys, and 4) focused invasive species surveys. Observations of plant species were recorded (**Appendix A**).

While these surveys were intended to be floristic in nature, a more focused search was conducted for special-status plant species that are known to occur near the analysis area, or occupy habitats similar to those within the analysis area.

All previously-recorded TESW plant occurrences within the analysis area that had not been documented for over 5 years were revisited and recorded to current information standards. All suitable carbonate plant habitats (previously mapped as part of the Carbonate Habitat Management Strategy) were carefully surveyed, focusing on detecting rare and endangered carbonate plant species. All carbonate plant occurrences were surveyed and remapped where previously mapped boundaries were imprecise.

Botanical surveys were performed at times of year when most plant species would be detectable. All focal species that could occur in the analysis area had moderate to high detectability during surveys, based on field checks of nearby reference populations. The likelihood of failing to detect these species in areas surveyed is considered low on accessible slopes, but moderate to high on steep and inaccessible slopes. Surveys were not performed during 2012, 2013, or 2014 because prior years' surveys were as thorough and complete as possible given slope limitations. In addition, 2012, 2013, and 2014 were drought years, and there was an associated likelihood of failing to detect focal species.

Botanical surveys were performed at times of year when most plant species would be detectable. All focal species that could occur in the analysis area had moderate to high detectability during surveys, based on field checks of nearby reference populations. The likelihood of failing to detect these species in areas surveyed is considered low on accessible slopes, but moderate to high on steep and inaccessible slopes. Surveys were not performed during 2012 or 2013 because prior years' surveys were as thorough and complete as possible given slope limitations. In addition, 2012 and 2013 were drought years, and there was an associated likelihood of failing to detect focal species.

<u>Wildlife Surveys and Survey Limitations:</u> **Table 2** displays information about surveys conducted in the analysis area. A number of surveys were conducted by Forest Service biologists Drew Farr, Julia Addison, Mikaila Rimbenieks, Meghan Pawlowski, Robin Eliason, and Marc Stamer between 2008 and 2013.

Additional surveys conducted by non-Forest Service biologists/botanists in or near the analysis area include: Aspen Associates Justin Wood and Dustin Ray in 2010 (**White 2010**), White and Leatherman biologists Scott White, Brian Leatherman, Kent Hughes, Tasha LaDoux, and Paul Kielhold (**White 2000),** Pamela MacKay and Timothy Thomas in 2008 (**MacKay and Thomas 2008**), Aspen Environmental Group Justin Wood and Tracy Valentovich in 2012 (**White and Wood 2012**), Stephen Myers, Bill Deppe, and Arturo Garcia in 2005 (**Myers 2005**), Robert McKernan, John Wear, and Nathan Moorhatch in 1992 (**Kielhold 1992**) (**Table 2**).

Wildlife species detected during field surveys by sight, calls, tracks, scat, or other sign were recorded. In addition to species actually observed, expected wildlife usage of the area was determined according to known habitat preferences of wildlife species and knowledge of their relative distributions in the area.

The focus of the wildlife surveys was to identify habitat suitability for special-status wildlife within the analysis area in order to predict those species with a higher probability of occurrence in the analysis area. Because a species was not detected does not mean that the species does not occur in the analysis area. Surveys or wildlife species have the inherent limitation that absence is difficult or impossible to determine. This is especially true for wildlife species with a nocturnal pattern of activity, species that occur in low numbers, or species that are otherwise difficult to detect.

In conjunction with USFWS, the SBNF used computer modeling to delineate potentially suitable habitat for T/E species in 1999–2000. Modeled habitat is considered suitable for unless site-specific evaluations determine that it is not suitable for the target species. Modeled habitat in the analysis area was assessed for suitability. Drought conditions were taken into consideration during these surveys.

Suitable habitat is considered occupied by the target species unless enough site-specific and species-specific surveys are conducted to assume absence. Because of the assumption of occupancy, further generalized wildlife surveys were not considered necessary. Additional surveys for some species are included in the Design Features (*e.g.,* nesting birds prior to ground clearance; participation in the North Slope Raptor Conservation Strategy that would include annual cliff-nesting raptor surveys and behavioral monitoring for nesting raptors, etc.).

<u>I-2.0 – CURRENT MANAGEMENT DIRECTION</u>

Applicable requirements and direction may be found in the SBNF Land Management Plan (LMP), Endangered Species Act, National Forest Management Act, Department of Agriculture 9500-4 Regulations, Forest Service Manual, and the Southern California Conservation Strategy. **Appendix B** contains management direction applicable to this project.

SBNF Land Management Plan Land Use Zones and/or Special Area Designations

The SQ project area is in the Desert Rim Place (**USFS 2006** LMP). Community protection (for Big Bear and Lucerne Valley) from wildland fire is of the highest priority. It is to be emphasized through public education, fire prevention, and fuels management. Management is expected to center on the implementation of the Carbonate Habitat Management Strategy and to continue to provide for orderly mineral development while also preserving and managing habitat for four federally-listed plants. Maintenance of plant and wildlife habitat for Threatened, Endangered, and Sensitive plant and wildlife species is to be emphasized in all management activities. The identification, evaluation, interpretation and protection of heritage properties will be emphasized. Prioritization of locations needing increased law enforcement patrol is to be emphasized for protection of national forest visitors and employees.

No special area designations from the LMP (*e.g*., Research Natural Areas, eligible Wild and Scenic Rivers, or Inventoried Roadless Areas) occur in the SQ project area. The proposed Arrastre Flat Research Natural Area is immediately adjacent to the south of the SQ project area. The LMP Land Use Zone for the SQ project area is Backcountry Motorized Use Restricted. The recreational opportunity spectrum in the project area is Semi-Primitive Non-Motorized.

LMP Direction

The LMP includes forest goals and desired conditions for resources, strategic management direction, and guidance for designing actions and activities (Design Features) during project planning. Applicable LMP direction has been incorporated into the project design.

The LMP includes several goals applicable to this project:

> *Goal 4.1a - Administer Minerals and Energy Resource Development while protecting ecosystem health (LMP, Part 1, page 38).* The desired condition is that approved minerals and energy developments are managed to facilitate production of mineral and energy resources while minimizing adverse impacts to surface and groundwater resources and protecting or enhancing ecosystem health and scenic values.
>
> *Goal 5.1 - Improve watershed conditions through cooperative management.* The desired condition is that national forest watersheds are healthy, dynamic and resilient, and are capable of responding to natural and human caused disturbances while maintaining the integrity of their biological and physical processes.
>
> Watersheds, streams, groundwater recharge areas, springs, wetlands and aquifers are managed to assure the sustainability of high quantity and quality water. Where new or re-authorized water extraction or diversion is allowed, those facilities should be located to avoid long-term adverse impacts to national forest water and riparian resources. The Forest Service has acquired and maintains water rights where necessary to support resource management and healthy forest conditions. Forest management activities are planned and implemented in a manner that minimizes the risk to forest ecosystems from hazardous materials.
>
> Additional desired conditions are that geologic resources are managed to protect, preserve and interpret unique resources and values, and to improve management of

activities that affect watershed condition and ecosystem health. Geologic hazards are identified, analyzed and managed to reduce risks and impacts where there is a threat to human life, natural resources, or financial investment.

Goal 6.2 - Provide ecological conditions to sustain viable populations of native and desired nonnative species. The desired condition is that habitats for federally listed species are conserved, and listed species are recovered or are moving toward recovery. Habitats for sensitive species and other species of concern are managed to prevent downward trends in populations or habitat capability, and to prevent federal listing. Flow regimes in streams that provide habitat for threatened, endangered, proposed, candidate, and/or sensitive aquatic and riparian-dependent species are sufficient to allow the species to persist and complete all phases of their life cycles.

Habitat conditions sustain healthy populations of native and desired nonnative fish and game species. Wildlife habitat functions are maintained or improved, including primary feeding areas, winter ranges, breeding areas, birthing areas, rearing areas, migration corridors, and landscape linkages.

I-3.0 – DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Mitsubishi Cement Corporation (MCC) has submitted to the U.S. Department of Agriculture, Forest Service (Forest Service) and the County of San Bernardino (County) a Plan of Operations and Reclamation Plan for the proposed South Quarry. An environmental review of the proposed Mitsubishi Cement Company South Quarry Project (Project) must be conducted under both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Implementation of the Project would require approvals from federal, state, and local agencies and, therefore, this Project is subject to the environmental review requirements of both CEQA and NEPA.

To ensure coordination between the CEQA and NEPA processes, and to avoid duplication of effort, a joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS) is being prepared as recommended by CEQA Guidelines Section 15222 and 40 CFR 1506.25. The County will be the CEQA Lead Agency and the Forest Service will be the NEPA Lead Agency for the EIR/EIS.

MCC is proposing to develop and reclaim a new high-grade limestone quarry to the south of its existing East Pit, its West Pit (under development), and the existing Cushenbury Cement Plant. The proposed South Quarry is located approximately 6 miles south of the community of Lucerne Valley in San Bernardino County, California (**Figure 1).**

Map Date: 9/6/2013
Service Layer Credits: Sources: USGS, ESRI, TANA, AND

Figure 1. Regional Location

2012-017 Mitsubishi Cement Corporation South Quarry Project

The Project as proposed in the Plan of Operations would total approximately 153.6 acres consisting of a 128-acre quarry, a 2.7- acre landscape berm, a 22.2-acre haul road 1.8 miles in length, and a temporary construction road of 0.7 acres. The South Quarry and haul road would be located almost entirely (147 acres) on 440 acres of unpatented claims owned by MCC on public federal land in the San Bernardino National Forest (SBNF) with approximately 6.6 acres of the haul road located on MCC fee land where it enters the existing East Pit.

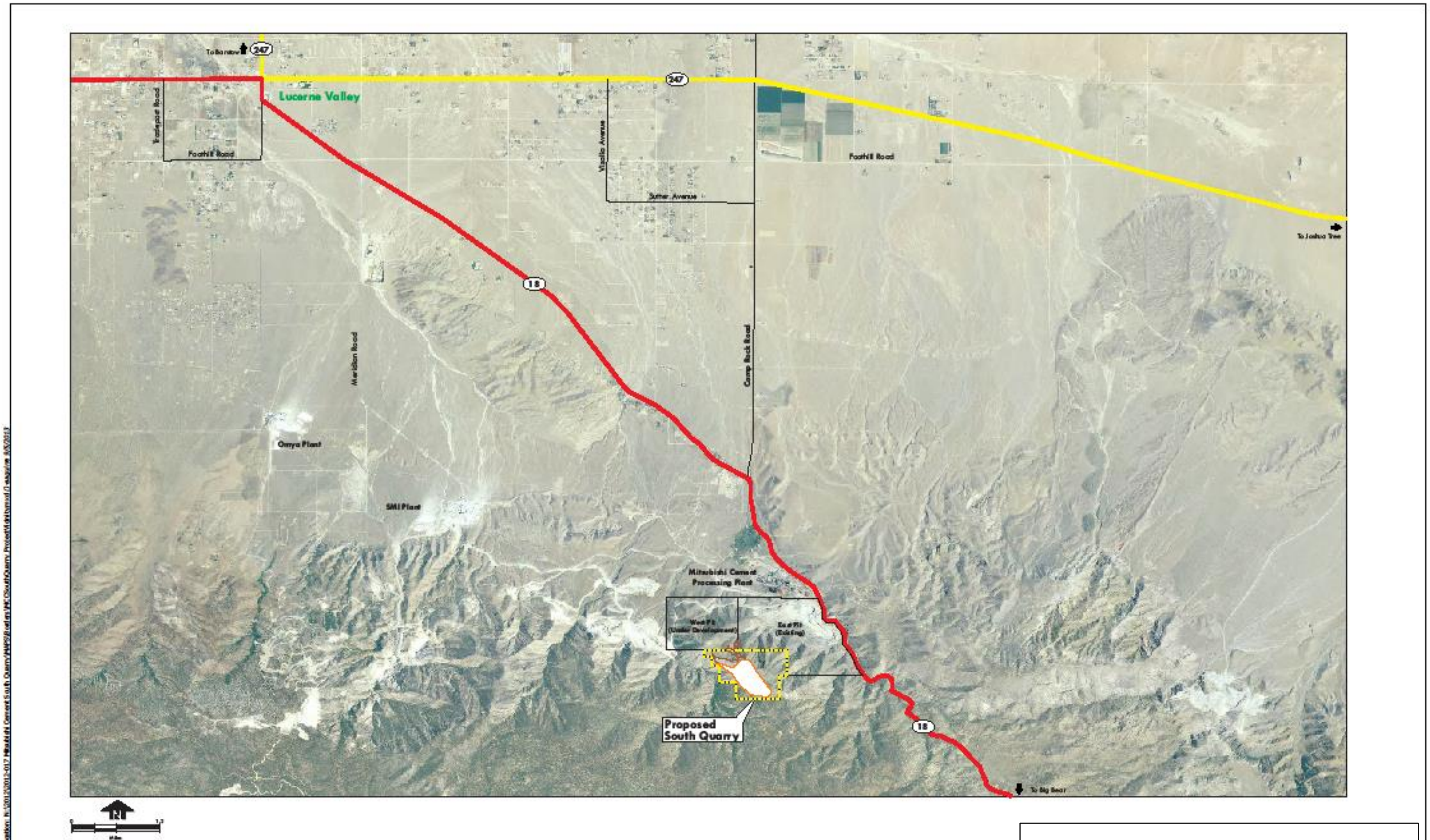
The proposed South Quarry is within portions of Sections 14, 15, 22, and 23 Township 3 North, Range 1 East SBBM. The Cushenbury Cement Plant and related quarries are accessed directly from State Highway 18 south of Lucerne Valley (**Figure 1**). The proposed South Quarry site and the adjacent surrounding land uses consist of vacant public lands administered by the Forest Service. MCC currently operates two quarries on private land just north of the proposed South Quarry site, the existing East Pit on 214 acres and the West Pit (under development) on 191 acres (**Figure 1**). The Specialty Minerals, Inc. Marble Canyon Quarry is located to the west of the proposed South Quarry on 132 acres, and other quarries, waste rock stockpiles, and a process plant operated by Specialty Minerals, Inc. are located to the northwest of the proposed South Quarry (**Figure 2**).

<u>I-3.1 – Project Background</u>

The Cushenbury area has been mined since 1861, and limestone mining has occurred since the early 1950s. In 1988, MCC acquired the Cushenbury Cement Plant and the existing East Pit. The cement produced at the Cushenbury plant has been used to meet local southern California and southern Nevada building and infrastructure needs. In 1999, planning to identify a source of limestone to replace diminishing reserves in the East Pit was initiated. During this process the location for a new quarry, the West Pit, was identified. The West Pit project required approval of a Mine Reclamation Plan by the County of San Bernardino and associated CEQA review, which was completed in 2004.

As part of the CEQA review and approval for the West Pit, several mitigation measures were incorporated into the West Pit project. To mitigate for the removal of four federally-listed as endangered carbonate endemic plant species, land was set aside through conservation easement at a ratio of 3 acres for each acre of occupied habitat that was disturbed (**Figure 3**), and 1 acre on the site was reclaimed with a comparable plant community for each acre that was disturbed. A Habitat Conservation Plan (HCP) and consultation with the U.S. Fish & Wildlife Service (USFWS) pursuant to the federal Endangered Species Act (ESA) was not required for the project because the law does not require an HCP or consultation for the take of listed plant species from private land when there is no Federal nexus (such as a Federal permit or funding). MCC was, however, active in the development of the Carbonate Habitat Management Strategy (CHMS), a regional planning effort aimed at protecting these rare plant species.

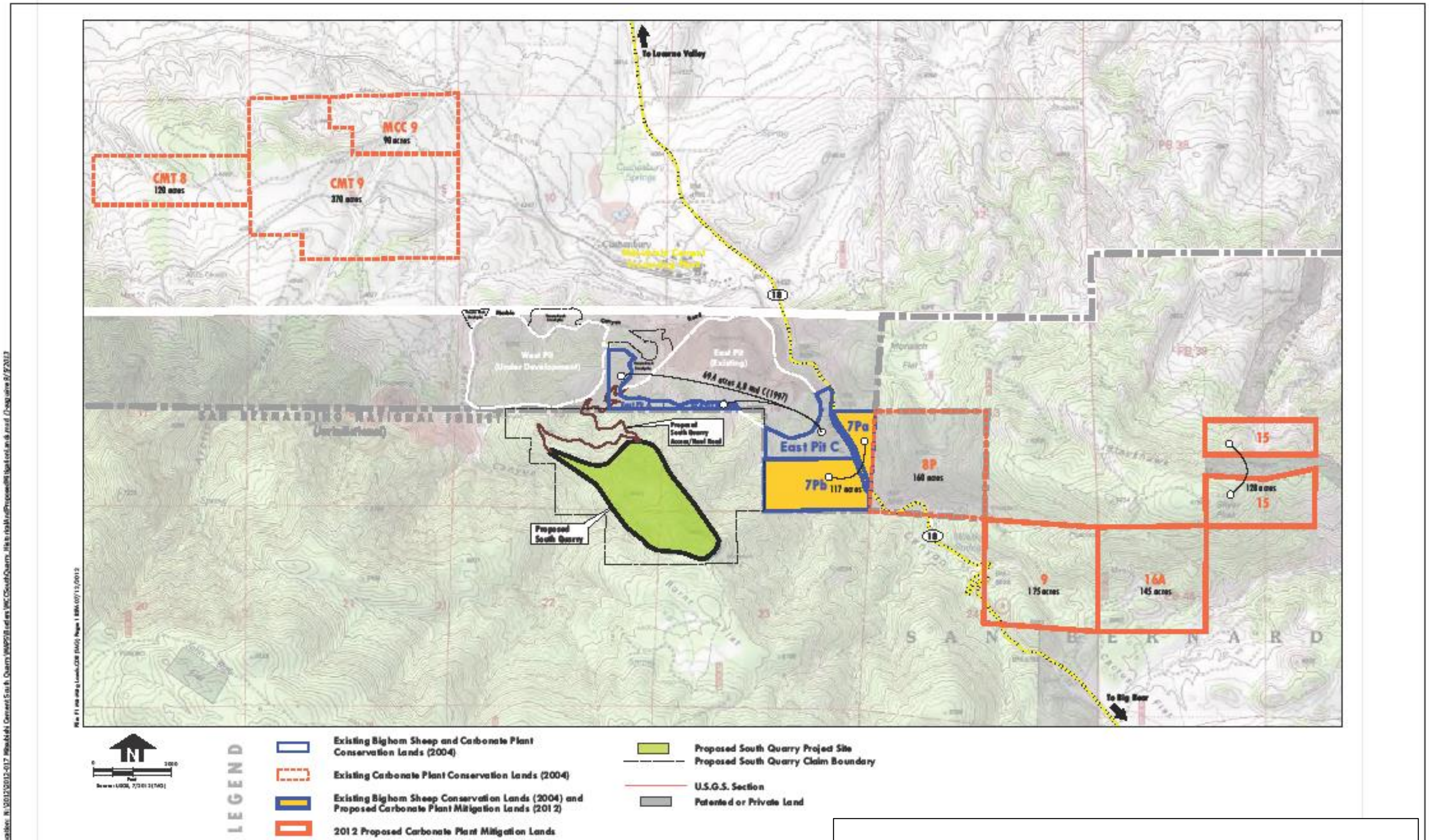
To compensate for the loss of foraging habitat for the bighorn sheep, MCC set aside land for conservation easement (**Figure 3**), agreed to create new water sources for the sheep, and committed funds to collaring efforts intended to help the California Department of Fish and Game (now California Department of Fish and Wildlife [CDFW]) better understand the habits and needs of the local population. A number of additional measures were incorporated, addressing issues such as traffic, air quality, and water quality.



Map Date: 9/5/2013
Source: Lilburn Corporation

Figure 2. Project Vicinity

2012-017 Mitsubishi Cement Corporation South Quarry Project



Map Date: 9/5/2013
Source: Lilburn Corporation

Figure 3. Historical and Proposed Mitigation Lands

Geologic reconnaissance during completion of the final plans for the West Pit confirmed the projected supply of low-grade limestone, but also identified a shortage of the anticipated high-grade material needed for cement production. MCC initiated a comprehensive survey of properties near existing operations in the Burnt Flats area to identify high-grade limestone sources. In addition to relying on the traditional exploration approaches of examination of historic data and geologic inference, MCC twice conducted a two-week drilling program on the Project area, in 2009 and 2010.

The first phase used a track-mounted drill to create six test holes in the centerline of the existing Forest Road 3N02. The second phase drilled eight test holes near Forest Road 3N02. For the second phase, drilling rigs were delivered to inaccessible areas using helicopter transit. Both phases were approved through the Forest Service Plan of Operation process, and Categorical Exclusions were prepared for each phase to comply with NEPA. As part of these processes, resource protection design features were incorporated in the Plans of Operation. Analysis of samples gathered during the drilling program confirmed both quality and quantity of the high-grade limestone resource in the location of the proposed South Quarry.

MCC has identified that the most efficient and effective means to continue Cushenbury Cement Plant operations would be to combine low-grade material from the West Pit with high-grade material from the proposed South Quarry at a ratio of approximately 50/50 to meet the limestone specifications necessary to feed the Cushenbury Cement Plant. Current estimates project that the South Quarry, in combination with the West Pit, could feed the cement plant for approximately 120 years.

MCC's Cushenbury Cement Plant requires a limestone feed of approximately 2.6 million tons per year (MTPY) of a specific blend of limestone to manufacture cement. In 2004, as the existing East Pit neared its exhaustion of cement-grade limestone, the West Pit expansion was approved by the County of San Bernardino on 191 acres to the west of the existing East Pit, with approximately 217 million tons of limestone reserves. Based on subsequent limestone testing, the amount of high-grade limestone to blend with the lower grades of limestone to meet the feed requirement for the cement plant will not be adequate for the life of the mine. Based on drilling sampling conducted during 2009 and 2010, the proposed South Quarry site has estimated proven and inferred reserves of more than 200 million tons of high- to medium-grade limestone rock. This higher-grade limestone rock would be blended with lower-grade limestone excavated from the East and West Pits at a ratio of approximately 50/50 to meet the limestone specifications to feed the adjacent Cushenbury Cement Plant. Should a source of high-quality limestone not be developed near the existing cement plant, the high-quality limestone for blending would need to be mined elsewhere in the region and trucked to the plant to ensure the proper blend to manufacture cement.

In November 2010, MCC submitted a Plan of Operations and Reclamation Plan for the South Quarry to the Forest Service and to the County. This plan was revised in January 2012 in response to Forest Service and County comments. This EIR/EIS evaluates the potential environmental effects from implementing the Plan of Operations and Reclamation Plan.

I-3.2 – Features Common to All Alternatives, Including No Action/No Project

I-3.2.1 – Timing

The amount of lower-grade limestone in the East and West Pits is sufficient to operate the existing cement plant for approximately 120 years with a source of higher-grade limestone for blending. Therefore, the existing cement plant is anticipated to be operated for 120 years under any alternative, including the No Action/No Project Alternative.

I-3.2.2 – Ore Processing

Mineral processing would be conducted at the adjacent existing Mitsubishi Cement Corporation (MCC) Cushenbury Cement Plant north of the existing East Pit. There would be no change in existing operations or production at the plant for any alternative, including the No Action/No Project Alternative. Limestone would continue to be crushed, mixed with other materials, and heated the rotary kiln, then cooled and stored for shipping. Cement would continue to be shipped to various markets by bulk truck, train, and in sacks and this would not change as a result of any alternative.

I-3.3 - Features Common to All Action Alternatives

I-3.3.1 – Land Management Plan Amendment

The Forest-wide scenery inventory included in the Land Management Plan (LMP) (Forest Service 2006) was developed as a coarse-scale overview, with the understanding that it would be refined and expanded via project-level scenery analysis. Through the work produced on the project-scale, sufficient detail has been added to the scenery inventory to more accurately establish Scenic Integrity Objectives that reflect and support the LMP's desired conditions for the Project area. The LMP Part 2 outlines the desired Project area landscape character as follows:

> *Desert Rim Place – is maintained as a modified to natural appearing landscape that functions as a sanctuary for a large number of federally listed native plants and a highly valued area for limestone production...*

The Project area has a Scenic Integrity Objective (SIO) of High and an existing scenic integrity level ranging from High to Very High. LMP direction is to maintain the landscape as modified to natural appearing because of the site's long cultural history and the local and regional economic impacts associated with mining, particularly mining for high-quality limestone mineral deposits. LMPs are expected to be revised every 10 to 15 years, and it would be expected that the SIOs would be further refined at that time.

According to LMP Aesthetic Management Standards S10, temporary drops of more than one SIO level may be made during and immediately following implementation of a project provided they do not exceed three years. With both action alternatives, the SIO level in the South Quarry Project Area would be reduced by more than one level, from High to Low during the first 10 years of implementation. Therefore, due to this deviation from the LMP Aesthetic Management Standard S10, a project-specific Forest Plan Amendment to the SIO is being considered. The proposed SIO would be Low (**Figure 4**).

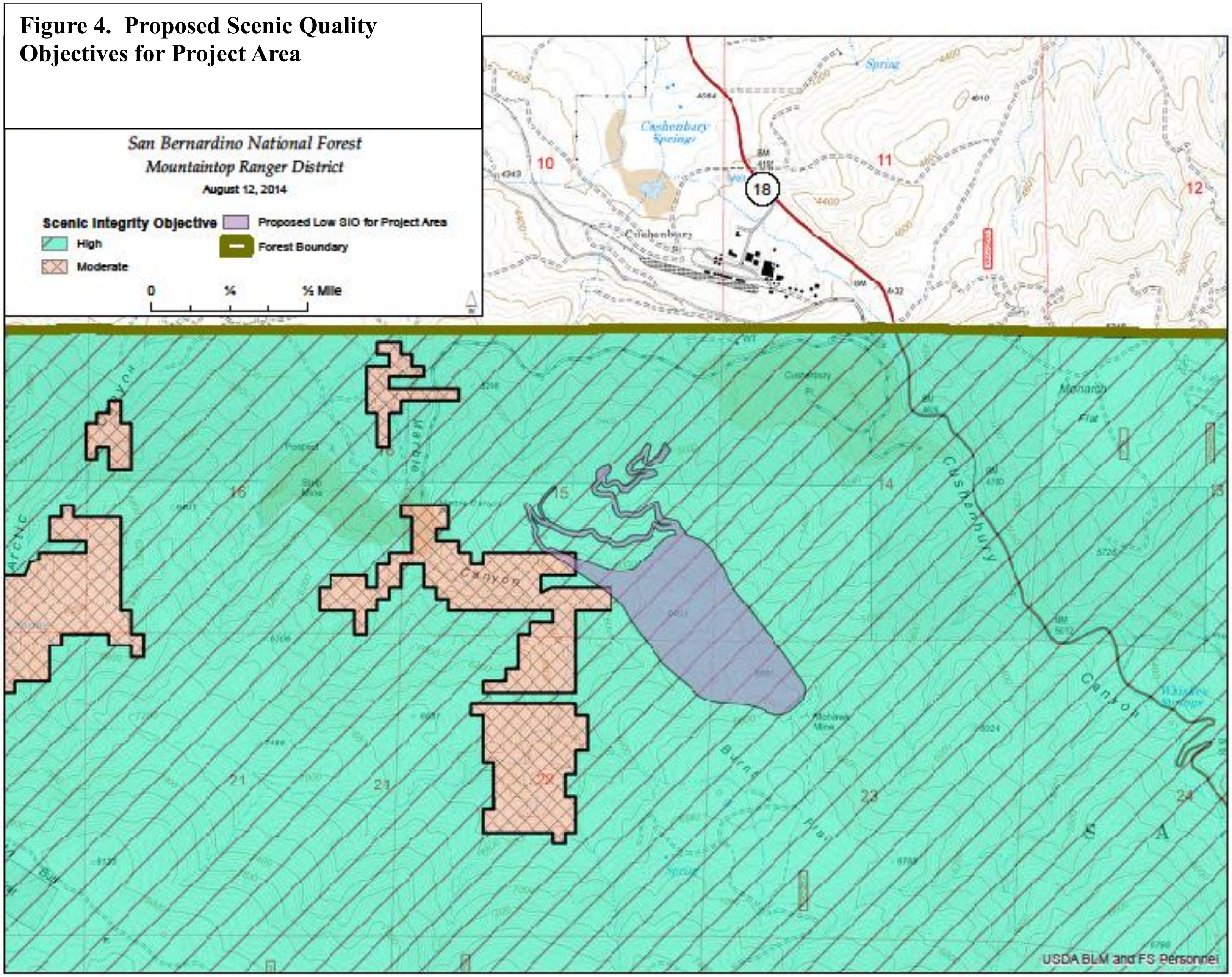


Figure 4. Proposed Scenic Quality Objectives for Project Area

I-3.3.2 - Pre-Construction and Pre-Mining Activities

The following activities would be conducted prior to haul road construction and prior to commencing rock extraction in each new area of the new quarry to facilitate ongoing and future reclamation and revegetation:

- Construction and excavation limits would be surveyed and marked in the field;
- Specified plants that can withstand removal would be salvaged and stored in a nursery to ultimately be replanted on reclaimed land as areas become available for revegetation. MCC, in coordination with the Forest Service (and with the U.S. Fish & Wildlife Service [USFWS] for federally-listed species) would determine where and how the plants would be grown, propagated, and used in the interim;
- Seeds of specified plants would be collected and either used for revegetation or stored appropriately for maximum future viability. MCC, in coordination with the Forest Service (and with the USFWS for federally-listed species) would determine where and how the seeds would be propagated and plants used in the interim; and
- Any available soils would be placed in separate identified stockpiles near the edges of the excavations for use as a seed bank and seedbed during reclamation. Soil stockpiles would be clearly marked and seeded with an erosion control native seed mix and/or covered with larger material to limit wind and water erosion.

I-3.3.3 - Haul Road Construction

Limestone ore excavated at the proposed South Quarry would be hauled by off-road haul trucks to the existing primary crusher located at the north end of the existing East Pit. The haul trucks currently in the MCC fleet have capacities of 77 to 105 tons. It is anticipated that 3 additional off-road haul trucks would be needed, and that these would be new, 105-ton capacity haul trucks. During the first two years of the project, the 9,585-foot or 1.8-mile long haul road would be constructed. The haul road would access the South Quarry at 5,950 feet above mean sea level and traverse down the North Slope to an elevation of 5,050 feet at the southwest corner of the existing East Pit. The road's surface width would be 50 to 60 feet with a grade not to exceed 10 percent. It would have a surface of crushed limestone.

The preliminary road design has estimated the required cut of 450,000 cubic yards based on 1H:1V slopes required to develop the road. The cut rock would generally be trucked to the primary crusher and used for cement production; the surface material would be salvaged and stockpiled in the existing East Pit for reclamation and revegetation. In addition, to aid in the cutting of the access road, a temporary construction road approximately 755 feet in length and 25 feet wide (0.7 acre) would be cut from the end of an existing access road from the West Pit area. On completion of the main access road, this temporary road would be reclaimed and revegetated. The estimated disturbance area of the proposed haul road is 22.2 acres, of which 6.6 acres are on MCC fee land in the County of San Bernardino and 15.6 acres are within the SBNF boundary.

I-3.3.4 - Excavation

There would be no increase in overall ore production. Higher grade limestone in the proposed South Quarry would be blended with lower grade limestone excavated from the East and West

Pits at a ratio of approximately 50/50 to meet the limestone specifications to feed the adjacent Cushenbury Cement Plant, which requires a limestone feed of approximately 2.6 million tons per year (MTPY). The South Quarry would be mined at an average production rate of 1.3 MTPY of ore and 150,000 tons per year of waste rock for up to 120 years. Production from the East and West Pits would be reduced to an average of approximately 1.3 MTPY of ore and 150,000 tons per year of waste rock. Therefore, the overall average limestone production of 2.6 MTPY and 300,000 tons per year of waste rock at the mining complex would not change from the currently-approved production.

Limestone would be excavated by standard open pit practices. Once an area is stripped of vegetation and available soil is salvaged, controlled blasting would loosen the rock at a vertical benching interval of 45 feet. A dozer would push material and two to three loaders would load the shot or broken rock onto off-highway haul trucks. These trucks would transport material to the existing primary crusher located at the north end of the existing East Pit near the cement plant. Limestone that does not meet cement quality specifications and other rock types would be pushed or hauled directly to waste rock stockpiles located within the quarry. To limit additional land disturbance and to reduce potential visual and erosion impacts, no new waste stockpiles would be developed outside the perimeter of the proposed quarry. The excavations would be designed to develop a series of stable rock slopes up to 45 feet in height with horizontal benches 25 feet wide.

Each bench would be sloped inward toward the vertical wall at 1 percent to capture any precipitation or runoff. The overall slope angle would be 60 degrees or a slope of 0.55 horizontal (H): 1 vertical (V). The site-specific geotechnical study (see EIS) determined that the planned slopes would meet the stability criteria for sliding and earthquakes. A geotechnical program of ongoing field mapping, drilling, geophysical surveys, and laboratory testing would be established and implemented as the quarry is excavated. This type of site investigation during the mining operation would provide information for detailed slope stability assessment on a continual basis and stabilization of slopes in areas where poor rock and/or adverse geologic structures are present. An annual report discussing the geotechnical program would be prepared for the Forest Service and the County of San Bernardino (County).

To reduce the possibility of boulder roll down or material erosion off-site on the down slopes to the north and east, specific excavation methods would be implemented. These include limiting the drilling and blasting when the outer quarry rim benches are being cut, designing blasting to undercut the outside wall, and excavating material by pulling into the quarry.

I-3.3.5 - Operating Hours and Equipment

The new quarry would normally operate approximately 250 days per year, five days per week, and 10 hours per day. Factors such as market conditions and maintenance requirements may vary this schedule, occasionally requiring a second shift or weekend work. In addition, snow or other weather conditions may suspend quarry operations for one or two months during the winter. Approximately 11 employees would work at the new quarry; eight of these would be existing employees and three would be new employees.

The average daily ore production is estimated to be 5,200 tons, which would require approximately 50 to 55 off-road, on-site truck trips to the crusher per day. An average of 600 tons of waste rock would be extracted per day, requiring approximately six or seven internal truck trips per day.

Table 3 lists the typical equipment that would be used for the mining activities conducted within the quarry. The number, makes, and sizes of the mobile equipment would vary depending on the required diesel emission standards, quarry needs, rock production, and normal replacement of old equipment. There would not be a net increase in most types of equipment from the amount currently used for the operation of the existing Cushenbury quarries because some existing equipment would be moved to the new quarry. The exception would be off-road haul trucks and employees to operate the haul trucks, both of which would increase with all action alternatives.

Table 3. Typical Quarry Equipment

Equipment	Typical Number	Net Increase of Equipment from Current Conditions	Purpose
Dozer	1-2	0	Removal of topsoil and waste rock. Construction and maintenance of the haul road.
Off Road Haul Trucks	2-9	0-5	Transportation of material to the primary crusher and onsite waste rock stockpiles. Two trucks would be dedicated to the South Quarry. Up to seven trucks would rotate with the West Pit operations, as required.
Drill Rig	1	0	Drill holes for placement of explosives
Water Trucks	1-2	0	Water haul roads, active excavation areas, stockpiles, and general dust suppression
Front End Loaders	2-3	0	Loading of materials into haul trucks at active mining area.

I-3.3.6 - Blasting

To extract the limestone rock, blasting activities would be required to develop a series of benches and to break the rock into smaller pieces so that it can be removed. Blasting operations involve drilling along the mining face, placing charges, and detonating the charges. All blasting activities would be conducted by a licensed blaster under permit through the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) for handling explosives. MCC currently has four licensed individuals on the staff. Blasting materials are currently, and would continue to be, secured in an appropriate magazine located at the cement plant facilities. All explosives and detonators would be transported, handled, and stored in accordance with all federal, state and local regulations, which includes permits issued by the San Bernardino County Sheriff's Department and San Bernardino County Fire Department pursuant to the Uniform Fire Code. Blasting would typically be conducted twice each week between the hours of 10:00 am and 6:00 pm Monday through

Saturday. During the initial construction of the haul road, more frequent (up to once per day) smaller blasts would occur.

I-3.3.7 - Production Water

Water would be used for road and mine dust control and would be obtained from existing water wells on MCC-owned land outside of the SBNF boundary. This water would be hauled in a 13,000-gallon water truck and sprayed on haul roads and active mine areas to minimize fugitive dust. The water truck would work continuously during active quarry operations as needed to control visible dust. Typically, the water truck would make up to eight trips per day, and the estimated water use would be approximately 104,000 gallons per day or approximately 79.2 acre-feet per year (af/yr). This water would infiltrate or evaporate and, therefore, not produce any wastewater or runoff. Approved chemical dust suppressants may also be used to control road dust and reduce water spraying frequency.

The total future water demand in acre-feet per year (af/yr) for plant operations (463.3 af/yr) and dust control for the West Pit (42.7 af/yr) and the proposed South Quarry (79.2 af/yr) is 585.3 af/yr. Current water use for the plant (463.3 af/yr) and East Pit (20.6 af/yr, to be closed in the future) has averaged 484 acre-feet per year. Therefore, the proposed South Quarry would require a net increase of approximately 58.6 acre-feet per year (79.2 af/yr minus 20.6 af/yr) or a 12.1 percent increase from existing conditions. The supply would be the existing MCC wells, which use groundwater pumped from the Este sub-area of the Mojave Basin. No new wells are proposed.

I-3.3.8 - Public Access Restrictions

Forest Road 3N02 officially ends at a locked SBNF gate approximately 0.25 mile south of the site, which indicates the end of public access. The road north of the gate is a historic road that has never been part of the official SBNF road system. The road is not maintained north of the gate.

Although motorized public access is not allowed north of the gate, unauthorized access via off-highway vehicles (OHV) has been known to occur. To reduce unauthorized accessibility to the quarry from OHV riders and to provide for hiker safety, MCC would construct a 2,330-foot-long landscape and safety berm along the southern rim. This berm would tie into steeper slopes on the east and southwest to help restrict public access to the South Quarry. The berm would be composed of waste rock and salvaged soil, approximately 6 feet in height with 1.5 Horizontal (H):1 Vertical (V) slopes, and would cover approximately 2.7 acres, including the adjacent setback and access road. The berm would include placement of warning signs and a mixture of large rocks to discourage vehicles trying to ride over it, and would be revegetated with native vegetation.

A 25-foot wide setback with safety berms 4 feet in height with 1H:1V slopes and oversized boulders would be constructed along any other quarry rim areas susceptible to public access. Warning signs would be installed and frequently maintained along all sides of the rim every 250 feet. Signs would measure at least 18 inches by 18 inches with contrasting background lettering and would include the warnings Danger, Open Pit Mine and/or Steep Slope in both English and Spanish.

I-3.3.9 - Wastes/Waste Rock

There are no ponds or tailings-type wastes associated with limestone mining. All usable limestone would be transported to the existing cement plant to be used in the cement manufacturing process.

The production of limestone would generate approximately 10 percent waste rock or approximately 150,000 tons per year of rock unsuitable for cement processing depending on the quality of the limestone. This amount may be higher for Alternative 2 – Partial Implementation than for Alternative 1 – Proposed Action. Minimal amounts of overburden are expected as the limestone is generally exposed across the quarry site. Instead of removing the waste rock from the site and creating separate waste stockpiles outside of the rim of the quarry, the waste rock would be stockpiled within the mining footprint.

The development of internal waste rock stockpiles would reduce the area of disturbance outside of the quarry rim, reduce potential visual impacts of the waste rock piles, and reduce internal slopes, thus aiding in revegetation. Based on 250 days of operations per year, an average of 600 tons of waste rock would be extracted per day, which would require six or seven internal off-road truck trips per day depending on the volume of the haul truck. Note that the amount of waste rock would be highly variable depending on the area being mined. Mining an area with high volumes of waste rock would require more trucks to haul the rock to the stockpiles, but a like number of trucks moving ore to the crusher would be reduced.

I-3.3.10 - Drainage and Erosion Controls

Diverting Undisturbed Area Runoff

Drainage structures would be located and constructed to control flow velocities, provide for stability during their planned operating life, and minimize additional contributions of sediment to runoff flows. Based on area topography and the proposed development plans, it is anticipated that the need for diversions would be limited, with most runoff collecting in active quarry areas.

Disturbed Area Drainage Control

Runoff resulting from direct precipitation on active and unreclaimed disturbed areas and uncontrolled runoff from upgradient undisturbed areas has the potential to cause erosion and resulting sediment loss, transport, and deposition, in both the disturbed and downgradient areas. In active quarry areas, drainage control would generally not be a significant concern because all disturbed area drainage is anticipated to be retained within the basin created by the quarry excavation.

For quarry development areas, roads, stockpile areas, and other disturbed areas, erosion and sediment loss and transport would be controlled through the use of localized drainage and sediment control measures. These measures would include construction of temporary diversion and collection ditches, berms, check dams or catchment basins; placement of erosion control materials, sediment fences, or straw bales; and other appropriate measures individually or in combination.

The objective of all drainage control measures would be to limit flow volumes and velocities to minimize or prevent erosion and to promote settling of suspended solids before the runoff leaves the disturbed area. It is anticipated that drainage control measures would be implemented as needed based on regular inspection of operating areas. If initial evidence of any significant erosion or siltation is observed downgradient of any disturbed area, appropriate and timely control measures would be identified and implemented. These control measures are identified in the previous paragraph.

Stabilization of Disturbed Areas

Disturbed areas would be stabilized to minimize both short- and long-term erosion and sediment loss. In the case of mine roads, short-term stabilization measures include proper road design and construction methods, including minimizing disturbed areas and the use of site-specific drainage and sediment control measures. These measures include, but are not limited to, placement of erosion control materials, sediment fences, or straw bales. Other measures include regular road maintenance and establishment of temporary vegetation where appropriate, and stabilization of cut slopes and fills. Growth media stockpiles would be stabilized through establishment of a temporary vegetative cover if they are designed for storage periods exceeding one year.

Long-term stabilization, or reclamation, would generally involve grading or reshaping disturbed areas, establishing effective drainage, placement of plant growth media, and revegetation. Due to both operational and economic limitations, surface stabilization of quarry areas would be limited to removal of loose rocks from high wall areas, and growth media replacement and revegetation of quarry bench surfaces. Following reclamation, the majority of surface runoff from quarry areas will be retained in the quarry limits where it will either infiltrate or evaporate.

I-3.3.11 - Reclamation

As defined by the California Surface Mining and Reclamation Act (SMARA), reclamation is the combined process of land treatment that minimizes water degradation, air pollution, damage to aquatic or wildlife habitat, flooding, erosion, and other adverse effects from surface mining operations. Specific reclamation activities would occur concurrent with excavations and throughout the life of mining operations, including slope reduction, stockpile management, erosion control, and revegetation. At the conclusion of excavations, five years of active reclamation and revegetation will be implemented followed by revegetation monitoring and remediation until revegetation performance standards are achieved.

The intent of SMARA is to *"maintain an effective and comprehensive surface mining and reclamation policy with regulation of surface mining operations so as to assure that: (a) adverse environmental effects are prevented or minimized and that mined lands are reclaimed to a usable condition which is readily adaptable for alternative uses; (b) the production and conservation of minerals are encouraged, while giving consideration to values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment; and (c) residual hazards to the public health and safety are eliminated."*

The SMARA regulations (14 CCR Section 3700) state the following: *"Reclamation of mined lands shall be implemented in conformance with standards in this Article (Reclamation Standards). The standards shall apply to each surface mining operation to the extent that (1) they* *are consistent with required mitigation identified in conformance with CEQA; and (2) they are consistent with the planned or actual subsequent use or uses of the mining site."*

The site would be reclaimed to meet both the requirements of SMARA and the Forest Service Minerals Regulations (36 CFR 228 Subpart A). The objectives of the Reclamation Plan are to:

- Eliminate or reduce environmental impacts from mining operations;
- Reclaim the site in a usable condition for post-mining end uses that will include open space and wildlife habitat;
- Reshape mining features and revegetated disturbed areas to minimize aesthetic, biological, and hydrologic impacts; and
- Reclaim the site as necessary to eliminate hazards to public health and safety.

Reclamation procedures are incorporated with the mine plans and operations to optimize costs and maintain economic efficiency. With proper reclamation planning, early reclamation measures would be introduced while the quarry is being developed to minimize impacts.

The mining and reclamation plan are for an average rate of 1.3 MTPY of ore. Because market demand for the finished product determines the rate of extraction, it is difficult to precisely forecast future demand for limestone and to make exact long-term predictions for annual production. The time span of the total life of the operation is an estimate that may vary based on actual market conditions.

Another factor that may affect the time frame and phasing of the mining operation, and therefore the reclamation, is the quality of material encountered as mining progresses. The natural deposit at the site is not of uniform quality, so it is necessary to excavate selectively from different locations to achieve a suitable blend of raw materials. Until the ultimate exhaustion of the limestone deposit, reclamation would progress in the manner described below.

The permanent perimeter quarry slopes would be reclaimed from the rim downward as each phase is completed to meet slope design as specified in the ongoing slope stability assessments. Reclamation would consist of sloping excavated cuts and benches as necessary to meet the designed 0.55H:1V overall slope and to round the rims of the final benches. Each bench would be sloped inward toward the vertical wall to capture any precipitation or runoff. The individual benches would be approximately 45 feet high and 25 feet wide unless required to be flatter in specific areas, as determined by geological mapping during ongoing quarry operations.

General slope construction during excavation would depend on the nature of the slope material and would be in accordance with the geotechnical slope reports. During reclamation, the upper slopes that may be visible from Lucerne Valley or areas of the SBNF would be sculpted or roughened to reduce straight lines, create shadowing, and reduce visual impacts. In addition, at approximately every 500 feet, a ramp would be constructed to connect the benches to allow for wildlife movement within the reclaimed quarry.

Surface material salvaged for revegetation would be limited due to the surficial rock conditions on the site. Available material containing the native seed bank would be placed on the benches and would be augmented with additional growth media and mulch in islands to provide future sources of seeds. Revegetation would be accomplished by one or more of the following methods: by reseeding with native plant perennial species including seeds collected at or near the site, from plantings grown in a nursery, from plant cuttings, and from whole plants salvaged from new mining areas.

Reclamation Assurance

A reclamation financial assurance cost estimate, in an amount sufficient to pay for the cost of reclamation, would be prepared. The County and Forest Service would annually review and update, as needed, the cost estimate, as required by SMARA. The reclamation assurance would be reviewed and approved by the California Office of Mine Reclamation (OMR) to fulfill an additional SMARA requirement. MCC currently provides a financial assurance mechanism in the form of a letter of credit payable to the County and OMR for the approved amount to assure reclamation of its existing operations. An additional letter of credit or other acceptable financial assurance mechanism would be provided for the South Quarry, which would include the Forest Service as a payable party.

I-3.3.12 - Revegetation Plan

Revegetation is the establishment of native vegetation on lands that have been disturbed. A Revegetation Plan has been prepared for the project as part of the Plan of Operations (Aspen Environmental Group 2010), which is summarized below.

The Revegetation Plan's objectives are to establish islands of shrubs and grasses on approximately 30 percent of bench and other disturbed areas; plant and seed pinyon pine, canyon live oak, Utah juniper, and salvaged yuccas onto these islands after initial establishment; establish cover on steeper cut slopes through hydroseeding; conduct concurrent revegetation; and monitor and implement remediation activities to achieve success criteria over the life of the plan.

The Revegetation Plan would:

- Establish islands of native shrubs and perennial grasses covering at least 30 percent of the site where access allows;
- Establish young pinyon pine and canyon oak seedlings and salvaged yuccas onto revegetated islands after initial shrub nurse plant establishment;
- Establish some cover of rabbitbrush and curl-leaf mountain mahogany on roll down and overburden sites; and
- Revegetate disturbed sites progressively as mining or related disturbance is completed to maximize the acreage of reclamation completed before completion of mining.

Three listed carbonate plant species, Parish's daisy (*Erigeron parishii*), Cushenbury buckwheat (*Eriogonum ovalifolium*), and Cushenbury puncturebract (formerly oxytheca) (*Acanthoscyphus parishii var. goodmaniana*) have been found at the site of the proposed quarry. Habitat on the site is suitable for several sensitive wildlife species, including Nelson's bighorn sheep. The Revegetation Plan is intended to enhance or restore suitable habitat for listed carbonate-endemic plants and enhance both foraging and cover habitat for Nelson's bighorn sheep. The Revegetation Plan includes measures to salvage yuccas and to include pinyon pines in the revegetation plant palette to comply with the County's Native Plant Protection Policy.

The Revegetation Plan would establish suitable conditions with pioneering species so that the climax species can be become established over time. This two-phased revegetation would be undertaken on selected islands with salvaged topsoil application, seeding with appropriate pioneer shrub species, and monitoring and maintenance activities until the site is favorable for planting and seeding of climax trees and shrubs. Nursery-grown trees and shrubs would be planted at that time. It is expected that the planting islands would trap windblown seeds and attract wildlife to aid in seed dispersal. Those areas with steeper slopes on road cuts would be hydroseeded with appropriate native seeds and mulch.

The Revegetation Plan would implement a series of activities to revegetate portions of the site including the quarry benches. Due to the very rocky existing conditions, only a limited amount of topsoil or growth media is expected to be available for salvage. In addition, the excavated slopes would be solid rock. Revegetation is planned to be undertaken on the 25-foot wide benches in planting islands with available soils, seeds, and salvaged and nursery-grown plants.

Physical reclamation procedures would include re-grading, decompaction, deposition of stockpiled soil, seeding/planting with natives, protecting reclaimed areas from disturbance, irrigating, monitoring, and application of remedial/supplemental measures as needed.

Revegetation Goals
The primary goal for revegetation of the South Quarry is to revegetate approximately 30 percent of bench and other areas disturbed by mining with a self-sustaining vegetative cover of native species, including listed carbonate plant species. The Plan goals include minimizing visual effects; restoring biodiversity and ecological function; enhancing habitat for rare plants and animals; and mitigating losses of protected plants. The revegetation goals would conform to SMARA requirements and the guidelines in the Carbonate Habitat Management Strategy (CHMS). The details regarding the revegetation goals are found in the Revegetation Plan (see DEIS).

Success Criteria
Detailed descriptions of success criteria are included in the Revegetation Plan. The criteria specify minimum shrub cover, diversity and species richness thresholds in revegetated areas, and minimum numbers of young climax species plants so that overstory cover would develop over time. The success criteria are based on the revegetation guidelines and success criteria described in Carbonate Habitat Management Strategy and other vegetation data. Quantitative thresholds for vegetation cover and climax species densities may be adjusted if more precise data are available in the future.

The success criteria below are minimum thresholds for quantitative descriptive characteristics of vegetation on reclamation sites. These characteristics would be evaluated from data collected during monitoring (the monitoring plan is described later in this section). In general, completion would be at the close of a 10-year monitoring period, though revegetation sites may be evaluated for success earlier or later than the 10-year period depending on actual conditions. The success criteria are:

- Successfully revegetated islands (per this criteria) must make up at least 30 percent of the total area on any given revegetation site;
- Any successful or complete revegetation site would have had no management-related manipulation (such as weeding, irrigation, seeding, or planting) for at least three years immediately prior to evaluation for completion.
- Native shrub and tree cover will be at least 50 percent that of predisturbance cover in baseline data (summed native shrub and trees cover is estimated at 74 percent for woodlands). Thus, revegetated woodland cover must reach 37 percent to meet this criterion (summed shrub and tree cover).
- Native tree and shrub species richness will average at least 50 percent of the native tree and shrub species richness in undisturbed reference vegetation (baseline estimated as 10 species per 0.1 acre plot). Thus, revegetated woodlands must have at least 5 native tree and shrub species per 0.1 acre reference plot.
- Seedling and sapling tree density in revegetated woodlands will reach at least 50 percent of overstory tree density in undisturbed reference vegetation (baseline values estimated as 84 trees per acre in pinyon woodlands, mostly pinyon pines). Thus, revegetated woodlands must have at least 42 surviving seeding and sapling trees per acre.
- Non-native species cover will be no more than 15 percent absolute cover and annual monitoring data will show a downward trend documented by a declining regression coefficient.
- None of the plants identified as invasive exotics or invasive non-native plants in Appendix E of the CHMS will be present on the revegetation site as of the date of approval.
- At least 50 percent of the number of yucca plants salvaged during the project will be alive and stable as of the completion date. In the event that 50 percent of the salvaged plants do not survive, alternative sources of yucca can be used to meet this criterion.

Where the criteria for success are achieved, sites should be expected to continue on a trend toward eventual development as native shrubland or woodland, eventually dominated by characteristic native species of surrounding shrublands and woodlands. The details regarding the success criteria are found in the Revegetation Plan (see DEIS).

Test Plots

SMARA requires mine operators to test revegetation strategies on test plots prior to implementing revegetation more widely through the mine areas. Two types of test plots are planned: test plots to experiment with replacement soil composed mostly of crusher fines, and plots to test climax species establishment. The Revegetation Plan may be modified based on the results of these test plots. The details regarding the test plot methodology are found in the Revegetation Plan (see DEIS).

Revegetation Implementation
The details regarding the revegetation implementation are found in the Revegetation Plan (see DEIS); it is summarized below.

Timing
Revegetation tasks would begin on approval of the Plan of Operations. Reclamation and revegetation in any given part of the permit area would commence when mining would no longer affect the area. This would allow vegetation recovery within some parts of the project area before completion of mining.

Plant Salvage
The methods of salvaging plants prior to site clearing would include whole plant excavation, cuttings, and seed collection. The Revegetation Plan (see DEIS) contains a list of the important salvageable plants and preferred methodology for each.

Topsoil (Growth Media) Salvage and Conservation and Site Preparation
Any topsoil on the site would be in the form of smaller eroded limestone gravel that may contain organic material and seeds. This surface material would be salvaged and stored in separately marked stockpiles for future reclamation efforts. To minimize the storage period for salvaged topsoil, vegetation and topsoil would be collected in increments, removed only from the area to be disturbed during the next two years. Because there is a lack of surface material, the soil available for revegetation would be insufficient to cover the entire disturbed area of the mine. Therefore, soil would be used to create islands within the mined area that would be the focus of the initial revegetation efforts. The site would be graded to minimize erosion and maximize rainwater holding capacity. Compacted areas would be ripped to depth of 1 foot if feasible due to the rock material to relieve compaction and to create an uneven surface. This would aid in collecting windborne seeds and moisture and create more favorable microhabitats. The details regarding the soil salvage, conservation, and site preparation are found in the Revegetation Plan (See DEIS).

Irrigation
Temporary irrigation systems would be installed at each revegetation site. Revegetation sites would be irrigated as needed to ensure native plant establishment.

Seed Application and Species Mix
A seed mix would be developed for the site based on seed mixes used previously for nearby quarries. The seed mix would be adapted based on seeding and test plot experiments. The details regarding the seeding are found in the Revegetation Plan (See DEIS).

Out-Planting
Salvaged and container-grown plants would be placed in revegetation areas by hand or tree spade and identified for data keeping. Elevation and site physical characteristics would determine which species are suitable for the site. Plant spacing and arrangement would be determined by

measurements taken in reference areas. Herbivore exclusion, weed control, and fungal inoculum may be used as necessary.

Monitoring

Monitoring is intended to (1) verify correct implementation of the revegetation plan; (2) evaluate the degree of success in terms of the specified objectives; and (3) determine if maintenance or remediation are needed. Specific monitoring methods are detailed in the Revegetation Plan (See DEIS) and summarized here. Beginning one year after initial seeding at any site (test plots, pre-closure revegetation areas, and final closure), and continuing annually as needed until success criteria are achieved, a series of quadrats would be evaluated to estimate cover, diversity and density of each species. Monitoring would occur for at least five years, or until success criteria are achieved. Each year, recommendations would be made (if necessary) for remediation, which could include weeding, changes in irrigation, re-seeding or re-planting, etc. In the final year of monitoring, data would be compared to the baseline data to determine if the success criteria have been met.

Reporting

Annual monitoring reports describing revegetation progress and making recommendations, as needed, for appropriate reseeding, maintenance, or other action would be prepared. These reports would be provided to the Forest Service and the County.

I-3.3.13 - Post-Reclamation Uses

The planned land use subsequent to mining, reclamation, and revegetation is open space and wildlife habitat managed by the Forest Service. The quarry excavation and reclamation would result in a series of revegetated benches 25 feet wide and 45 feet high. Portions of the quarry would be partially backfilled, aiding in the reclamation and revegetation of these quarry slopes.

I-3.3.14 - Avoidance/Minimization and Environmental Protection Measures

Both NEPA and CEQA encourage project planning and approvals to incorporate measures to mitigate the adverse environmental effects of a project. The NEPA and CEQA definitions of mitigation are very similar (see 40 CFR Section 1508.20 and 14 CCR Section 15370). Mitigation can take many forms, including avoiding the effects to a resource, minimizing impacts to a resource, or compensating for effects to a resource. Where the project applicant incorporates such measures into the project as proposed (or other action alternatives under consideration), these measure are often referred to as project design features. The SBNF Land Management Plan includes standard design features that provide guidance for designing actions and activities during Project planning and are intended to be incorporated into proposed projects as applicable. Early incorporation of and commitment to project design features is encouraged because it facilitates sound and collaborative project development, and efficient environmental review.

CEQA also requires a lead agency to consider project impacts with and without proposed mitigation measures to evaluate whether other measures might be more effective than the measures proposed. Thus, some of the project design features incorporated into the Project action alternatives are also classified as mitigation measures for purposes of analysis under CEQA. For purposes of this CEQA classification, the EIR/EIS uses the following distinctions:

For CEQA purposes, project design features are measures that are integrated into the design of the project or project components, including but not limited to selection of building materials, selection of equipment to be installed, location, and site layout. These choices are integral to and usually cannot be physically separated from project implementation. Often, these measures are completed upon completion of project construction, and cannot subsequently be undone. For CEQA purposes, mitigation measures are work practices affecting the manner in which the project would be carried out; other on-site or off-site actions to avoid, reduce or compensate for the significant adverse effects of a project; measures requiring continuous commitment to implementation over the life of the project; and/or measures that will be taken at a future time remote from project approval and construction.

Design features for purposes of NEPA are listed below. The majority of these measures are also considered mitigation measures for purposes of CEQA and are identified and listed again in the relevant environmental resources subsections of Chapter 3 of the EIS.

Air Quality

AIR-1: Within three years after the commencement of mining in the South Quarry, or whenever the total quarry haul truck operating HP-hrs/year reach 6 million per year, whichever is later, the applicant shall:

(1) Add to its fleet no fewer than five quarry haul trucks meeting Tier 4 standards; and
(2) Retire all remaining Tier 0 quarry haul trucks.
"Tier 0" and "Tier 4" refer to those terms as defined by the CARB off-road diesel rule, CCR Title 13 Sections 2449-2449.3. For the purposes of this condition, "mining" shall not include the construction of the South Quarry Road.

AIR-2: Every day of active mining, the Project proponent shall apply water or chemical dust suppressants to unpaved roads and disturbed mine areas that are in active use on that day. For days when water is used rather than chemical dust suppressants, water shall be applied no less than once every 1.25 hours at a rate of no less than 0.11 gallons per square yard. Alternatively, to control dust emissions from unpaved roads and disturbed mine areas in active use, the Project proponent shall apply chemical dust suppressants in accordance with manufacturer specifications.

Biological Resources

General Biological Resources

GEN-1: MCC shall minimize disturbance or hazards to surrounding vegetation, habitat, and wildlife, such as toxic substances, dust, noise, and lighting, as follows:

a. New lighting shall be established at the minimum necessary to meet safety requirements, and shall be shielded to avoid lighting the surrounding habitat and the night sky;

b. Except as necessary to survey or maintain the safety of the mine site, the Project's disturbance footprint shall be limited to areas designated for mining and related activities;
c. Equipment staging areas and other construction or related habitat disturbance shall be limited to areas within the new or existing quarry footprint(s) and shall be designed and operated to the goal of minimizing impacts to adjacent habitat and sensitive biological resources;
d. Any soil bonding or wetting agents to be used for dust control on unpaved surfaces shall be non-toxic to wildlife and plants and non-attractants for wildlife. If wetting or soil bonding agents appear to be attracting wildlife to the roadways (*e.g.*, by pooling or creating mineral licks), the mining operator will work with the Forest Service to develop remedies;
e. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for spill of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. Spills will be cleaned up as quickly as possible;
f. All trash and food-related waste shall be secured in self-closing animal-proof containers and removed daily from the site;
g. Only authorized agency or security personnel (including the California Department of Fish and Wildlife [CDFW], USFWS, and Forest Service) shall bring firearms or weapons to the site.
h. No recreational target shooting will occur on Forest Service lands within the permit area.
i. Standard erosion control measures commensurate with those typically required in an Industrial Stormwater Pollution Prevention Plan for a limestone surface mining operation shall be implemented for all phases of construction and operation where sediment run-off from exposed slopes may enter native soils or habitat or jurisdictional streambeds;
j. Disturbed soils and roads within the project site shall be stabilized to reduce erosion potential; and
k. For drainages that cannot be avoided, MCC shall obtain a Streambed Alteration Agreement in compliance with Section 1602 of the California Fish and Game Code and an application for waste discharge requirements (WDRs) or a waiver of WDRs in compliance with Section 13260 of the California Water Code, as applicable.

GEN-2: *Employee Training:* MCC shall conduct wildlife/plant awareness programs for employees (including new employee orientation and annual refresher trainings). The program will address bighorn sheep, desert tortoise, golden eagles, rare reptiles/amphibians, other animals of the area, and rare plants. This will include the importance of avoiding harassment/disturbance, adherence to speed limits, adherence to defined project boundaries, reporting guidelines, discouraging ravens and other scavengers, etc. Specific items as described in the employee education component of the North Slope Bighorn Conservation Strategy, Raptor

Conservation Strategy, and the desert tortoise design features below will be included in the training. MCC will solicit input from CDFW and USFS in developing the training program.

GEN-3: *Fencing:* MCC shall identify likely or potential wildlife movement routes across or around the site and then avoid or minimize potential impediments to wildlife movement by fencing only those areas where access must be restricted for safety or security reasons.

In the event fencing is necessary during construction and/or extraction activities, project personnel shall ensure that any such fence meets existing specifications that have been developed to preclude accidental entanglement of bighorn sheep, deer, and other animals. Biologists from the USFS and CDFW will be consulted for appropriate fence guidelines. Where this Design Feature conflicts with Mine Safety and Health Administration guidelines, attempts will be made to meet the intention of both. Where that is not possible, Mine Safety and Health Administration guidelines will be applied.

GEN-4: *Reclamation:* Reclamation of the South Quarry shall include the creation of angled pathways and interlacing reclaimed benches in order to facilitate the movement of bighorn sheep and other wildlife through the quarries. These benches will be created as the mining sequence is completed and prior to restoration.

GEN-5: *Haul Road Crossings:* The final design of the haul road shall ensure movement pathways for wildlife, including bighorn sheep and deer, between the existing East and West Pits and the proposed South Quarry. This will include terracing or stair-stepping or micro-benches of steep and vertical cuts, especially at strategic crossing locations, as recommended by the CDFW and Forest Service biologists. This will not occur where slope and rock qualities will threaten haul road safety and stability.

GEN-6: *Pets and Domestic Animals:* MCC employees shall not bring pets or domestic animals to the work site. MCC will not authorize the housing or grazing of domestic animals on the project site.

GEN-7: *Feeding Animals:* Feeding of animals will be prohibited to discourage the spread of non-native birds, to discourage the spread of disease and pathogens, etc.

GEN-8: Mine operators will maintain facilities and grounds in a manner that minimizes any potential impacts to hunting or scavenging raptors and other predators/scavengers (e.g., minimize storage of equipment near active quarries that may attract prey, remove trash/garbage daily, etc.). All trash and food-related waste shall be secured in self-closing animal-proof containers and removed daily from the site. MCC shall avoid practices that attract/enhance prey populations and opportunities for raptor hunting or scavenging near active quarries, haul roads, and processing areas. This would also help discourage the spread of non-native birds and discourage the spread of disease and pathogens, etc.

GEN-9: To reduce vehicle collision risk to raptors and other scavengers, intact animal carcasses (with the exception of bighorn sheep and deer) will be removed immediately from mine roads and mining areas. Carcasses will be removed far enough away from roads and active mining areas that scavengers would not be in danger of vehicle collision or other mining-related hazards. Bighorn sheep and deer carcasses shall be covered with a tarp and left in place until the CDFW or Forest Service biologist is notified and provides direction. As much as is feasible, care will be taken to avoid disturbing the area around the carcass to preserve predator tracks, parasites, etc.

GEN-10: *Disturbance Avoidance:* MCC employees and contractors will not use MCC roads in order to access National Forest lands for recreation or hunting. Access for personal use will be through National Forest system roads and trails that are open to the general public.

GEN-11: *Blasting:* Prior to blasting activities within the project area, mine employees shall conduct a visual inspection (both naked eye and with binoculars) for a minimum of five minutes to ascertain the presence or absence of bighorn sheep, deer, golden eagles, peregrine falcons, or other large animals. If animals are located within the blast area, mine employees shall wait until animals have moved from the area or may use sound, as from shouts, vehicle, or air horns, to move them out of the blast area prior to detonation of any blasting materials.

GEN-12: *Biomass Disposal:* All woody vegetation to be cleared from the surface (quarry site, haul road, etc.) will be disposed of as follows:

a. Small size vegetation and organic material (stems less than 6 inches in diameter) will be applied to inactive quarry benches, overburden piles, and on sidecast areas along roads and quarries. Material may be chipped and/or stockpiled prior to use. Stockpiling and use should be done as part of phased reclamation to minimize stockpile duration and associated weed risk.
b. All wood greater than 6 inches in diameter will be either reduced to less than 6 inches and applied as described in GEN-12a or removed from the site and decked by MCC at a location to be determined by the Forest Service. The decked wood will be sold to the public by the Forest Service.

GEN-13: The BLM’s withdrawal of approximately 540.4 acres of land from mineral entry and MCC’s quit-claim of specified unpatented mining claims (discussed in EIR/EIS Section 1.6 and below under Carbonate Plants) is also designed to mitigate for the loss of pinyon-juniper woodland and desert transition habitats as wildlife habitat.

GEN-14: The current regular groundwater monitoring program within the general MCC Cushenbury operating area will continue through the life of the project (South Quarry Operating Plan and Reclamation Plan). MCC will continue to submit a report regarding the monitoring to the Forest Service and the County at least annually. If this regular report indicates a change in groundwater levels, use, or recharge rates that may pose a substantial threat to surface water and wetland vegetation at Cushenbury Springs, or if unusual vegetation mortality is observed at the wetlands, a pump test will be performed for all wells supplying the Cushenbury Cement Plant and associated monitoring wells to determine if there has been a change in the groundwater basin between the subject wells and Cushenbury Springs. If there are future adverse changes to water quantity, seasonal duration of surface flow, or extent of wetland vegetation related to the project, MCC will respond to minimize these effects. Future minimization actions may include, but are not limited to, water conservation programs and shifts in the usage of various available water sources.

Bighorn Sheep

BHS-1: *Foraging Habitat:* When trucks spray water on haul roads to control fugitive dust, some overspray occurs on road berms for a short distance beyond. Those watered areas sometimes support vegetation that bighorn sheep consume. MCC will not make an effort to eliminate the overspray. The Revegetation Plan will focus on using native species that will help enhance bighorn sheep habitat.

BHS-2: *Water Developments:* In the event that bighorn sheep abandon the use of one or more water developments as a result of disturbance associated with the development of the South Quarry, MCC shall create additional water development(s) after consulting with appropriate agency personnel (Forest Service and CDFW) to select location(s) for additional water development(s). MCC shall ensure that any existing water development(s), as well as any created as part of the Design Features/Mitigation Measures, are maintained in good operating condition for the duration of the project.

BHS-3: *Reporting of Mortality:* MCC shall immediately report any bighorn sheep mortalities, whatever the cause, to the CDFW and Forest Service as soon as possible after the observation. The bighorn sheep carcass shall be covered and left in place until the CDFW or Forest Service biologist can examine it and determine the proper disposal method. In the event that mountain lion predation is occurring at levels that compromise the viability of the population, MCC shall cooperate fully by ensuring access to MCC properties for Forest Service and/or CDFW personnel for the purpose of determining the predator involved or, in the event that an individual predator has been identified, to remove the predator.

BHS-4: *Monitoring/Adaptive Management:* MCC shall monitor bighorn sheep use in and near their operations and at water sources in and adjacent to their operations. Monitoring shall consist of installation and maintenance of cameras stationed at CDFW- and Forest Service-identified water sources and recording of data from cameras in a database developed by CDFW, as well as collection of observations by MCC employees. The North Slope Bighorn Sheep Management Strategy may identify other monitoring methodologies to be developed over time. An annual monitoring report will be provided to the Forest Service and CDFW.

BHS-5: *Highway Crossing:* Upon obtaining the necessary approvals from Caltrans, MCC shall fund, purchase, and install highway warning signs on State Route 18. MCC shall use best efforts to obtain the Caltrans approvals necessary to install the highway warning signs on State Route 18. The intent of the signs is to avoid vehicle-strike mortality or "take" of bighorn sheep crossing the highway.

BHS-6: *Conservation Strategy:* A Draft North Slope Bighorn Sheep Conservation Strategy will be developed by CDFW and the Forest Service. The management plan will cover the North Slope of the San Bernardino Mountains from White Mountain to Terrace Springs (see Figure 3.3-1 in Section 3.3). The management plan shall include guidelines/thresholds for population status that would trigger augmentation of the herd; a strategy/guidelines for developing water sources to respond to drought years; and herd monitoring methodology and objectives. MCC will be a partner in the North Slope Bighorn Conservation Strategy and will help support the long-term management goals of maintaining a sustainable population of bighorn sheep on the North Slope, as described in BHS-7.

BHS-7: *Future Conservation and Management:* Within one year after approval of the South Quarry Plan of Operations and the Reclamation Plan by the County and the Forest Service, MCC shall begin contributing to a non-wasting endowment, designated as the North Slope Bighorn Sheep Conservation Fund (Fund). The amount of MCC's contributions shall be determined by CDFW in coordination with MCC prior to final approval of the South Quarry project. The Fund shall be administered by the National Fish and Wildlife Foundation as a sub-account of the California Department of Fish and [Game] Master Mitigation Account. This sub-account shall be managed as a long-term endowment dedicated to activities that aid in conservation and monitoring of bighorn sheep both within the Cushenbury herd and on proximate habitats, occupied or unoccupied, including the Bighorn Mountains and San Gorgonio Wilderness where immigration and emigration may connect groups into a functional metapopulation.

BHS-8: *Employee Awareness Training:* MCC will consult with the CDFW to incorporate bighorn sheep education and awareness into their training for employees and contractors. Training will include how to minimize impacts to bighorn sheep and include guidelines for driving, operation of heavy equipment, general quarry operation, and blasting in bighorn sheep habitat.

Nesting Birds

BIRD-1: *Migratory Bird Treaty Act Compliance:* During the development of the quarry, haul roads, and associated facilities, all initial ground clearing (vegetation removal, grading, etc.) shall occur outside the avian breeding season (i.e., do not

remove potential nesting habitat from February 1 through August 31, or appropriate dates based on on-site nesting phenology determined by a qualified biologist).
For initial ground clearing (vegetation removal, grading, etc.) that is not feasible to be conducted outside the nesting season, surveys will be conducted to locate active nests within 10 days of the initiation of ground-disturbing activities. Any active nest sites that are located will be buffered and no work will be conducted within those buffered areas until the nests are no longer active. The buffer distances would be determined by a qualified biologist referencing current species-specific standards, and taking into account the conservation status of the species (e.g., larger buffers may be appropriate for Sensitive species, etc.), species-specific biology, and the nature of the planned disturbance (e.g., driving past a nest versus extensive grading).

BIRD-2: Nesting bird surveys for passerine birds, as outlined in BIRD-1, shall be conducted by a qualified biologist experienced and familiar with robust nest-locating techniques or comparable to those described by Martin and Guepel (1993). Surveys shall be conducted in accordance with the following guidelines:

a. Surveys shall cover all potential nesting habitat to be disturbed and a 500 foot buffer surrounding areas to be disturbed;

b. At least two pre-construction surveys, separated by a minimum 10 day interval, shall be completed prior to initial grading or grubbing activity; the later survey shall be completed no more than 10 days preceding initiation of initial grading or grubbing activity. Additional follow-up surveys shall be required if periods of construction inactivity exceed one week in any given area, in interval during which birds may establish a nesting territory and initiate egg laying and incubation.

Conservation of Special Status Raptors

RAPTOR-1 A Raptor Conservation Strategy (RCS) will be developed in coordination with the Forest Service, USFWS, and CDFW. MCC shall provide input to the development/finalization of the RCS and shall follow the guidelines put forth in the effort. The RCS will be tailored for activities associated with mining activities and effects. Upon approval of the Plan of Operations and the Reclamation Plan by the County and the Forest Service, MCC will participate in the implementation of the RCS by contributing to specified survey and monitoring efforts, and by following applicable operational guidelines.

The RCS will cover the North Slope of the San Bernardino Mountains from White Mountain to Terrace Springs, and will address special status raptors (currently, golden eagle, California condor, and peregrine falcons). The RCS may be updated to include other raptors in the future if concerns develop over their local population status.

The RCS will be a dynamic document and will be updated as new data and scientific understanding of the aforementioned species become available. It will include monitoring and information gathering, and measures to avoid, minimize, rectify, and reduce (or eliminate over time) effects to raptors nesting on the North Slope. The intent is to use systematic monitoring of raptor nesting chronology and observed behavior to develop site- and activity-specific measures to ensure successful nesting and provide for adaptive management opportunities.

RAPTOR-2: If an occupied nest for a federally-protected species, a California-listed species, or a California fully-protected species is found within 1.5 miles of an active quarry operation, the Forest Service will determine if additional monitoring is needed and undertake the appropriate coordination/consultation with the appropriate agencies. If required, the appropriate permit(s) will be requested from USFWS or CDFW, under the applicable law (federal or state Endangered Species Act, Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act). MCC will cooperate in such efforts and implement the resulting measures designed to minimize or avoid "take".

RAPTOR-3: If monitoring detects that blasting or other mine activities are resulting in disturbance of nesting raptors that could lead to mortality or nest abandonment, the Forest Service, MCC, and USFWS and CDFW, as appropriate, will evaluate the feasibility of implementing measures to avoid or reduce effects. The RCS will contain potential methods, such as establishment of buffers and parameters for work stoppage, for reducing or avoiding effects.

Desert Tortoise

DETO-1: MCC will consult with the Forest Service to incorporate desert tortoise education and awareness into their training for employees, customers, and contractors. This will include how to minimize impacts to desert tortoise and their habitats. Information about penalties will also be included. These briefings will include guidelines about driving in desert tortoise habitat, handling prohibitions, etc. MCC will solicit input from the Forest Service to develop other protective measures if a need is identified through reporting from Design Feature DETO-2 or other CDFW or Forest Service requirements.

DETO-2: Any sightings of desert tortoises, including dead tortoises, in the Project Area must be reported to the Forest Service biologist. The report will include photos if possible, location, date, time, cause of death (if obvious), and any other pertinent information.

Non-Native Species – Plants, Animals, and Pathogens

NNS-1: MCC shall monitor the occurrence of non-native invasive plants in the Project Area by visual inspection. The goal is to prevent non-native invasive plants from becoming established and depositing seeds in areas to be re-vegetated at a later date. If inspections reveal that weeds are becoming established in the Project Area, then removal would be initiated by MCC in coordination with the Forest

Service botanist. Inspections shall be made in conjunction with revegetation monitoring.

NNS-2: To reduce the risk of introducing non-native invasive plants, insects, and pathogens from off-site, all heavy mining equipment (e.g., drill rigs, haul trucks, loaders) must be thoroughly washed of all soil and vegetation debris prior to being brought into the company's operating area (i.e., the MCC Cushenbury Cement Plant and associated local quarries).

NNS-3: If any new non-native invasive plants, animals, or pathogens are identified as having a potential for establishment in the Project Area, MCC will consult with the Forest Service to develop measures for detection, control, and eradication as necessary. MCC shall be responsible for funding detection, control, and eradication efforts in the Project Area.

NNS-4: MCC personnel will be trained on the need to report sightings of feral or domestic sheep, goats, dogs, or cats on, in, and near the Project Area to the Forest Service and CDFW within two hours of the observation. In the event of domestic or feral animals being found, MCC shall employ a trained trapper to catch and remove the animals following County regulations. CDFW may assist in capture/removal efforts, if available.

Salvage and Recovery of Plants

PLANT-1: MCC shall inventory all accessible yucca species (Joshua trees, Mojave yucca, and chaparral yucca) within the proposed project disturbance areas, and identify yuccas (all species) likely to survive transplantation.

Prior to grading, accessible yucca plants suitable for translocation shall be transported to off-site reclamation or restoration areas. The suitability for salvage and transplantation shall be determined by a qualified botanist or horticulturalist, based on their size, stability, and location. A qualified horticulturalist shall direct the removal, transport, and replanting, and follow-up maintenance including irrigation and physical support as needed until transplantation is successful. Relocation sites shall be within the same general area. Suitable reclamation/restoration sites will be identified in coordination with the Forest Service botanist.

PLANT-2: MCC will solicit input from the Forest Service and will provide for salvage of rare native plants within the Project Area to be propagated and/or transplanted to protected habitat reserve areas at the discretio14n of the Forest Service.

Carbonate Endemic Plant Species

CARB-1: As specified under the CHMS, and within the Project Area, MCC or the Forest Service may at their discretion salvage carbonate endemic plant species (whole plants, cuttings, or seed), and propagules of associated species, to aid in carbonate habitat revegetation efforts on or off-site.

CARB-2: MCC shall, upon BLM's withdrawal of approximately 540.4 acres of land from mineral entry, quit-claim specified unpatented mining claims held within the SBNF, and convey specified patented lands, which have been verified by the Forest Service to contain occupied endangered species habitat on an approximately 3 to 1 ratio (species-acres and CHMS conservation value) as mitigation for impacts of the South Quarry project on Cushenbury buckwheat (*Eriogonum ovalifolium var. vineum*), Cushenbury puncturebract (formerly oxytheca) (*Acanthoscyphus parishii var. goodmaniana*), and Parish's daisy (*Erigeron parishii*) pursuant to the guidance provided by the CHMS as follows: MCC shall determine total project disturbance acreage, to include the South Quarry and haul road as well as rock and debris roll-down areas below them. MCC shall evaluate the Conservation Value of the acreage proposed for disturbance according to the CHMS.

Geology and Soils

GEO-1: Control of surface drainage, erosion, and sedimentation of the proposed haul road and quarry operations will involve the following primary components currently being implemented for existing operations:

a. Limiting surface disturbance to the minimum area required for active operations.
b. Diverting runoff, where operationally feasible, such that runoff from undisturbed areas does not enter the area of active operations.
c. Using ditches, sediment basins, and localized control and maintenance measures to intercept and control runoff along the haul road.
d. Stabilizing disturbance areas through re-grading, revegetation, and other restoration practices.

GEO-2: A geotechnical program of ongoing field mapping, drilling, and geophysical surveys and laboratory testing will be established and implemented as the quarry is excavated. This type of site investigation during the mining operation will provide information for detailed slope stability assessment on a continual basis and stabilization of slopes in areas where poor rock and/or adverse geologic structures are present. An annual report discussing the geotechnical program will be prepared for the Forest Service and the County.

GEO - 3**:** Areas mapped as underlain by landslides shall be further evaluated. Should landslides be found present within the quarry, appropriate mitigating engineering measures shall be employed to stabilize cuts into quarry walls. Such measures may include removal of landslide debris, construction of buttresses, or other stabilization measures. Monitoring of cut slopes by an Engineering Geologist shall also be performed during excavation of the quarry so that further recommendations for slope stabilization can be provided as appropriate.

GEO-4**:** There is a high potential for ground shaking at the Project during a nearby seismic event, and this would include the proposed quarry and haul road. Engineering measures designed by a geotechnical engineer to mitigate the effects of ground shaking shall be included in slope design and construction.

Scenery

SCEN-1: The haul road shall be designed with minimal fill slopes to reduce the contrast of the lighter-colored fill on the natural slopes and boulder roll-down.

SCEN-2: Approved color-staining product(s) shall be used to darken the access road cuts and visible southern quarry slopes where shown to be successful. Prior to commencement of construction of the access road, MCC shall submit information to the Forest Service summarizing available staining products and whether they are appropriate for application to the South Quarry road cuts and visible quarry slopes, considering color, effectiveness, and durability. If appropriate products are not available at the commencement of construction, MCC shall update the information no less than once every five years thereafter until an appropriate product is identified. MCC may use an alternative method to reduce visual contrast as approved by the Forest Supervisor.

SCEN-3: Adequate erosion control features shall be designed along the haul road to limit erosion downslope.

SCEN-4: Onsite structures shall be painted a color with low contrast and reflectivity.

SCEN-5: A berm shall be constructed along the south rim of the quarry and planted with native vegetation.

SCEN-6: The footprint of the quarry shall be designed to minimize impacts to any streams and riparian habitat to the extent feasible.

SCEN-7: Surface disturbances shall be limited to those areas identified in the Mine Reclamation Plan. Disturbances outside of these areas shall be prohibited.

SCEN-8: The quarry shall be designed to limit views of the quarry site from the east and southeast.

SCEN-9: Upper slopes that may be visible from Lucerne Valley shall be cut or roughened to reduce straight lines and visual impacts as benches are completed (not applicable to Alternative 2 – Partial Implementation).

SCEN-10: The quarry shall be designed to limit views of the lower half of the quarry by not removing the north slope through approximately Phase 3, allowing reclamation and revegetation (including tree growth) to occur to reduce contrast (not applicable to Alternative 2 – Partial Implementation).

SCEN-11: A 20- to 25-foot high natural perimeter berm (half of a vertical bench height) shall be left in place on the outside ridge of each excavated bench until the interior area of the next lower excavation level is completed to limit views of active mining and equipment from Lucerne Valley (not applicable to Alternative 2 – Partial Implementation).

SCEN-12: Waste rock shall be deposited into waste rock stockpiles within the quarry footprint to reduce the area of disturbance and visual impact outside the quarry rim and to reduce internal slopes and aid in revegetation.

SCEN-13: Reclamation and revegetation shall be implemented per the approved Reclamation Plan on completed benches concurrent with mining.

SCEN-14: MDAQMD dust controls shall be implemented to reduce visible dust plumes.

I-3.4 - Alternative 1 – South Quarry Development (Proposed Action)

Elements common to all alternatives are described in Part I-3.3. This section describes elements specific to Alternative 1 – Proposed Action, which is the project proposed in the Plan of Operations. **Figure 5** is an overview of Alternative 1 – Proposed Action.

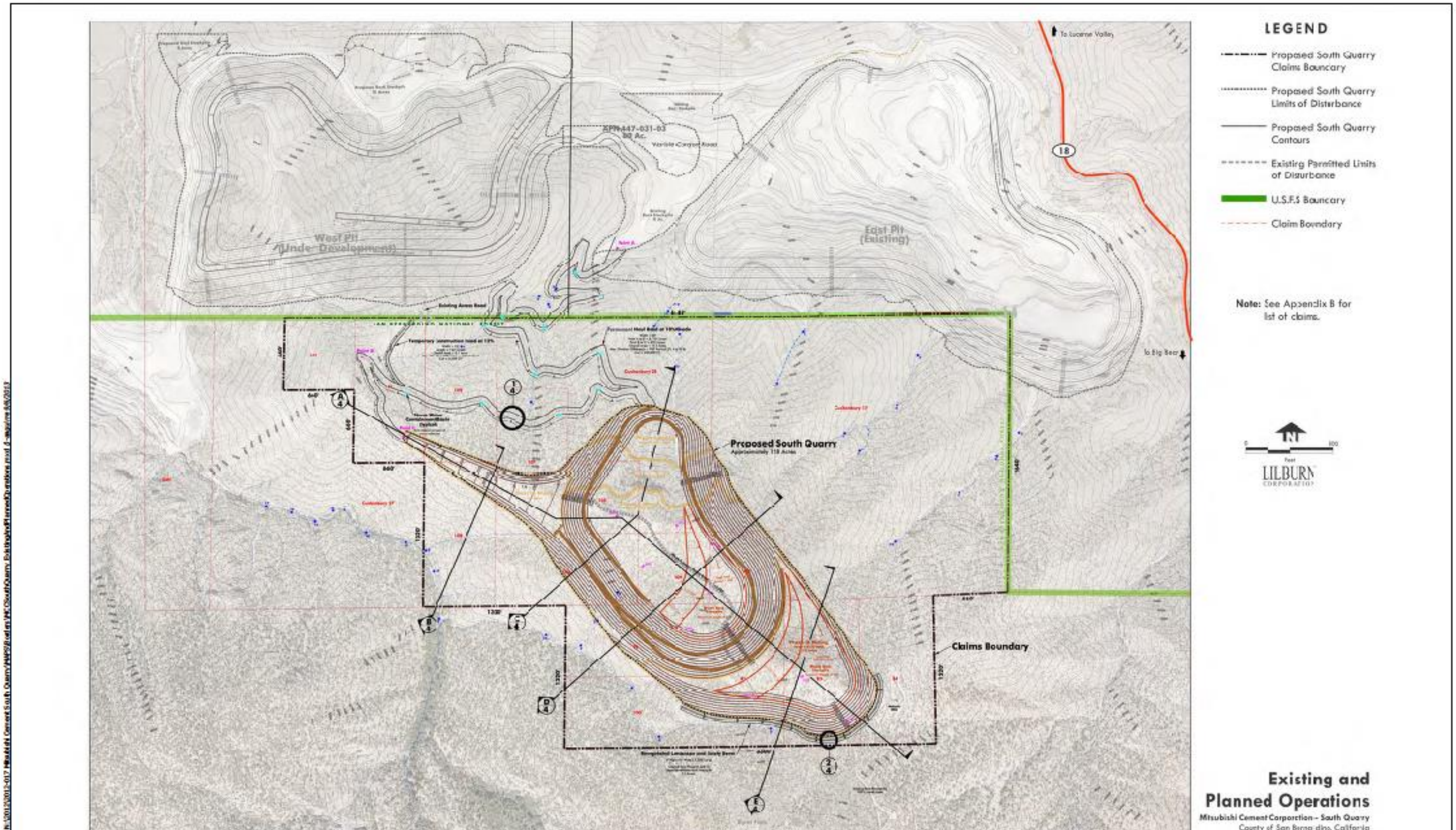
I-3.4.1 - Quarry Phasing

The excavation plan for the South Quarry is divided into four phases based on operational, engineering, and environmental concerns (**Figure 6** and **Figure 7**). **Figure 8** shows the phasing in a cross section from the northwest to the southeast portions of the quarry. **Table 4** summarizes relevant data by mining phase.

Table 4. Planned Quarry Phasing and Production. Alternative 1 (Proposed Action)

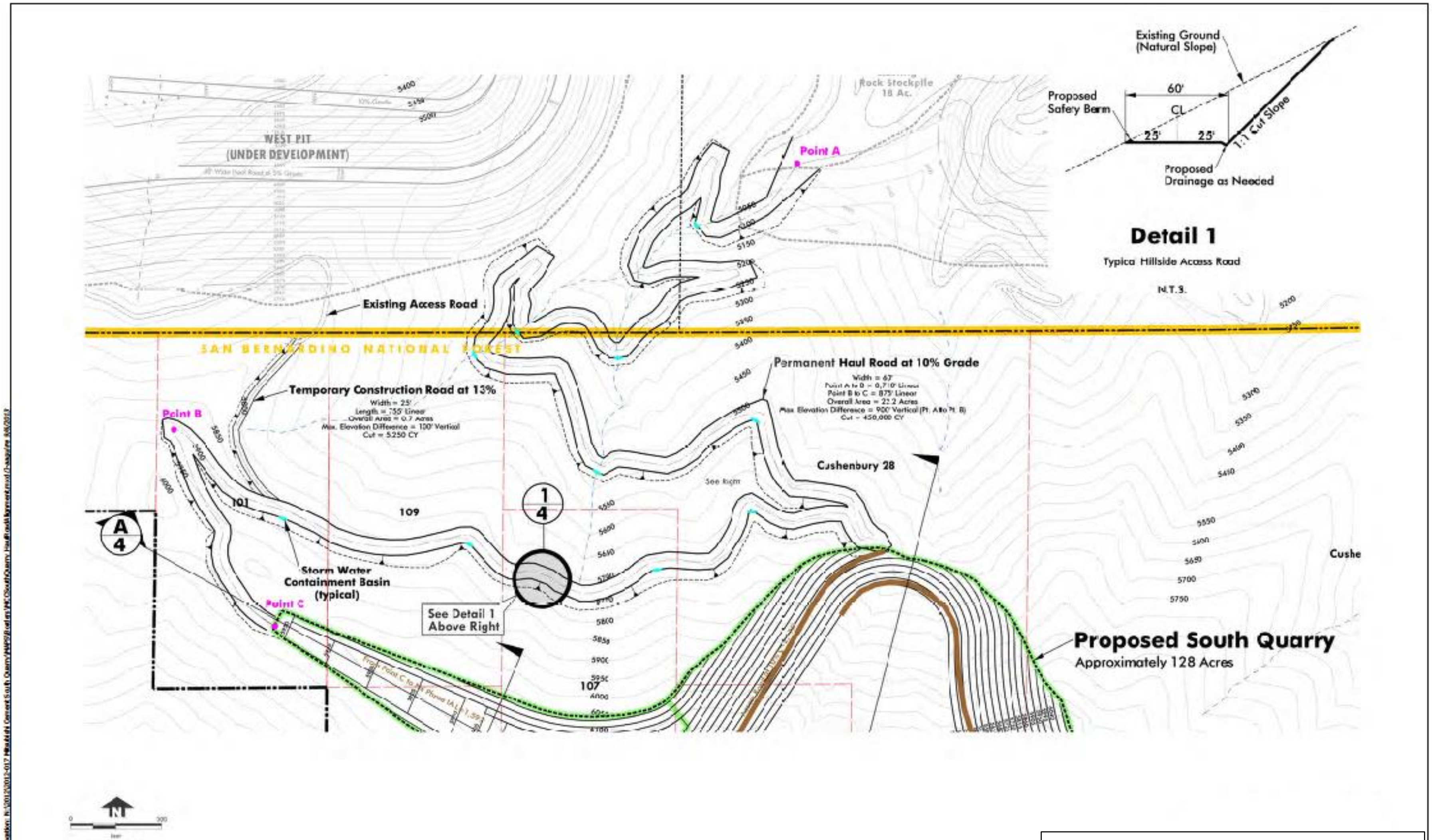
Phase	Area[1] (acres)	Cumulative Area[1] (acres)	Total Material Excavated (millions of tons)[2,3,4]	Ore Reserves (millions of tons)[2,3]	Waste Rock (millions of tons)[2,3]	Max. Depth (feet amsl)	Years of Operation[5]
1A	11	11	5.1	4.5	0.5	5,860[6]	3.5
1B	32	43	32.1	28.8	3.2	6,130[6]	22.0
2	65	108	21.0	18.8	2.2	6,220[6]	14.5
3	12[5]	120	58.0	52.0	6.0	5,905	40
4	8[5]	128	58.0	52.0	6.0	5,365	40
Total	**128**	**128**	**174.0**	**156.0**	**18.0**	**5,365**	**120**

Notes:
[1]Area has been rounded to the nearest whole acre. Totals may be slightly different due to rounding.
[2]Millions of tons rounded to the nearest tenth.
[3] Waste rock estimated at 0.15 million tons per year or approximately 10 percent, which would vary depending on area being excavated.
[4]Years of operation based on average ore production of 1.3 million tons per year.
[5] Phases 3 and 4 areas are generally deeper excavations within the previously disturbed Phase 2 area, except for the north slope area.
[6] Phases 1A, 1B and 2 are distinct separate areas with varied excavation depths.



Map Date: 9/6/2013
Source: Lilburn Corporation

Figure 5. Existing and Planned Operations



Map Date: 9/6/2013
Source: Lilburn Corporation

Figure 6. Haul Road Alignment

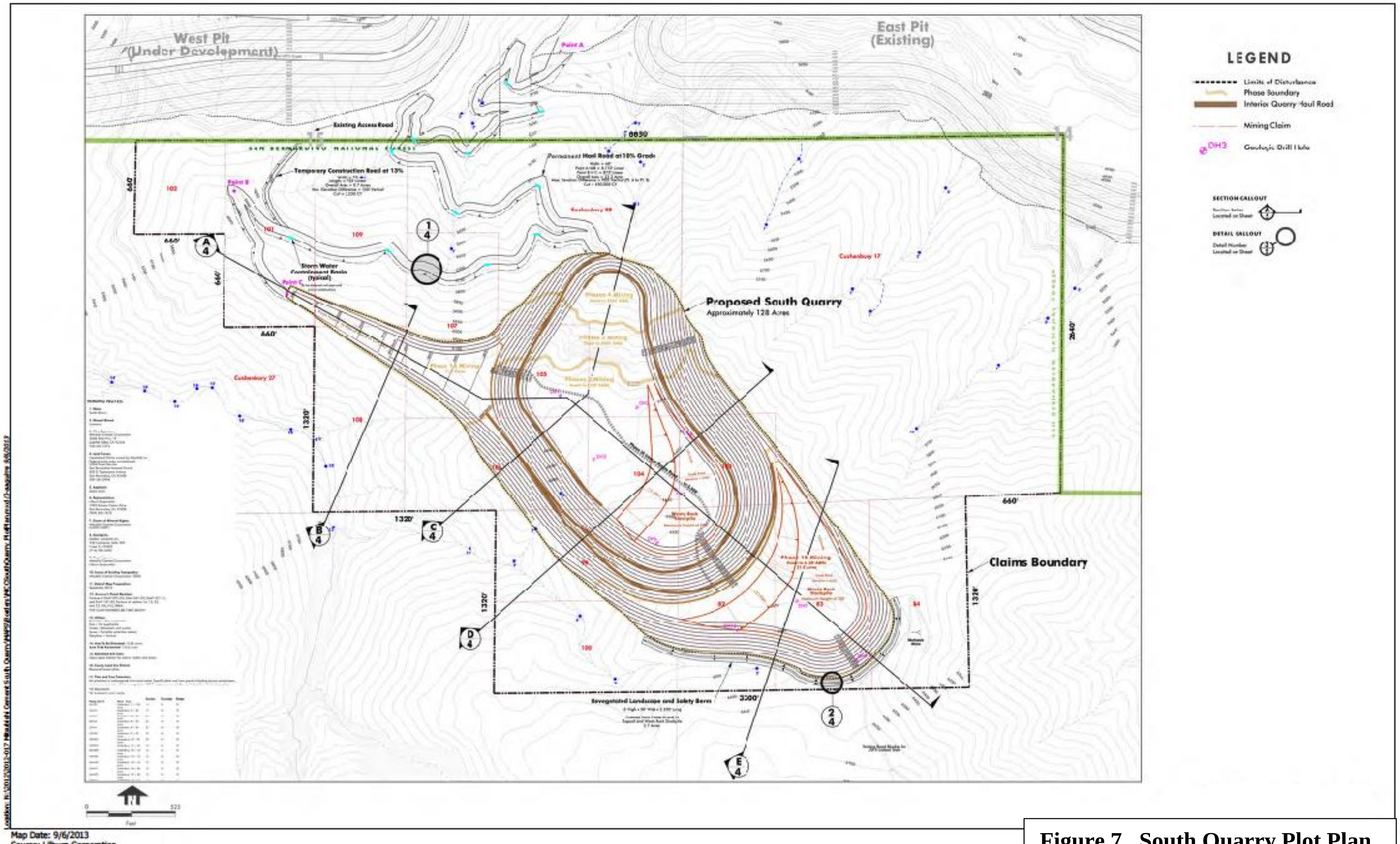
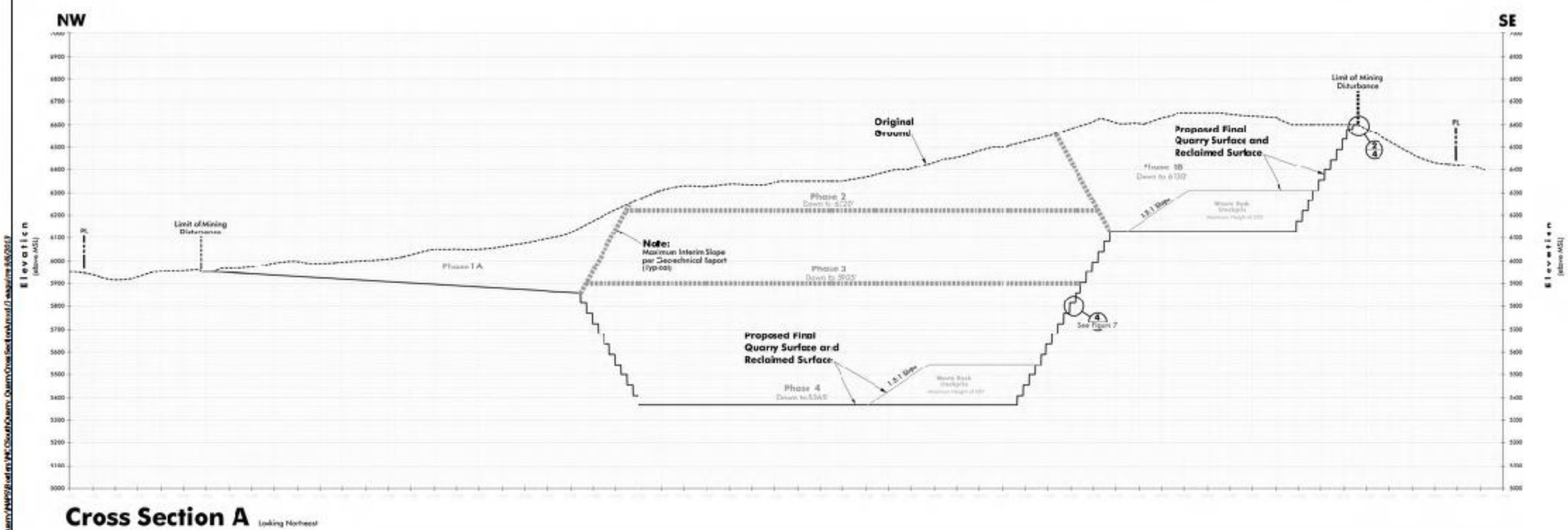


Figure 7. South Quarry Plot Plan



Cross Section A Looking Northeast

Map Date: 9/6/2013
Source: Lilburn Corporation

LILBURN CORPORATION

Figure 8. Quarry Cross Section A

The South Quarry is proposed to be excavated according to this phasing plan. However, mining operations may experience unscheduled interruptions and/or phasing changes due to various market/economic demands and variation in slopes and material quality beyond the operator's control, because the natural deposit is not of uniform quality. It may be necessary, therefore, to excavate selectively from different locations within the quarry to achieve a suitable blend of raw materials. The Forest Service and the County would be updated on the status of the operational phases in the annual monitoring report. The following is a summary of the planned mining operations by phase.

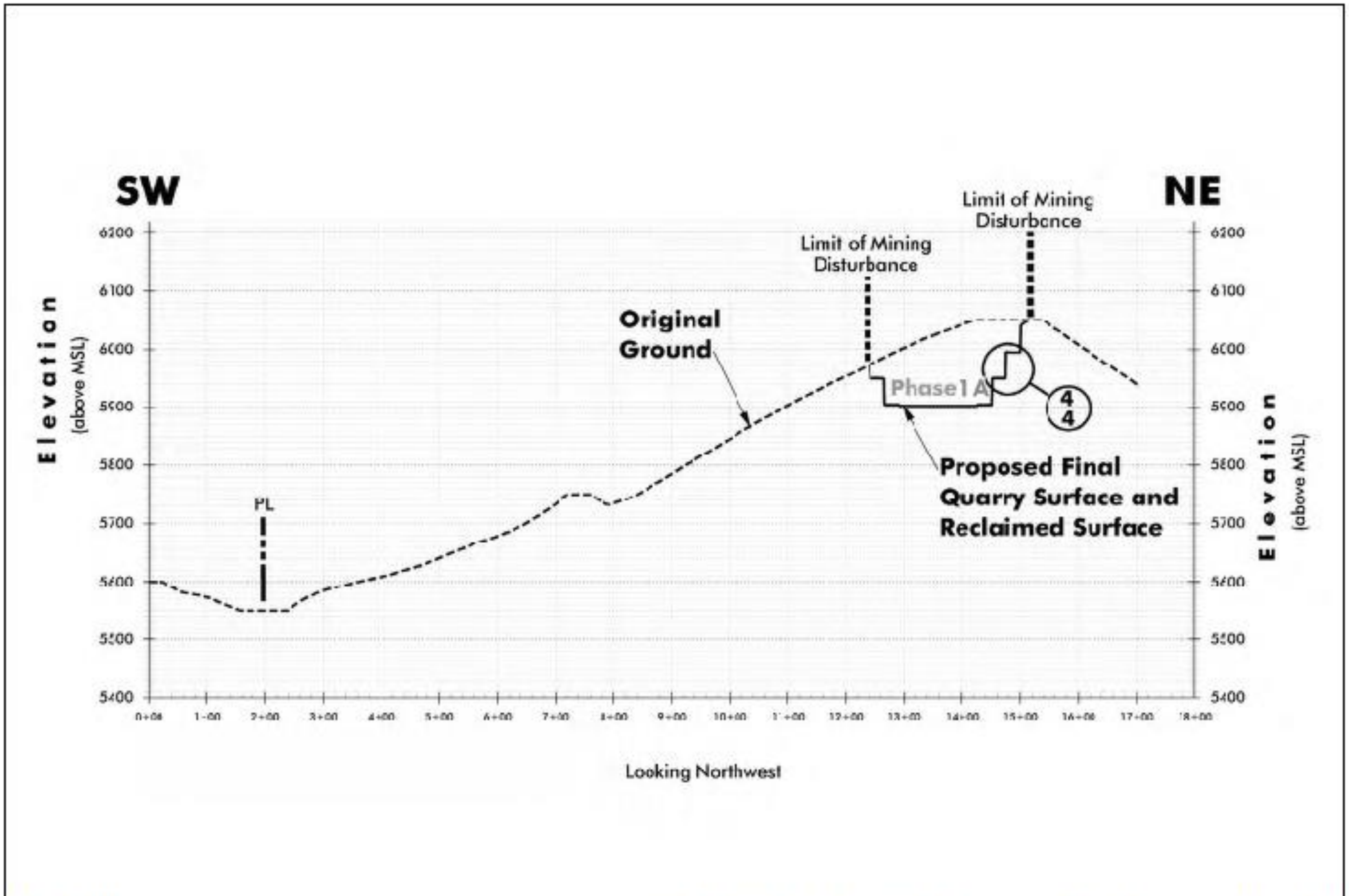
Phase 1A

Phase 1A would be initiated after construction of the haul road. The expected length of Phase 1A is approximately 3.5 years, based on an estimated reserve of approximately 4.5 million tons and an ore production rate of 1.3 MTPY. Approximately 500,000 tons of waste rock or less would be produced that would be used for the southern berm, stored in temporary stockpiles in Phase 1A, and deposited into permanent stockpiles in Phase 1B as it is developed. Note that Phase 1A would not be completely excavated prior to initiating mining in Phase 1B. Based on the borehole data obtained in 2009 and 2010, minimal waste rock is expected in this area. This phase is an extension of the haul road, of which approximately 1,600 feet would be excavated up to 300 feet deep into the quarry area as the quarry is excavated (**Figure 7**). The phase and extended haul road were designed to depress this portion of the haul road below the remaining cut on its north-facing slope and to reduce the road's grade as it extends across the quarry to Phases 1B and 2. This would reduce the exposure of this area from view from Lucerne Valley (**Figure 9**).

Phase 1B

Phase 1B would excavate the southeast 32 acres of the quarry (**Figure 7 and Figure 10**). Mining would create a horseshoe-shaped quarry that would extend from the southern quarry rim of 6,580 feet to a floor elevation of approximately 6,130 feet, a maximum depth of approximately 450 feet. Slopes would be constructed at 0.55H:1V with 45-foot vertical cuts and 25-foot horizontal benches in the hard rock formations. Reserves are estimated at 29 million tons of ore. At an ore production rate of 1.3 MTPY, Phase 1B would continue for approximately 22 years. Mining and the transport of ore to the primary crusher would be the same as described for Phase 1A. Approximately 3.2 million tons of waste rock may be produced in Phase 1B, which would be used for the southern berm and deposited into permanent stockpiles in this phase.

Phase 1B was designed to (1) avoid the former Mohawk Mine and the access road to the Mohawk Mine; (2) avoid the drainage along its southwest rim that drains into Marble Canyon; (3) create at least one bench along the northeast quarry to reduce open views of the quarry from the northeast and east (as compared to daylighting the cut into the downslope); (4) recover the high grade limestone to a depth of 6,130 feet as indicated by exploratory drilling log data; and (5) provide an internal area within the quarry to permanently stockpile waste rock from Phases 1A, 1B, and 2. The development of internal waste rock stockpiles would reduce the area of disturbance outside the quarry rim, eliminate potential visual impacts of the waste rock piles, and reduce internal slopes in Phase 1B to 1.5H:1V to aid in revegetation.



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Location: N:\2012\2012-017 Mitsubishi Cement South Quarry\MAPS\Borders\MCCSouthQuarry_Phase1A_QuarryCrossSectionB.mxd (, 9/6/2013) - aaguirre

Figure 9. Phase 1A Quarry Cross Section B

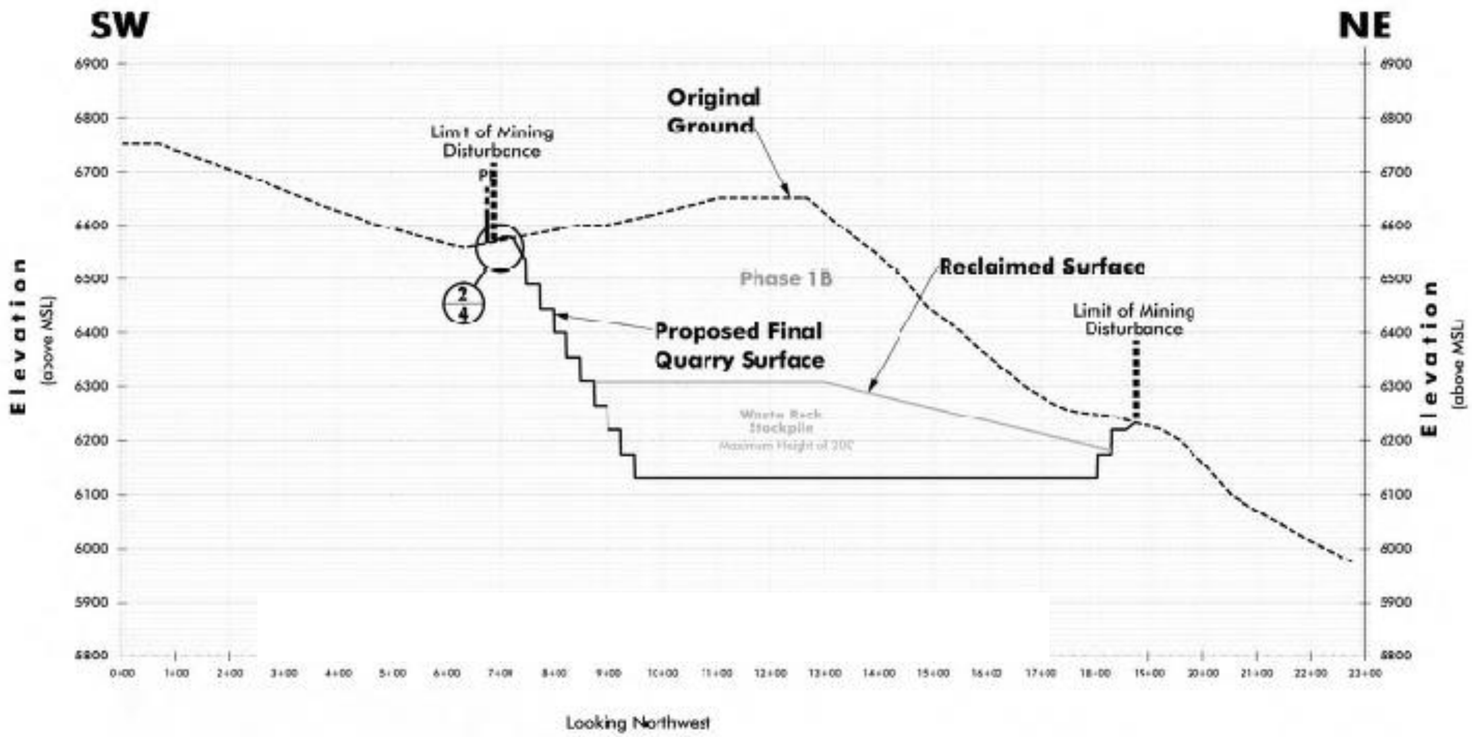

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Figure 10. Phase 1B Quarry Cross Section E

2012-017 Mitsubishi Cement Corporation South Quarry Project

Phase 2

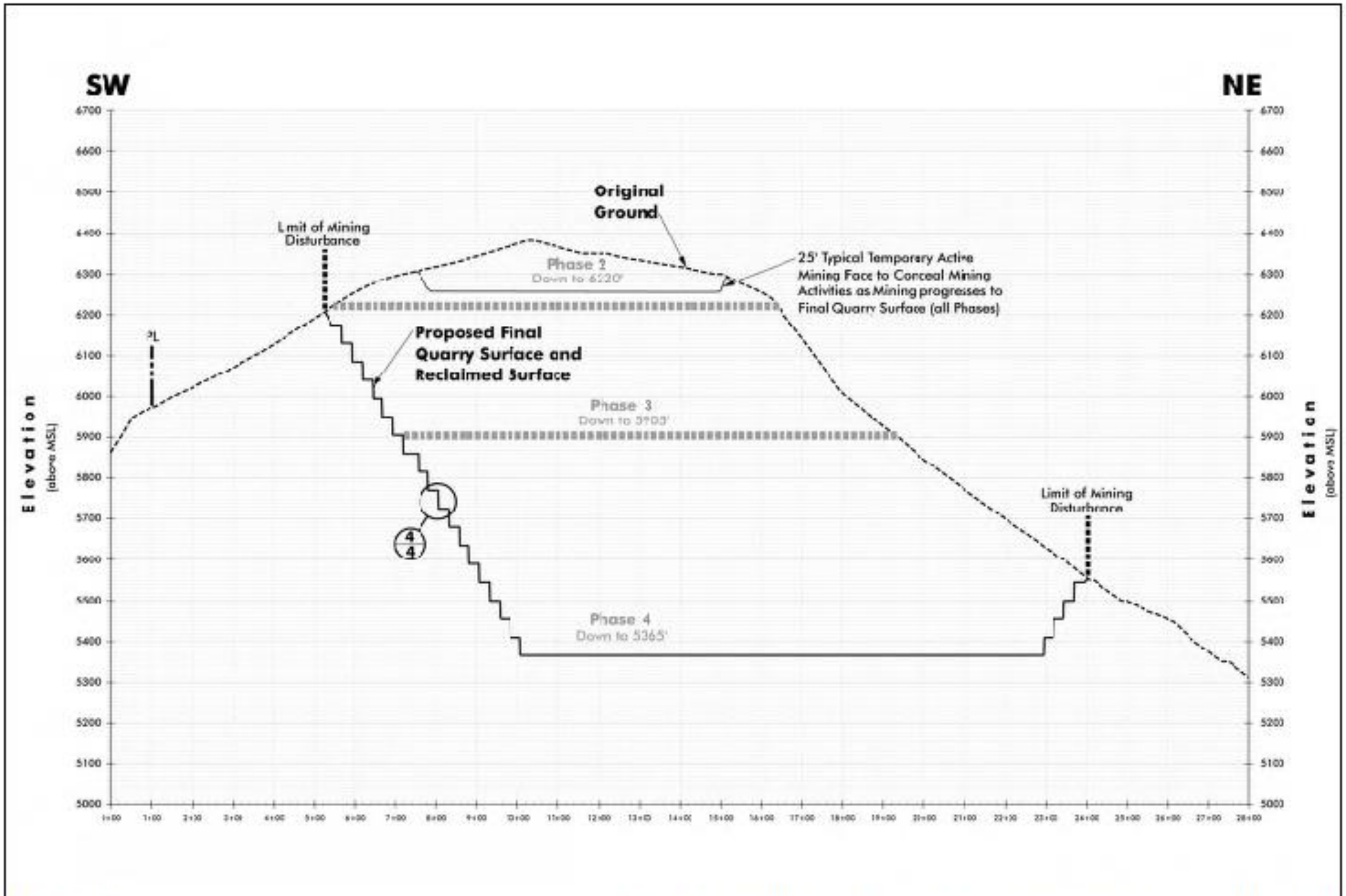
Phase 2 would excavate the central 65 acres of the quarry (**Figure 7** and **Figure 8**). Mining during this phase would level the quarry and create an oval-shaped quarry generally between Phases 1A and 1B. The quarry depth in this location would be slightly higher than Phase 1B with an average base elevation of 6,220 feet. Slopes would be constructed at a 0.55H:1V with 45-foot vertical cuts and 25-foot horizontal benches in the hard rock formations. Reserves are estimated at 19 million tons of ore. At an ore production rate of 1.3 MTPY, Phase 2 would last approximately 14.5 years, for a cumulative total of 40 years from the commencement of mining. Approximately 2 million tons of waste rock may be produced in Phase 2, which would be deposited into permanent stockpiles to fill a portion of the southern slopes in Phase 1B.

Phase 3

Phase 3 would be a 40-year excavation phase on approximately 77 acres mostly within the footprint of Phase 2; approximately 12 of the 77 acres would be new disturbance to the north of the footprint of Phase 2. Mining would excavate to a floor elevation of approximately 5,905 feet, a depth of approximately 315 feet above mean sea level below the Phase 2 floor elevation of 6,220 feet (**Figure 7**, **Figure 8,** and **Figure 11**). Slopes would be constructed at a 0.55H:1V with 45-foot vertical cuts and 25-foot horizontal benches in the hard rock formations. Reserves are estimated at over 52 million tons of ore. Approximately 6 million tons of waste rock would be produced in Phase 3, which would be deposited into the permanent stockpiles in Phase 1B. Phase 3 was designed to maximize the recovery of the limestone resource with depth while staying within the planned 128-acre site limits and to create benches on the northeast side of the quarry to reduce open views of the quarry.

Phase 4

Phase 4 would be the final excavation phase on approximately 85 acres mostly within the footprint of Phase 2. Approximately 8 of the 85 acres would be new disturbance to the north of the footprint of Phase 2. Mining would excavate to the floor elevation of approximately 5,365 feet, a maximum depth of approximately 550 feet amsl below the Phase 3 floor elevation of 5,905 feet (**Figure 7**, **Figure 8, Figure 11,** and **Figure 12**). Slopes would be constructed at 0.55H:1V with 45-foot vertical cuts and 25-foot horizontal benches in the hard rock formations. Reserves are estimated at 52 million tons of ore. At an ore production rate of 1.3 MTPY, Phase 4 would continue for approximately 40 years. Approximately 6 million tons of waste rock would be produced in Phase 4, which would be deposited into the permanent stockpiles on the southeast side of Phase 4.



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Source: Lilburn Corporation

Figure 11. Phases 2, 3, and 4 Cross Section C

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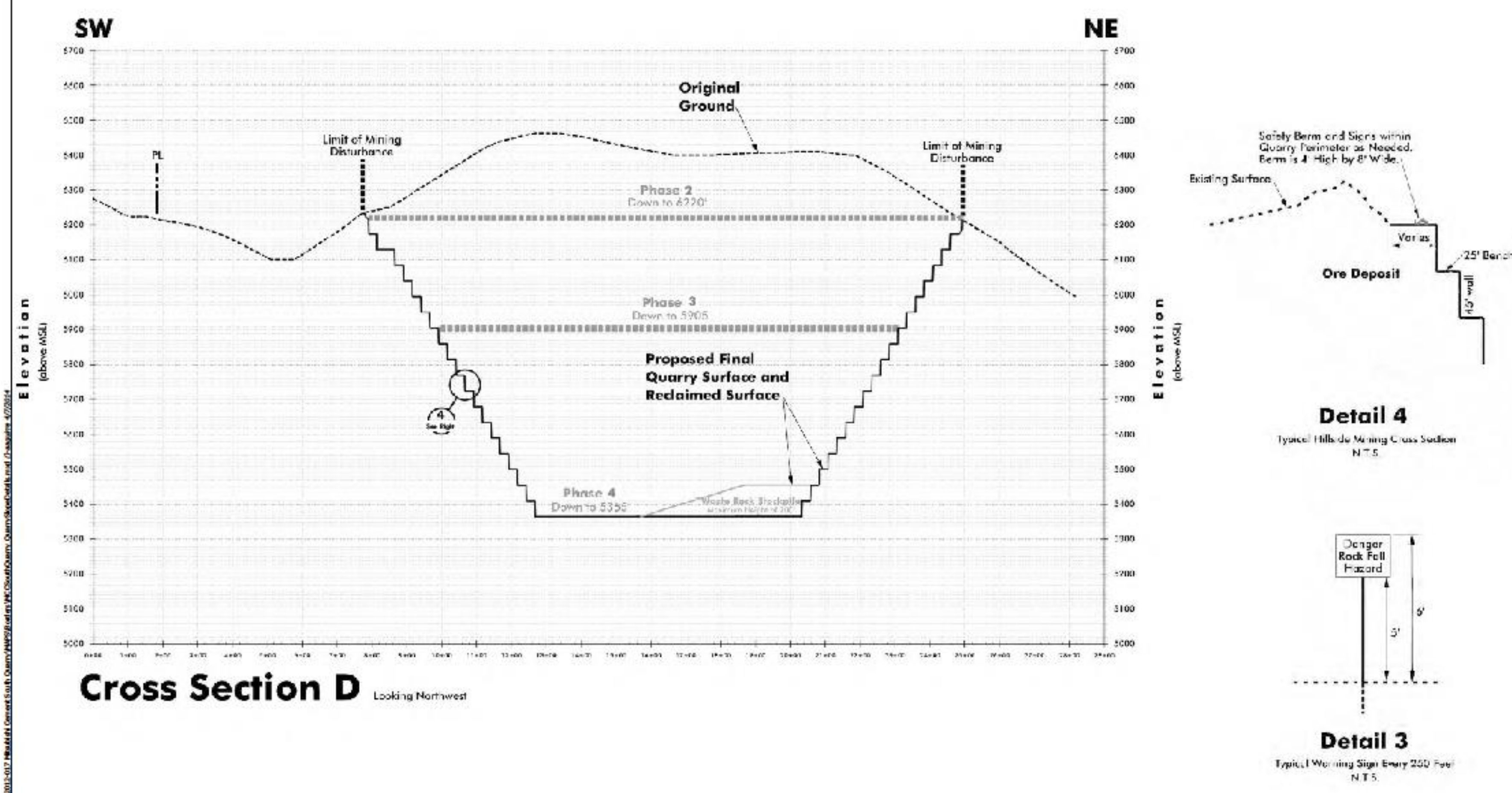

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Source: Lilburn Corporation

Figure 12. Quarry Slope Details

I-3.4.2 - Reclamation and Revegetation

General reclamation methods common to all alternatives are described in Parts I-3.3.12 and I-3.3.11. This section describes reclamation and revegetation methods specific to Alternative 1 – Proposed Action. A summary of the planned reclamation for Alternative 1 – Proposed Action is provided in **Table 5** and shown in **Figure 13.**

Table 5. Summary of Reclamation and Revegetation Phasing: Alternative 1-Proposed Action

Phase	Estimated Years of Operation*	Planned Activities
1A	1-5	Sloping, erosion control, and revegetation of haul road cuts and fills and south and north slopes of Phase 1A excavations. Reclamation of the temporary access road of 0.7 acre.
1B	6-82	Sloping, erosion control, and revegetation of upper slopes and benches as they are completed in the southern area to about the 6,400-foot amsl bench. Construction and vegetation of the landscape berm. Stockpiling of waste rock to reduce slopes to occur throughout phase.
2	26-42	Erosion control and stockpiling of waste rock in Phase 1B area. The Phase 2 area would be mined to greater depth in Phases 3 and 4; therefore, no additional reclamation is proposed in this Phase.
3	43-82	Sloping, erosion control and revegetation of upper benches as completed on the southwest and northeast sides of the site to about the 5,950 feet amsl bench. Stockpiling of waste rock in Phase 1B. Reclamation and revegetation of completed sections of Phase 1B waste rock stockpile.
4	83-120	Sloping, erosion control, and revegetation of upper benches as completed in the central portion of the site. Stockpiling of waste rock in Phase 4 area. Reclamation of Phase 1B waste rock stockpiles.
Final Reclamation	121-126	Removal of equipment, stockpiles, and internal roads not needed for site access during revegetation and site monitoring. Sloping, erosion control, and revegetation of any remaining unreclaimed benches and waste stockpiles in Phase 4 and quarry floor.

Note: The estimated life of each quarry phase is dependent on the slope stability and slopes, extraction rate, and product demand. These estimates assume an ore and waste rock extraction rate of 1.45 MTPY and a five-year period to conduct final reclamation at the estimated completion of Phase 4 to be followed by revegetation monitoring until success criteria are achieved.

Phase 1A

The initial development of the site includes the construction of the temporary construction road, permanent haul road, and the 11 acres in the northwest. The slopes along the haul road and the north and south slopes of Phase 1A would require sloping, erosion control, and revegetation. Because the haul road itself is required for future phases, the road itself would not be revegetated until after completion of mining. The temporary access road that would be used during the construction of the access road would be stripped of any road base material, ripped, covered with growth media, and revegetated per the revegetation plan after approximately 2 years.

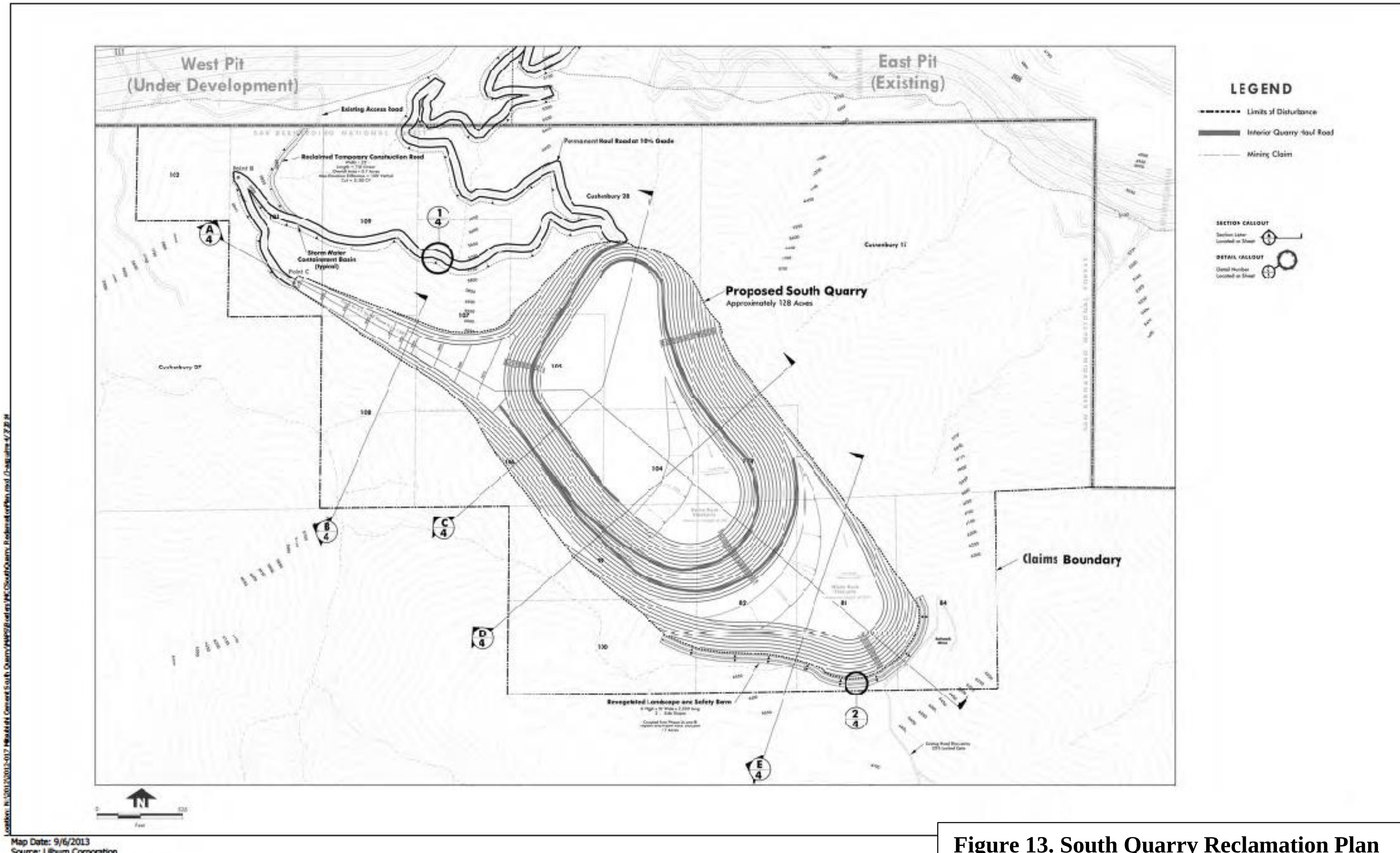


Figure 13. South Quarry Reclamation Plan

Phase 1B
The upper slopes of the southeastern portion of the quarry would be reclaimed upon completion of Phase 1B. Most of this phase would consist of depositing and contouring waste rock to fill portions of the benches and slopes on the southeast slopes to 1.5H:1V (**Figure 10**). The landscaped berm would be completed early in this phase using waste rock and soil material.

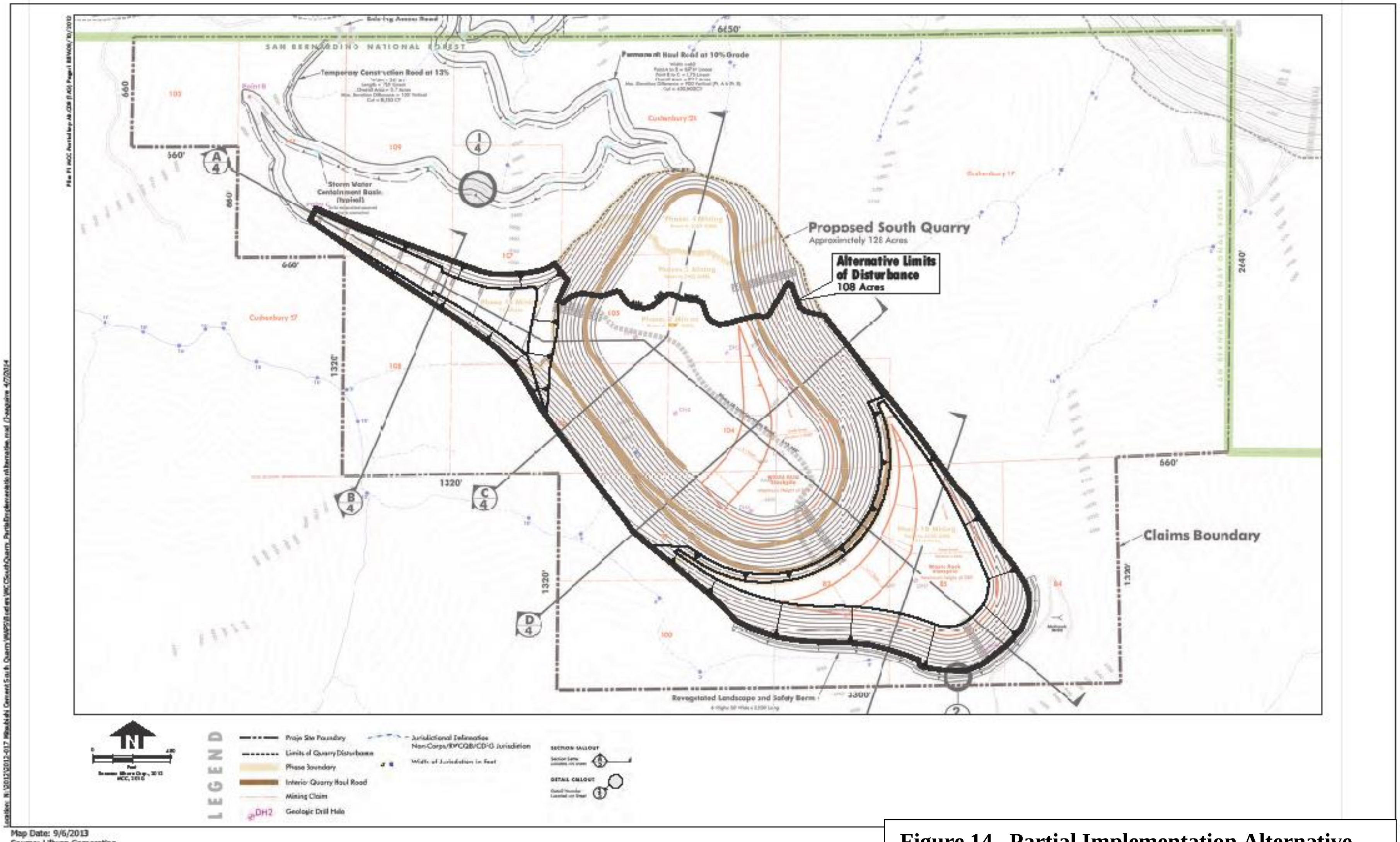
Phase 2
Most of Phase 2 would remove the upper hills within the central part of the quarry perimeter. This area would be mined to greater depth in Phases 3 and 4. Therefore, the outside quarry walls would be developed in later phases and no specific reclamation besides salvaging of the growth media and plants prior to disturbance would occur during this phase.

Phase 3
The upper benches of the northeast and southwest sides of the site are scheduled to be reclaimed as completed during Phase 3. As slopes are completed to greater depths, final sloping, erosion control, and revegetation on the benches would be implemented to about the 5,950-foot amsl bench. The waste rock stockpile in Phase 1B would be finished with 1.5H:1V slopes, ripped as necessary, covered with available topsoil and growth media in an islands pattern, and revegetated.

Phase 4
Quarry activities would be completed during Phase 4 and the site would be excavated to a floor elevation of approximately 5,365 feet. Final sloping, erosion control, and revegetation would be completed on the quarry benches as they are completed in the central portion of the site and on the Phase 1B waste rock stockpiles. The waste rock stockpile in Phase 4 would be finished with 2H:1V slopes, ripped as necessary, covered with available topsoil and growth media in an islands pattern, and revegetated.

Final Reclamation/Revegetation
Final reclamation and revegetation would take place within the 5 years after the termination of mining. All remaining equipment, stockpiles, and internal roads not needed for site access, revegetation, and general site monitoring would be removed. Final sloping, erosion control, and revegetation of any remaining unreclaimed benches, waste rock stockpiles, the landscaped berm and the quarry floor would be conducted. Some haul roads may be left on the site but reduced in width for use in the revegetation and monitoring activities and for overall site maintenance of fencing, signs, and erosion control. Roads not needed for site and quarry access would be stripped of any road base material, ripped, covered with available growth media, and revegetated according to the revegetation plan.

I-3.5 - Alternative 2 – Partial Implementation
Alternative 2 – Partial Implementation, would only implement Phases 1A, 1B, and 2 of the Plan of Operations **(Figure 14**). The sequence of mining in these phases would be the same as described in Alternative 1 – Proposed Action. This alternative was developed in response to public comments requesting an alternative with a shorter duration and/or smaller footprint.



Map Date: 9/6/2013
Source: Lilburn Corporation

Figure 14. Partial Implementation Alternative

Mining of the North Slope, which is proposed in Phases 3 and 4 of Alternative 1 – Proposed Action, would not occur; therefore, the footprint of the quarry would be approximately 20 acres smaller. With this alternative, the final quarry would also not be as deep as with Alternative 1 – Proposed Action. Mining in the quarry would last 40 years rather than 120 years. As with Alternative 1 – Proposed Action, reclamation activities would be initiated as mining is completed in each part of the quarry. Reclamation of Phases 1A, 1B, and 2 is expected to occur on the same schedule as Alternative 1 – Proposed Action; however, final reclamation activities for the South Quarry would be concluded in year 46, unless a separate extension for further mining activities, including associated NEPA documentation, was sought and approved after year 40.

With this alternative, the higher grade limestone would still be required for cement plant operations. This limestone would be obtained from elsewhere in the region and trucked to the cement plant after Phase 2 is completed (approximately year 41 through year 120). Trucks would likely access the cement plant using local roads through Lucerne Valley. Starting with year 41, approximately 52,000 haul truck trips per year would be required, assuming import of 1.3 million tons per year of high-grade limestone using 25-ton on-road trucks (approximately 150 truck trips per day assuming deliveries 350 days per year). The number of off-site, on road haul truck trips would be much greater during the last 80 years of Alternative 2 – Partial Implementation than the number of on-site off-road haul truck trips required for mining Phases 3 and 4 of the South Quarry with Alternative 1 – Proposed Action. On-road haul trucks are much smaller than on-site, off-road haul trucks, and a greater number of trucks would be required to haul limestone from an off-site source. Elements common to all alternatives are described earlier in Part I-3.3. This section describes elements specific to Alternative 2 – Partial Implementation.

I-3.5.1 - Quarry Phasing

The excavation plan for Alternative 2 – Partial Implementation is divided into two phases based on operational, engineering, and environmental concerns (**Figure 14**). The excavation plan for this alternative is similar to the first two phases of Alternative 1 – Proposed Action. However, the footprint of Alternative 2 – Partial Implementation would be approximately 20 acres smaller than Alternative 1 – Proposed Action, because excavation along the North Slope, which would be part of Phases 3 and 4 of Alternative 1 – Proposed Action, would not occur with this alternative. **Table 6** summarizes relevant data by mining phase.

Table 6. Planned Quarry Phasing and Production for Alternative 2 – Partial Implementation

Phase	Area[1] (acres)	Cumulative Area[1] (acres)	Material Excavated (millions of tons)[2,3,4]	Ore Reserves (millions of tons)[3]	Waste Rock (millions of tons)[2.3]	Max. Depth (feet amsl)	Years of Operation[4]
1A	11	11	5.1	4.5	0.5	5,860[5]	3.5
1B	32	43	32.1	28.8	3.2	6,130[5]	22.0
2	65	108	21.0	18.8	2.2	6,220[5]	14.5
Total	**108**	**108**	**58.2**	**52.1**	**5.9**	**5,860**	**40**

Notes: [1]*Area has been rounded to the nearest whole acre. Totals may be slightly different due to rounding.*
[2]*Millions of tons rounded to the nearest tenth.*
[3]*Waste rock estimated at 0.15 million tons per year or approximately 10 percent, which would vary depending on area being excavated.*
[4]*Years of operation based on average production of 1.3 million tons per year.*
[5] *Phases 1A, 1B, and 2 are distinct, separate areas with varied excavation depths.*

The South Quarry is proposed to be excavated according to this phasing plan. However, mining operations may experience unscheduled interruptions and/or phasing changes due to various market/economic demands and variation in slopes and material quality beyond the operator's control, because the natural deposit is not of uniform quality. It may be necessary, therefore, to excavate selectively from different locations within the quarry to achieve a suitable blend of raw materials. The Forest Service and the County would be updated on the status of the operational phases in the annual monitoring report.

Because the excavation plan details of Alternative 2 – Partial Implementation would be substantially similar to Phases 1A, 1B, and 2 of Alternative 1 – Proposed Action, they are not repeated in this Section (see Part I-3.3.4).

I-3.5.2 - Reclamation and Revegetation

General reclamation methods would be similar to those described for Alternative 1 – Proposed Action (Parts I-3.3.11 and

I-3.3.12). A summary of the planned reclamation specific to Alternative 2 – Partial Implementation is provided in **Table 7**. The planned reclamation and revegetation for this alternative is the same as Alternative 1 – Proposed Action without Phases 3 and 4.

Table 7. Summary of Reclamation and Revegetation Phasing for Alternative 2-Partial Implementation

Phase	Estimated Years of Operation*	Planned Activities
1A	1-5	Sloping, erosion control, and revegetation of haul road cuts and fills and south and north slopes of Phase 1A excavations. Reclamation of the temporary access road of 0.7 acre.
1B	6-40	Sloping, erosion control, and revegetation of upper slopes and benches as they are completed in the southern area to about the 6,400-foot amsl bench. Construction and vegetation of the landscape berm. Stockpiling of waste rock to reduce slopes to occur throughout phase.
2	26-40	Erosion control and stockpiling of waste rock in Phase 1B area. Sloping, erosion control, and revegetation of upper benches as they are completed. Reclamation of the Phase 1B waste stockpiles.
Final Reclamation	41-46	Removal of equipment, stockpiles, and internal roads not needed for site access during revegetation and site monitoring. Sloping, erosion control, and revegetation of any remaining unreclaimed benches and waste stockpiles in Phase 1B and quarry floor.

Note: The estimated life of each quarry phase is dependent on the slope stability and slopes, extraction rate, and product demand. These estimates assume an ore and waste rock extraction rate of 1.45 MTPY and a five-year period to conduct final reclamation at the estimated completion of Phase 2 to be followed by revegetation monitoring until success criteria are achieved.

I-3.6 - Alternative 3 – No Action/No Project

CEQA requires that the No Project Alternative be analyzed in an EIR. In accordance with Section 15126.6(e)(3)(B), the No Project Alternative consists of an analysis of the circumstance under which the project does not proceed. With the CEQA No Project Alternative, the County would not approve Reclamation Plan under SMARA.

NEPA also requires consideration of a No Action Alternative. As described in the "Purpose" discussion in the EIS, pursuant to Federal mining laws and Forest Service regulations, the Forest Service is required to respond to a Plan of Operations for conducting mining operations submitted by an applicant. Under 36 Code of Federal Regulations (CFR) 228.5, the Forest Service must decide whether to approve the Plan of Operations as submitted by MCC or to require changes or additions that are necessary for the Plan of Operations to meet the requirements of the regulations for environmental protection in 36 CFR 228.8.

Neither the CEQA No Project nor the NEPA No Action alternative imply that the limestone resource would never be developed, only that the resource would not be developed under the submitted Plan of Operations. Because MCC owns the rights to mine the limestone deposits, another Plan of Operations could be submitted in the future.

With Alternative 3 – No Action/No Project, MCC would not develop the limestone deposit in the South Quarry under the current Plan of Operations. However, the existing Cushenbury Cement Plant would continue to operate. The ore reserves in the West Pit, when blended with high grade ore, are sufficient to feed the cement plant for approximately 120 years. Trucks would likely access the cement plant using local roads through Lucerne Valley. Approximately 52,000 haul truck trips per year would be required, assuming import of 1.3 million tons per year of high-grade limestone using 25-ton on-road trucks (approximately 150 truck trips per day assuming deliveries 350 days per year). The number of off-site, on road haul truck trips would be much greater for Alternative 3 – No Action than the number of on-site off-road haul truck trips required for mining the South Quarry with Alternative 1 – Proposed Action. On-road haul trucks are much smaller than on-site, off-road haul trucks, and a greater number of trucks would be required to haul limestone from an off-site source.

I-3.7 - Comparison of Alternatives Carried Forward for Analysis

Table 8 provides a comparison of the components of all alternatives that were carried forward for analysis.

Table 8. Comparison of Alternatives Carried Forward for Analysis

Project Element	Alternative 1	Alternative 2[1]	Alternative 3[2]
Quarry Area (acres)	128	108	Not Applicable
Haul Road (acres)	22.2	22.2	Not Applicable
Landscape Berm (acres)	2.7	2.7	Not Applicable

Table 8. Comparison of Alternatives Carried Forward for Analysis			
Project Element	**Alternative 1**	**Alternative 2[1]**	**Alternative 3[2]**
Temporary Construction Road (acres)	0.7	0.7	Not Applicable
Total Disturbed Area (acres)	153.6	133.6	Not Applicable
Total Material Excavated (ore reserves/waste rock) (millions of tons)	174.0 (156.0/18.0)	58.2 (52.1/5.9)	Not Applicable
Maximum Depth (feet amsl)	5,365	5,860	Not Applicable
Number of Phases	4	2	Not Applicable
Years of Operation	120	40	Not Applicable
Quarry Equipment	1-2 Dozers 2-9 Off Road Haul Trucks 1 Drill Rig 1-2 Water Trucks 2-3 Front End Loaders	1-2 Dozers 2-9 Off Road Haul Trucks 1 Drill Rig 1-2 Water Trucks 2-3 Front End Loaders After year 40, on-road haul trucks would be used to truck material to the Cushenbury Cement Plant from elsewhere in the region. Approximately 52,000 haul truck trips per year or approximately 150 haul truck trips per day for 350 days each year would be required.	There would be no new equipment on the site, but a similar equipment mix would likely be operated at a site elsewhere in the region. In addition, on-road trucks would be used to transport high-grade limestone from elsewhere in the region to the Cushenbury Cement Plant. Approximately 52,000 haul truck trips per year or approximately 150 haul truck trips per day for 350 days each year would be required.
Final Reclamation Year	Year 125/monitoring to continue until success criteria are achieved	Year 46/monitoring to continue until success criteria have been achieved	Not Applicable
Project-Specific LMP Amendment to Scenic Integrity Objectives	Required	Required	Not Required
Notes: [1]With Alternative 2 – Partial Implementation, only Phases 1A, 1B, and 2 would be implemented and the quarry would be operated for 40 years rather than 120 years. Higher-grade limestone for blending would be trucked to the cement plant from elsewhere in the region from approximately year 41 through year 120.			

Table 8. Comparison of Alternatives Carried Forward for Analysis			
Project Element	**Alternative 1**	**Alternative 2[1]**	**Alternative 3[2]**
[2]*With the No Action/No Project Alternative, MCC would not develop the limestone deposit in the South Quarry under the proposed Plan of Operations. The existing Cushenbury Cement Plant would continue to operate fo the length of the West Pit's current estimated life of 120 years. Higher-grade limestone for blending could be trucked to the plant from elsewhere in the region or could be mined locally under a different future project.*			

I-3.8 - Preferred Alternative (NEPA)

NEPA requires that the Lead Agency identify the preferred alternative, if one exists (40 CFR 1502.14). A preferred alternative need not be identified in the Draft EIS if the responsible official does not have one at that stage. The preferred alternative must, however, be identified in a final EIS (FSH 1909.15 Sec. 16). The Forest Service has not identified a preferred alternative at this Draft EIS stage.

I-3.9 - Environmentally Superior Alternative (CEQA)

CEQA Guidelines Section 15126.6(e)(2) requires that the EIR identify the environmentally superior alternative. If that alternative is the No Project Alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. Although on-site impacts resulting from development and operation of the Project would not occur with Alternative 3 – No Action/No Project, this alternative would require trucking higher-grade limestone from elsewhere in the region, Approximately 52,000 haul truck trips per year would be required, assuming import of 1.3 million tons per year of high-grade limestone using 25-ton on-road trucks (approximately 150 truck trips per day assuming deliveries 350 days per year) resulting in environmental effects to air quality, greenhouse gas emissions, and noise related to increased haul truck use of local roads and State Highway 18.

The environmentally superior alternative of the two build alternatives is Alternative 2 – Partial Implementation, because this alternative would end mining approximately 80 years sooner and would have a slightly smaller footprint. It should be noted that Alternative 2 – Partial Implementation would also have environmental effects to air quality, greenhouse gas emissions, and noise related to increased haul truck use of local roads and State Highway 18. Approximately 52,000 haul truck trips per year would be required, assuming import of 1.3 million tons per year of high-grade limestone using 25-ton on-road trucks (approximately 150 truck trips per day assuming deliveries 350 days per year).

I-3.10 - Alternatives Not Carried Forward For Analysis

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Likewise, the County is required by CEQA to evaluate a range of reasonable alternative to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project. The EIR should identify alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and should briefly explain the reasons underlying the lead agency's determination (CEQA Guidelines Section 15126.6).

Public comments received during the scoping period provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of the South Quarry project, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized below.

I-3.11 - Alternative Design

This alternative would continue mining south from the East Pit to reach the high grade ore in the South Quarry area. Ore would be hauled on roads within the quarry footprint as the quarry is expanded southward. Even though the new haul road would not be constructed and Phases 1A and 1B would not be mined, the overall footprint of the mine would be increased. Impacts related to ground disturbance and removal of public access to the property (such as air emissions, impacts to biological resources from removal of vegetation, erosion impacts, recreation impacts, etc.) would all be greater than with either action alternative. With this alternative, the ridgeline between the East Pit and the South Quarry area would be removed, and there would be a greater visual impact from viewpoints in the Lucerne Valley. Impacts to other environmental resources would be similar to Alternative 1 – Proposed Action. Therefore, this alternative design was not selected for detailed environmental review.

I-3.12 – Alternative Mining Methods

Alternative mining methods for transporting ore to the cement plant were considered to reduce the footprint of disturbance at the South Quarry site. These alternative mining methods included: 1) the use of a conveyor to move rock down to the cement plant instead of using haul trucks, and 2) the use of the shaft and tunnel mining method, where most of the excavation would take place under the ground, minimizing disturbance at the surface. With these methods, there would still be a surface mine with the same surface area disturbance if the conveyor or shaft and tunnel methods were used and, instead of the haul road, only a small access road for workers and equipment would be constructed. Portions of the haul road would not be needed, and impacts associated with constructing the haul road would be avoided. No haul trucks would be required to move rock to the cement plant, and air emissions impacts associated with these vehicles would be avoided. However, haul trucks would still be needed within the South Quarry to transport rock to the alternative transport method (*e.g.,* conveyor, shaft); therefore, air emissions from haul trucks would not be completely eliminated.

These alternative mining methods were rejected because site conditions make them infeasible to implement. The conveyor would require a primary crusher in the quarry at the conveyor and associated power lines and cables. The very steep terrain at the site would make the installation and maintenance of such a system infeasible. The shaft and tunnel mining method was rejected because the limestone at the project site does not have sufficient strength/integrity to safely implement this method.

I-3.13 – Alternative Haul Road Routes

Two alternative haul road routes were considered and rejected because they would be infeasible, would not reduce environmental impacts. At some sites, environmental effects would have been more severe.

I-3.13.1 – East Side Haul Road Route

A haul road route on the east side of the proposed South Quarry was evaluated. The terrain in this location is steeper than the haul road proposed for Alternative 1 – Proposed Action and Alternative 2 – Partial Implementation, resulting in a longer road with more switchbacks. Construction of such a long road in steep terrain would substantially increase ground-disturbing impacts. These more severe effects include greater air emissions during both construction and operation. The longer road would also be in an area that would be more visible to the Lucerne Valley community, resulting in more severe effects to scenery resources. Impacts to biological resources from habitat removal, noise, and roadway conflicts would also be increased. This alternative haul road route was rejected because it would not lessen or reduce environmental impacts and would actually result in more severe environmental effects than the alternatives that were selected for evaluation.

I-3.13.2 – Marble Canyon Haul Road Route

A second alternative haul road route that would access the South Quarry from the west, through Marble Canyon, was evaluated. This route would begin at approximately the midpoint of the southwest edge of the South Quarry and would extend approximately 10,300 linear feet southwest through Marble Canyon before joining with the approved West Pit perimeter road at the southwest corner of the West Pit. The approved West Pit perimeter road would be used to travel the remaining 8,530 linear feet to the existing crusher. This haul road alignment from the South Quarry to the approved West Pit perimeter road would be approximately 700 linear feet longer than the haul road route proposed for Alternative 1 – Proposed Action and Alternative 2 – Partial Implementation. Additionally, because the haul route would use the West Pit perimeter road to access the crusher instead of the East Pit haul road, the total distance from the South Quarry to the crusher would be approximately 1.25 miles longer one way than with Alternative 1- Proposed Action or Alternative 2 – Partial Implementation.

Although the route would be longer, because a portion of this route would be within the canyon, it was initially thought that it would have a less severe impact to scenery resources. Therefore, this alternative was examined more closely to determine its feasibility and to determine its potential for reducing impacts to scenery resources. A slope stability analysis, scenery analysis, and air emissions analysis were conducted for the alternative, the results of which are summarized below.

A slope stability report was prepared for the Marble Canyon haul road alternative. This report found that, due to the steep terrain in Marble Canyon, road construction would need either fill slopes no steeper than 2H:1V, or reinforced fill slopes/retaining structures. On the steep terrain in Marble Canyon, 2H:1V fill slopes would reach considerable heights and would potentially obstruct the existing natural drainage of Marble Canyon. There is insufficient space for such fill slopes for considerable lengths of the alternative route. At 2H:1V slopes, the fill would extend so far horizontally into the canyon that the fill for the higher switchbacks would bury the lower switchbacks, making this approach infeasible. The use of reinforced slopes or retaining structures is another construction option. However, these options would be costly and difficult to construct and maintain for the significant lengths of road required for this alternative alignment. During road operation, there would be risk of continual erosion and road failure due to the angle of the dip slopes.

A scenery analysis of the proposed haul road alignment determined that effects to scenery resources would be slightly less with this alternative, but would remain adverse and significant. From key viewpoints in the SBNF, the direct effects would be the same. Although the alternative haul road route would cause less disturbance in Phases 1 and 2 by eliminating the straight line disturbance caused by the Alternative 1 – Proposed Action and Alternative 2 – Partial Implementation haul road as observed by some Lucerne Valley viewpoints, overall direct effects would nonetheless cause the scenic integrity level of the area to fall to Low during Phases 1 and 2 and to Very Low during Phases 3 and 4 until completion of reclamation.

Air emissions would be greater with this alternative for some pollutants. In particular, the MDAQMD CEQA significance thresholds for PM_{10} would be exceeded with this haul road alternative, but it would not be exceeded with the Alternative 1 – Proposed Action or Alternative 2 – Partial Implementation haul road alternative. Greenhouse gas emissions would be 31 percent higher for this alternative, but would remain below the CEQA greenhouse gas emissions threshold.

The Marble Canyon haul road alternative would disturb a larger area than the haul road proposed for Alternative 1 – Proposed Action or Alternative 2 – Partial Implementation. To maintain safe grades, the road or overburden would be in the bottom of the Marble Canyon drainage. This would result in substantial impacts to occupied and suitable habitat for rare plants, including threatened, endangered, and sensitive species and the designated critical habitat for threatened and endangered plants; substantial barriers to movement of large terrestrial animals including deer, mountain lions, and Nelson's bighorn sheep; substantial loss/disturbance to unique canyon bottom/drainage habitat found in Marble Canyon that is likely important to a number of Forest Service Sensitive and Watchlist animals; and greater acreage of loss/disturbance to cliff nesting raptor habitat. All of these effects would be more adverse than with the haul road alignment proposed for Alternative 1 – Proposed Action and Alternative 2 – Partial Implementation.

The Marble Canyon haul road alternative was initially examined for its potential to reduce scenery impacts. With additional analysis, it was determined that, while scenery impact would be slightly reduced, significant adverse effects to viewpoints in Lucerne Valley would remain until reclamation is fully implemented. This alternative would have more severe effects to air quality and biological resources. Additionally, construction of the 2H:1V slopes required for slope stability would be infeasible in the steep terrain and limited space available in Marble Canyon. Therefore, this alternative is not examined further in the EIR/EIS.

I-3.14 - Alternative Reclamation Methods

Alternative reclamation methods, including an alternative bench construction method and phasing the mining based on achieving reclamation goals, were considered. An alternative bench construction method, such as microbenching, was rejected because this type of construction would require a larger mine footprint to result in the same amount of ore. This method also depends on thick vegetative cover to cover the microbenching, and would not work well in the sparser habitat at the Project site; therefore, this method would not significantly reduce scenery effects. Additionally, the reclamation plans for all of the alternatives include sculpting of upper visible benches for shadowing to reduce scenery effects.

I-3.15 - Congressional Withdrawal Instead of Administrative Withdrawal

The Project includes a mineral withdrawal of National Forest System lands from mineral location and entry under the General Mining Laws of the U.S., subject to valid existing rights, and achieving the requirement to maintain and conserve habitat for four listed threatened and endangered plant species. A withdrawal is a formal action that sets aside Federal land for public purposes. There are two ways to achieve this withdrawal, an administrative withdrawal and a Congressional withdrawal. Congressional withdrawals are legislative actions by Congress in the form of public laws (Acts of Congress). Administrative withdrawals are withdrawals made by the President, the Secretary of the Interior, or other authorized officers of the executive branch of the Federal Government. The Project would use an administrative withdrawal by the Secretary of the Interior.

An alternative was considered to withdraw the land for conservation of biological resources using a Congressional withdrawal instead of an administrative withdrawal. There are no established rules requiring one process over the other that apply in this instance. Furthermore, the protections provided under an administrative withdrawal are identical to those provided if a Congressional withdrawal is issued, with one minor exception, administrative withdrawals are subject to renewal every 20 years, while Congressional withdrawals do not have a renewal period.

The Secretary of the Interior delegated to the Bureau of Land Management (BLM) the authority to process all administrative withdrawal actions, regardless of what Federal agency or Federal lands are at issue. This delegation decision was made primarily because the Secretary of the Interior determined that the BLM’s jurisdiction over the mineral estate on Federal lands rendered it the most appropriate agency to deal with administrative withdrawal requests. The Forest Service has no mechanism for asking Congress for a withdrawal. As such, this alternative was rejected because there is no procedural mechanism for getting Congress to act on a withdrawal in this instance.

On the other hand, there is an established process for pursuing administrative withdrawals with the BLM; the administrative withdrawal process helps to ensure that the agency charged with managing the mineral estate on Federal lands is involved in the withdrawal process and adequately informed of withdrawal decisions. The Forest Service has initiated the administrative withdrawal process.

I-3.15 - Full Restoration Alternative

A Full Restoration Alternative was considered that would include filling in the quarry pit with rock to re-create the pre-project condition. This type of alternative would not be feasible with this type of mining. For example, mines for other commodities, such as gold or copper generate substantial quantities of waste rock stored in waste rock piles that can be returned to the pits at the conclusion of mining. In contrast, in limestone mining for cement production, particularly at the South Quarry location, there is very little overburden/waste rock. An estimated 10 percent of waste rock is produced as compared to the ore volumes removed and this waste rock is proposed be deposited within the excavated quarry with both action alternatives.

MCC currently purchases waste rock from other mining operations for road base and other uses in its existing operation at the East Pit. Therefore, this alternative would require purchasing rock from other areas to have sufficient rock to completely backfill the South Quarry. This alternative would result in a greater environmental impact, because there would be environmental effects at the off-site location in addition to the environmental effects at the Project site. Additionally, the potential environmental effects of importing rock are discussed in Alternative 2 – Partial Implementation and Alternative 3 – No Action/No Project.

I-3.16 - Off-Site Alternative

As stated in CEQA Guidelines (Section 15126.6[f][2][A]), an environmental document shall determine "*…whether any of the significant effects of the project would be avoided or substantially lessened by putting the project in another location. Only locations that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR*." Off-site alternatives to Alternative 1 – Proposed Action would create similar environmental impacts. Any off-site alternative would require the transport of limestone material from the off-site location to the MCC Cement Plant. Such transport would increase the number of vehicle trips on public roadways; thereby increasing traffic and air quality impacts. Because impacts associated with this alternative would not be reduced compared to the proposed project, this alternative was not selected for further evaluation. Note, however, that Alternative 2 – Partial Implementation and Alternative 3 – No Action/No Project each include importation of some or all of the rock required to supply the Cushenbury cement plant, and thus evaluate the range of impacts that might occur through an off-site alternative.

PART II: EXISTING CONDITIONS AND GENERAL EFFECTS

II-1.0 – INTRODUCTION

Part II of this document addresses effects and concerns regarding vegetation, general botanical and wildlife species, Watchlist species, and effects that are common to those species as well as special status species that are discussed in more depth in **Parts III, IV, and V** of this document. The purpose of **Part II** is to describe, in general, species and habitats in the analysis area as well as to document the types and degree of potential effects from the proposed project.

II-2.0 – EXISTING ENVIRONMENT – GENERAL

The Mitsubishi South Quarry project (hereafter referred to as SQ) covers an area about 1 mile long (on a southeast to northwest axis) and 0.5 miles wide on National Forest System lands north of Big Bear Lake, California, in San Bernardino County, managed by the Mountaintop Ranger District. The project is located on the northern rim of the San Bernardino Mountains south of Lucerne Valley. All of the proposed mining is located on National Forest System (NFS) lands with a haul road extending from NFS land onto private land to the north, and all associated processing and ancillary facilities on private land.

Communities found nearby include the unincorporated community of Lucerne Valley to the north, and the City of Big Bear Lake (incorporated) and the unincorporated communities of Moonridge, Big Bear City, Fawnskin, Sugarloaf, Erwin Lake, Baldwin Lake, and Lake Williams to the south. The project area does not contain any roads or trails in the National Forest transportation system. The nearest National Forest Transportation System road to the project is 3N02 (Burnt Flat Rd.), which terminates at a gate approximately 0.3 miles south of the proposed project. An unauthorized route continues north from this gated terminus to the southern edge of the project area, and to the historic Mohawk Mine.

The project area ranges in elevation from approximately 5,000 feet to almost 6,700 feet. The project area comprises very steep slopes on the north end, rising to a relatively flat area at the south end. The aspect of the project area is primarily north-facing. **Figure 15** displays the project area and already-approved mining areas. **Figure 16**, **Figure 17,** and **Figure 18** display the topography of the area.

The project area is located in the Box S Springs sixth field watershed. There are no perennial, intermittent, or ephemeral streams within the project area. Soils consist primarily of decomposing carbonate rock with a coarse grained sandy texture.

See the MCC Soils and Hydrology Reports for more detailed information.

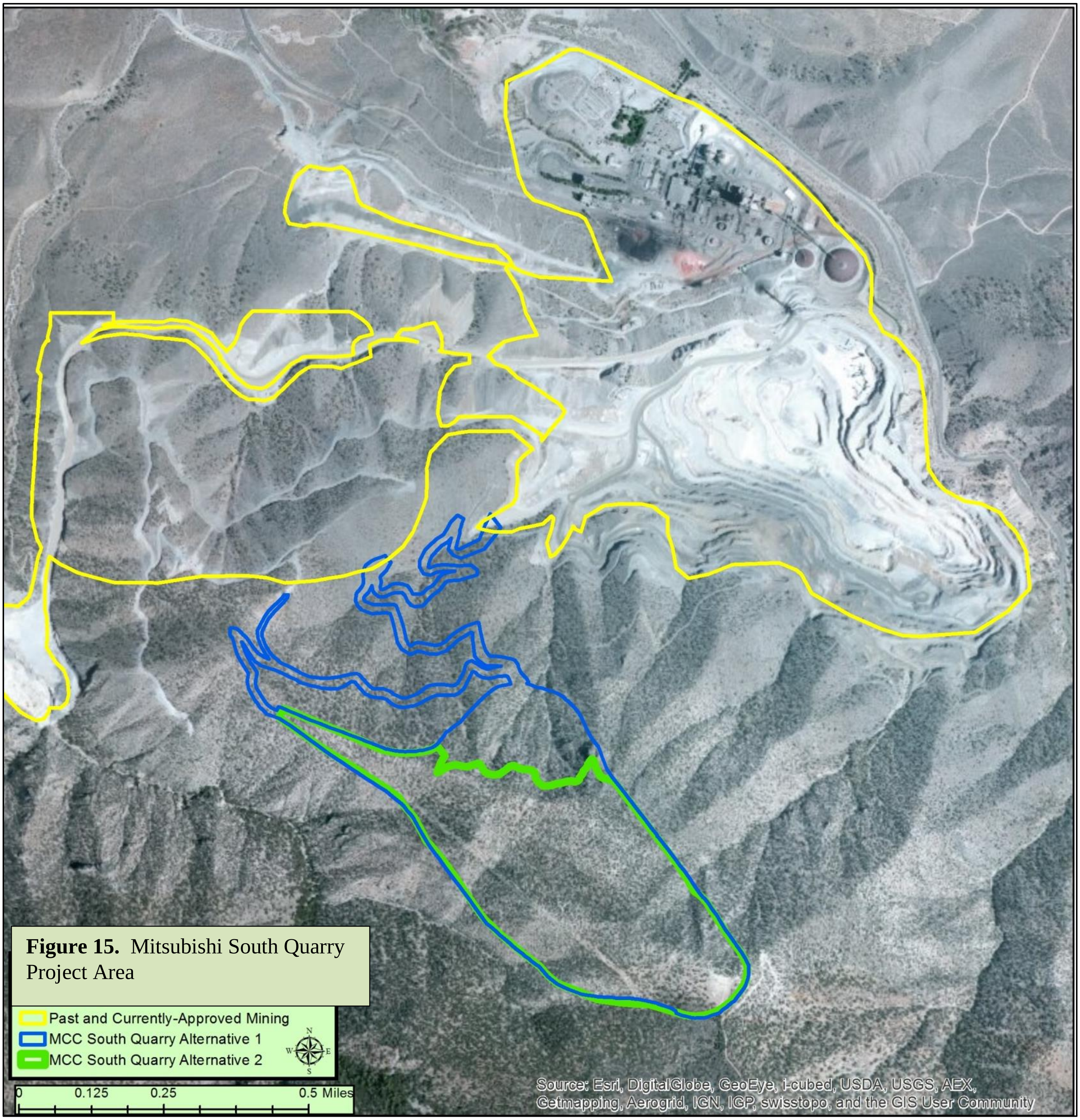


Figure 15. Mitsubishi South Quarry Project Area

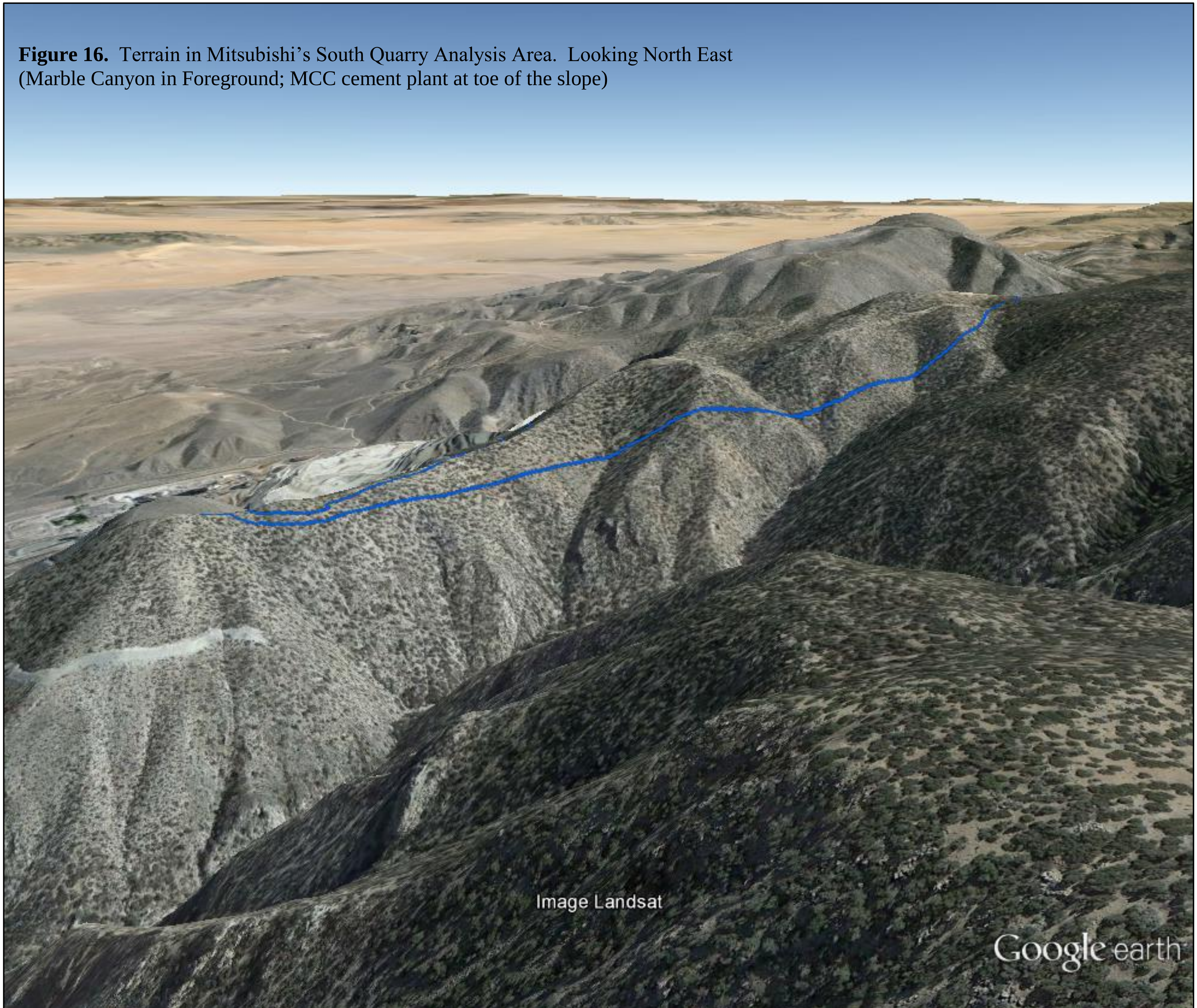


Figure 16. Terrain in Mitsubishi's South Quarry Analysis Area. Looking North East (Marble Canyon in Foreground; MCC cement plant at toe of the slope)

Figure 17. Terrain in Mitsubishi's South Quarry Analysis Area. Looking South

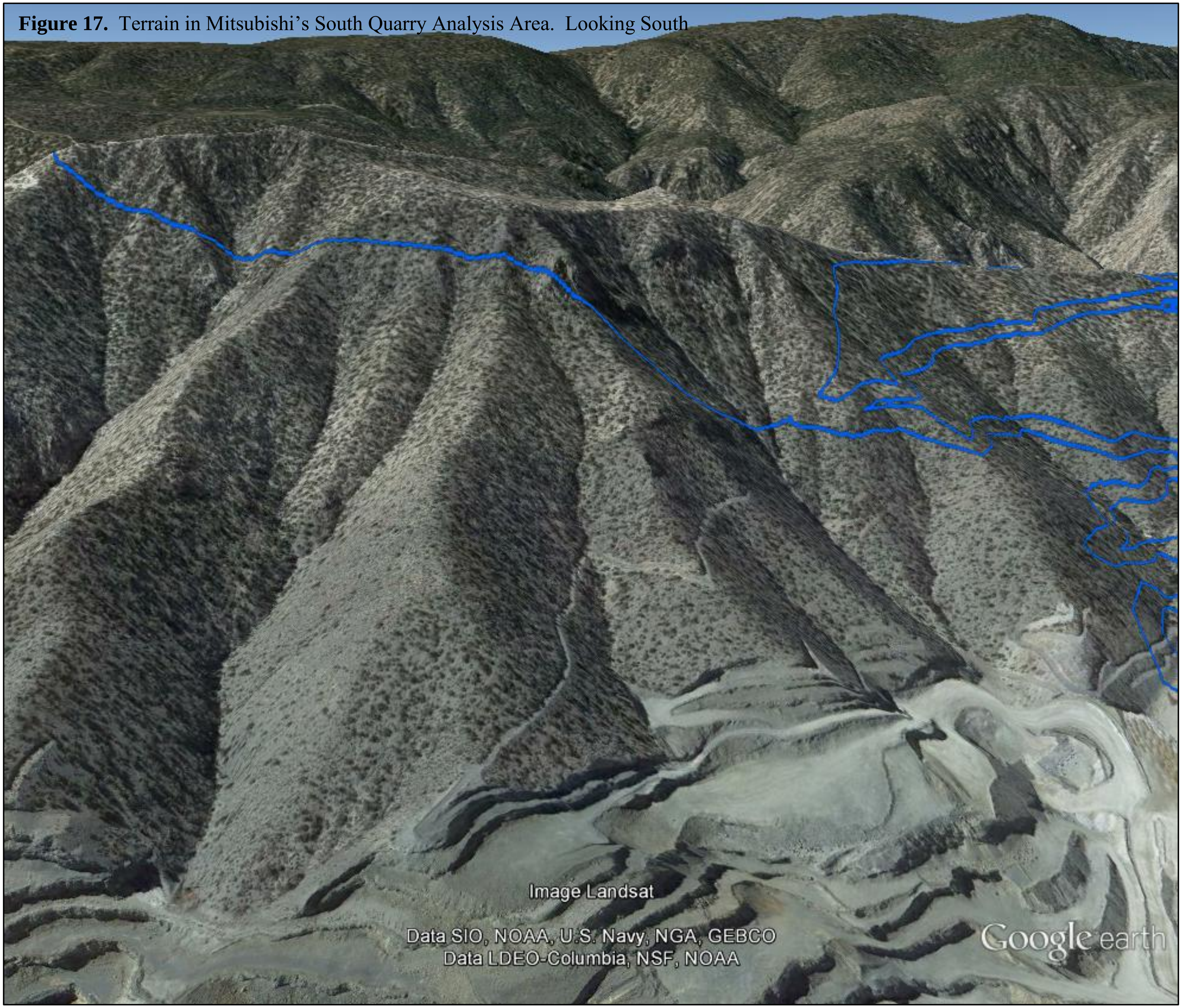


Figure 18. Terrain in Analysis Area. Looking South

II-2.1 – Existing Environment - Vegetation Descriptions

The dominant plant communities at the SQ pit are pinyon-juniper woodlands and desert scrub. The haul road descends from desert scrub through pinyon-juniper and desert scrub communities, onto an existing road leading to the Cushenbury Cement Plant. The cover types are based on Forest Service CALVEG data derived over several years and may not precisely reflect the current site conditions.

II-2.1.1 – Pinyon-Juniper Woodlands

The project area is composed of approximately 66 acres of pinyon-juniper woodland vegetation, mostly occurring in the northern half. Pinyon-juniper woodlands occur on semi-arid desert-side slopes throughout California and is usually dominated by single-leaf pinyon pine (*Pinus monophylla*) and a variety of junipers (*Juniperus* sp.).

Pinyon-juniper woodlands typically are open-canopied with a sparse understory shrubs and herbaceous species. Understory shrubs are primarily Great basin sagebrush (*Artemisia tridentata*), bitterbrush (*Purshia tridentata*), mountain mahogany (*Cercocarpus ledifolius*), rabbitbrush (*Chrysothamnus* spp.), yerba santa (*Eriodictyon californicum*), sage (*Salvia* sp.), and buckwheat (*Eriogonum* spp.). The open understory and interspaces within and near the analysis area supports multiple rare plant species.

Pinyon-juniper woodlands do not typically carry fire readily, unless cheatgrass or other non-native species have become well-established. When fires do occur, they are typically intense, stand-replacing events. Mature pinyon and juniper trees are readily consumed and have low resilience from even low-intensity burns because they have thin, resinous bark, dense branching, and self-prune poorly. One study of pinyon-juniper woodlands in the San Bernardino Mountains estimated the average fire return interval to be 480 years and that active fire suppression has had little effect on this vegetation type (**Wangler and Minnich 1996**).

Pinyon-juniper woodlands recover very slowly from crown fires. More than 100 years is required before these trees once again dominate a site after a stand-replacing wildfire. Pinyon neither stump sprouts nor does its seed survive fire. Thus, for pinyon to regenerate, seeds must be dispersed into the site by seed-caching pinyon jays or rodents. Moreover, because seedlings require mature shrubs as nurse plants to germinate and grow, 20 to 40 years of shrub growth may be necessary before tree seedlings can become established (**Burwell 1999, Koniak 1985, Wangler and Minnich 1996).** This exceptionally long recovery period combined with an increase in human-caused fires has converted some pinyon-juniper woodlands to desert chaparral or desert scrub. Cheatgrass (*Bromus tectorum*) and red brome (*Bromus madritensis* ssp. *rubens*) have invaded some of these former stands and have caused an increase in fire frequency.

II-2.1.2 – Desert Scrub

The project area is composed of approximately 47 acres of desert scrub vegetation, mostly at the northern portions of the project area. Desert scrub is a generic category of short-statured shrub-dominated habitat that occurs in desert transitional instances. The vegetation community is open in character, ranges from three to four feet in height, and contains very little understory.

The lower slopes, generally above the bajada and below the mixed chaparral are dominated by blackbrush (*Coleogyne ramosissima*). Joshua trees (*Yucca brevifolia*) are sub-dominant but visually-prominent in this vegetation. This habitat is generally open and has very low resilience following fire and historically burned very infrequently. Invasion of non-native annual grasses into the interspaces has increased the frequency of fire throughout the Mojave and Great Basin and large areas of this vegetation have been lost.

<u>II-2.1.4 – Mixed Chaparral</u>

The southeast portion of the project area is composed of approximately 13 acres of mixed chaparral vegetation. This vegetative cover is characterized by its continuous and intermittent canopy of mixed shrubs with intermixed emergent tree species.

In the project area, the slopes below the pinyon-juniper woodlands support mixed chaparral with associated species including *Cercocarpus ledifolius, Arctostaphyllus glauca, Quercus cornelleus-mulleri, Quercus john-tuckeri, Ericameria linerafolia, Rhamnus ilicifolia, Ephedra viridis, and Ceanothus greggii.* The vegetation structure is generally open and does not show evidence of frequent or recent fire.

<u>II-2.1.4 – Montane Hardwood-Conifer Forest</u>

The project area is composed of less than one acre of montane hardwood-conifer forest, just along the southeastern site boundary. This vegetation community is dominated by a mixture of hardwood (oak, etc.) and pine tree species with an understory of larger shrub species. Typical species within this community are black oak (*Quercus kelloggii*), Jeffrey pine (*Pinus jeffreyi*), and interior live oak (*Quercus wislizinii*).

<u>II-2.2 – Existing Environment – Other Habitats</u>

The SQ analysis area, including the haul road and pit site, is characterized by having an abundance of rocky outcrops and steep cliff faces. On the North Slope, this habitat type provides shelter, nest sites, escape terrain, and foraging sites for a number of species including nesting birds (golden eagles, red-tailed hawks, ravens, etc.), bighorn sheep, numerous cliff-dwelling bats, ringtails, reptiles, etc. The habitat is suitable for nesting prairie and peregrine falcons.

<u>II-2.3 – Existing Environment – Wildlife</u>

Appendix A includes a list of all animal species that have been recorded from the North Slope, including in and near the SQ analysis area. Because animals move, the following discussions address species that are known from or have potential to occur in the North Slope area, and not just those that have been documented in the analysis area. It is assumed that these species may, at some time during the project's life, occur within the reach of potential effects from the proposed project.

<u>II-2.3.1 – Invertebrate Occurrences</u>

The Analysis Area supports common invertebrate fauna including butterflies, centipedes, millipedes, spiders, scorpions, and many insect orders (*e.g*., Order Hemiptera, Order Hymenoptera). The invertebrate fauna in the Analysis Area serves a vital role in providing a source of food, acting as decomposers of decaying biomass, and pollination of plant species. Some invertebrate species are highly restricted to a particular microhabitat, such as springsnails (*Pyrgulopsis* spp.) and simple hydroporus diving beetles (*Hydroporus simplex*) that may reside within Cushenbury Springs, which is outside of the Project Area but within the Analysis Area. The Project Area contains habitat for the desert monkey grasshopper (*Psychomastax deserticola*), San Bernardino Mountains silk moth (*Coloradia velda*), and Andrew's marble butterfly (*Euchloe hyantis andrewsi*).

II-2.3.2 – Fish Occurrences

There are no bodies of water in or near the analysis area that are suitable for supporting fish populations.

II-2.3.3 – Amphibian Occurrences

Amphibians typically are associated with areas that support standing or running water for breeding but many species may also use drier areas during the hot summer months if they can find shelter in moist areas beneath leaf litter and fallen logs, under rock outcrops or in unoccupied mammal burrows. Some amphibians conserve moisture by excreting a gelatinous layer around their skin that retains moisture. Some species of amphibians will move far from water sources during certain times of year and only return during the active breeding season. These xeric-adapted species conserve moisture by emerging only under high humidity conditions or when the weather is cool and/or wet.

The springs and drainages on the North Slope (including Cushenbury Springs, Marble Canyon and other drainages in the analysis area) provide potential habitat for amphibian species that require permanent water as well as species adapted to drier conditions. Most of the area proposed for the quarry expansions is not high quality habitat for amphibians. Marble Canyon and the other unnamed drainages probably support the highest quality amphibian habitat but they may currently occur throughout at the quarry and haul road site on an occasional basis.

Amphibians that are known from or have potential to occur on the North Slope include pacific western toad (*Bufo boreas*), California treefrog (*Hyla cadaverina*), and Pacific treefrog (*Hyla regilla*). Rare amphibians that may occur in the analysis area are red spotted toad (*Bufo punctatus*), large-blotched ensatina (*Ensatina klauberi*), and yellow-blotched ensatina (*Ensatina eschscholtzii croceater*).

II-2.3.4 – Reptile Occurrences

The many different types of habitats in the Analysis Area would be expected to support a high diversity of reptile species, with potential for snakes, lizards, and tortoises. Unlike amphibians, reptiles are not typically tied to areas with permanent water. Reptiles are found throughout drier habitat areas as well as riparian areas, and use many different types of substrates, including burrows, sandy or rocky areas, leaf litter, rotting logs, and even debris deposited by humans. The rock formations and rocky substrates in the Analysis Area and the Project Area provide excellent cover and foraging habitat for many species of reptiles.

Common reptiles with potential to occur in the Analysis Area include side-blotched lizard (*Uta stansburiana*), western fence lizard (*Sceloporus occidentalis*), western skink (*Eumeces skiltonianus*), great basin whiptail (*Aspidoscelis tigris tigris*), yellow-backed spiny lizard (*Sceloporus uniformis*), long-nosed leopard lizard (*Gambelia wislizenii*), sagebrush lizard (*Sceloporus graciosus*), western banded gecko (*Coleonyx variegatus*), common kingsnake

(*Lampropeltis getula*), striped racer (*Masticophis lateralis*), southern Pacific rattlesnake (*Crotalus viridis*), northern Mojave rattlesnake (*Crotalus scutulatus scutulatus*), and granite night lizard (*Xantusia henshawi*).

II-2.3.5 – Bird Occurrences

The Analysis Area supports a high diversity of bird life, due the variety of habitats, presence of springs, and the transitional nature of the site's position within the landscape. Many bird species would be expected to use the habitats in the Analysis Area as residents on a year-round basis, while others would be found only during migration or during the winter months. The Project Area is a transition zone between the mountains and deserts, and attracts bird species from each biome.

The springs and associated riparian habitats within the Analysis Area, especially Cushenbury Springs, attract migrating or wintering bird species as they travel through on their migrations between breeding and wintering grounds. There are no springs or riparian vegetation in the Project Area. The variety of vegetation types and vegetation structure in the Analysis Area and on the North Slope in general provides many opportunities for foraging, nesting, perching, and sheltering.

Common bird species that are expected to occur in the Analysis Area include: western scrub jay (*Aphelocoma californica*), common raven (*Corvus corax*), black-throated sparrow (*Amphispiza bilineata*), western wood pewee (*Contopus sordidulus*), western tanager (*Piranga ludoviciana*), phainopepla (*Phainopepla nitens*), brown-headed cowbird (*Molothrus ater*), Scott's oriole (*Icterus parisorum*), red-tailed hawk (*Buteo jamaicensis*), and barn owl (*Tyto alba*).

The wide variety of vegetation types and vegetation structure in the Analysis Area and on the North Slope in general provides many opportunities for foraging, nesting, perching, and sheltering. There are also nesting opportunities on steeper slopes and cliff faces near the Project Area, where certain species of eagles or falcons may nest. Mountain species, such as dark-eyed junco (*Junco hyemalis*), mountain chickadee (*Poecile gambeli*), and western bluebird (*Sialia mexicana*), also likely move downslope to the Analysis Area during the cold winter months.

II-2.3.6 – Mammal Occurrences

A wide variety of mammal species would be expected to use the habitats in the Analysis Area. Small mammals, such as mice, rats, squirrels, chipmunks, and rabbits are common residents that not only forage and raise their young in the habitats of the Analysis Area, but they are also an important food source for larger mammals and birds of prey. A number of small mammal species are expected to be found in rocky outcrop and rock pile habitats in the Analysis Area and Project Area. Common species of smaller mammals that are expected to occur in the Analysis Area include Merriam's chipmunk (*Tamias merriami*), California ground squirrel (*Spermophilus beecheyi*), deer mouse (*Peromyscus maniculatus*), dusky-footed woodrat (*Neotoma fuscipes*), and desert cottontail (*Sylvilagus audobonii*).

Larger mammals would be expected to use the habitats in the Analysis Area for foraging, shelter, and for movement corridors as they access portions of their territories located outside of the Analysis Area. Common large mammals that would be expected to occur in the Analysis Area include: black bear (*Ursus americanus*), raccoons (*Procyon lotor*), gray fox (*Urocyon cinereoargenteus*), desert kit fox (*Vulpes macrotis arsipus*), black-tailed jackrabbit (*Lepus* *californicus*), bobcat (*Felis rufus*), mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), mountain lion (*Puma concolor*), and Nelson's bighorn sheep (*Ovis canadensis nelsoni*).

II-3.0 – EFFECTS OF PROPOSED ACTION – COMMON TO MANY SPECIES

II-3.1 – Analysis Area Definitions

The *project area* includes the footprint of ground that would be directly affected as a result of the project activities. The *analysis area*, as evaluated under the National Environmental Policy Act (NEPA), is the maximum expected reach of direct and indirect effects of the action (*i.e*., the decision to approve the POO), and includes the project area, any connected areas that may experience environmental effects of the project, and the carbonate habitat reserve contributions being proposed as mitigation for the project.

The *federal action area*, as defined by the Endangered Species Act and associated regulations, applies only to the discussions of listed species and designated Critical Habitat under the federal Endangered Species Act. For this project, the *analysis area* is the same as the *federal action area*. The *project area* is smaller than the *federal action area* or *analysis area*. For the SQ project, the *project area* is defined as the expanded boundaries of the proposed South Quarry, the temporary construction road, and the proposed haul road.

For the SQ project, the *analysis area* and *federal action area* include the *project area* (as described above) plus adjacent areas subject to increased noise, dust deposition, and roll-down of materials, and the downstream reaches of drainages within the reaches of effects. The federal action and analysis areas include Cushenbury Springs and associated wetlands, because the project would increase water use from wells in the vicinity of Cushenbury Springs and would require maintenance of the monitoring wells, access road, and wells. The analysis area also includes the carbonate habitat reserve contributions.

Since there is no proposed expansion of Mitsubishi's processing plant (on private land), and the plant does not depend on this project to continue operating, it is not included within the project, analysis, or federal action areas.

II-3.2 – Levels of Effect Analyses

The analysis of potential effects includes direct, indirect, and cumulative associated with the proposed project. The expected likelihood, extent, severity, and duration of effects are addressed in the analysis. The factors considered in each of level of analysis are explained below.

II-3.1.1 Direct Effects

Direct effects are considered actions or activities that are immediate in space and/or time (*e.g.,* physical damage to plants; death or injury of animals, destruction of eggs, disturbance that disrupts breeding behavior, removal of habitat used for foraging, reproduction, movement, etc.).

II-3.1.2 Indirect Effects

Indirect effects are actions or activities that could result in effects to the species but are removed from the project activities in space and/or time (*e.g.,* downstream sedimentation, changes to hydrological patterns, effects to pollinators, invasive species introductions).

II-3.1.3 Cumulative Effects

This document addresses two definitions of Cumulative Effects/Impacts:

- Under the NEPA, "cumulative impacts" are those effects caused by past, present, and future federal, state, and private activities within or onto special status species and their habitats. This definition applies to the general cumulative impacts discussions (**Part II**), cumulative impacts for Sensitive species (**Part IV**), and NEPA cumulative impacts for Threatened/Endangered species (**Part III**).
- Under the ESA, "cumulative effects" only consider future non-federal activities that are reasonably certain to occur. Future federal activities or activities permitted by federal agencies are not included under ESA "cumulative effects" because any proposed future federal activities or federally permitted activities must undergo future Section 7 consultation with the USFWS. This definition applies to the cumulative effects analysis for federally-listed Threatened/Endangered species (**Part III**).

Cumulative effects/impacts consider the effects of other actions that may combine with the predicted effects of the Proposed Action. Cumulative effects/impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. The analysis area for cumulative effects analysis depends on the distribution of the species. The cumulative effects analysis area for some narrowly-distributed species can be small, but analysis for some species where local effects can be extended to a broader scale through animal movement and population dynamics are done over a corresponding larger area.

II-3.2 – Effects of Proposed Action – Common Effects to Plants and Wildlife

The following discussion describes generalized potential direct and indirect effects that may be common to many of the plants, animals, or habitats in the analysis area. These discussions may also apply to TESW species discussed in later sections of this document. Parts of these discussions will be referenced later in the specific-species discussions for those species that are known to occur or have the potential to occur in the analysis area.

II-3.2.1 – Topographic Considerations

The proposed project would result in dramatic changes to the topographic formations in the project area, specifically in the quarry and haul road footprints. The most significant changes to the topography would be the open quarry, haul road (that would require some large cut slopes), overburden sites, and berm.

The haul road and quarry footprints would require initial ground clearance and blading. A total of 133.6 (Alternative 2) to 153.6 acres (Alternative 1) would be developed as haul road and quarry. The quarry would have a maximum depth of 5,365 amsl (Alternative 1) to 5,860 amsl (Alternative 2). The maximum original ground level within the proposed quarry is 6,681 feet amsl. The quarry depth relative to this original maximum ground level would be 1,316 feet (Alternative 1), or 821 feet (Alternative 2). The maximum final ground level at SQ would be at the southern quarry rim, at about 6,600 feet amsl, and the maximum quarry depth relative to the quarry southern rim would be about 1,235 feet deep (Alternative 1) or 740 feet deep (Alternative 2). The modified topography would contrast sharply with the existing landscape in both the short and long term.

II-3.2.2 – General Effects to Vegetation Communities/Wildlife Habitat Availability

Vegetation communities would be disturbed by construction, operation, and maintenance activities that remove existing vegetation. The proposed action would result in disturbance on ~154 acres (128 for quarry, 22 for haul road, 3 for landscape berm, and 0.7 for temporary road).

Alternative 2's quarry would be smaller by 20 acres for a total of ~134 acres. Permanent, direct impacts to approximately 84 acres of pinyon-juniper woodlands, 52 acres of desert scrub, 13 acres of mixed chaparral, and less than 1 acre of montane hardwood-conifer forest would occur under Alternative 1. Alternative 2 would result in permanent direct effects of approximately 64acres of pinyon/juniper woodlands, 52 acres of desert scrub, 13 acres of mixed chaparral, and less than 1 acre of mixed hardwood-conifer vegetation.

The primary impact of the project to vegetation would be initial removal of the land surface and all associated vegetation. The development of the SQ and haul road would result in the removal or burial of the land surface and associated vegetation totaling approximately 134 or 154 acres, depending on alternative. Both of these effects represent permanent loss of vegetation. Some vegetation would return to the site over the long term through mine reclamation and natural revegetation, though in the decades (to centuries) following completion of mining, the density and diversity of this vegetation is expected to be lower than that of the pre-project vegetation.

In addition to changes in the amount and distribution of vegetation communities, there would be an associated loss of special status plant species, as discussed in later sections of this report.

As vegetated areas are a critical component of wildlife habitat in terms of foraging sites, food supplies, cover/shelter, and breeding sites, losses of or disturbance to native vegetation can affect habitat availability and quality for wildlife species. The proposed project would result in effective loss of ~134 or 154 acres (depending on alternative) of vegetated landscape that is currently available for wildlife foraging, sheltering, and breeding. The 1.8 mile long haul road and would likely result in degradation of habitat quality outside the 22 acres of haul road. The temporary construction road (0.7 acres) would be restored after approximately two years (**Austin Marshall, pers. comm. 2013**) and would become usable for wildlife foraging and sheltering over time as revegetation occurs.

During the first phases of quarry development before the entire footprint has been disturbed, some vegetated areas may remain usable by some wildlife but the amount of human activity, construction activity, and blasting would likely reduce the wildlife usage over current levels.

During the entire 40-120 years of the operation (depending on alternative), the area encompassed by and near the quarry and haul road would be degraded in terms of wildlife habitat value. Concurrent reclamation will result in reclamation and revegetation as soon as mining is completed in those areas. Thus, some areas will be revegetated before mining is completed. Even so, due to the substantial alteration of the landscape and the challenges and length of time require for reestablishing vegetation, the habitat quality over much of the disturbed areas will be degraded for many decades after the end of mining operations on the site. Some species (*e.g.,* terrestrial animals) may be permanently excluded from some portions of the reclaimed project area due to steep terrain (*i.e.,* being unable to get in or out of an open pit quarry that is ~1200' deep).

The Proposed Action includes mitigation for the habitat losses, including vegetation, rare plants, and wildlife values. Mitsubishi would convey ownership in fee of private land (Cushenbury 7P) to the U.S. and it would become part of the SBNF. Other unpatented claim lands (Cushenbury 9, 15, and 16a) held by Mitsubishi would be relinquished following mineral withdrawal. All of those mitigation parcels would be unavailable for future mining. As a result, approximately 540 acres would become unavailable for future mining in order to mitigate for the development of 154 acres. The mitigation parcels support pinyon/juniper woodland and desert transition habitats with carbonate endemic plants. This effective mitigation ratio is a product of mitigation requirements under the Carbonate Habitat Management Strategy, described in the Biological Assessment (**Part III** of this document).

II-3.2.3– Potential Direct Effects to Plants

Habitat loss from removal of the land surface, and to a lesser extent burial of the land surface, would result in the permanent loss of occurrences of multiple species of plants (**Appendix A**). While it is expected that revegetation efforts conducted under the reclamation plan will reintroduce some of these species to the site in the future, the habitat effects are considered to be permanent due to the long life of the proposed project (40-120 years).

II-3.2.4 – Potential Indirect Effects to Plants

Plants in/near the project area may be affected by erosion, deposition, dust, and changes in microclimate due to removal of vegetation.

Erosion and deposition lead to loss of topsoil, including nutrients, native seedbanks, and beneficial microflora and microfauna. Erosion and deposition can also lead to loss of whole plants through undermining or burial. Design Features for engineering, road maintenance, soils and hydrology would help reduce these indirect effects to plants and vegetation.

Deposition of dust near the quarry and haul road would affect plants by blocking stomata and stigmatic surfaces, and reducing photosynthesis (**Padgett *et al.* 2007**). Dust in the 10-micron size range can get stuck in leaf stomata (the pores that allow plants to exchange gasses). This reduction in respiration interferes with the plants ability to make carbohydrates using sunlight (photosynthesis), leading to reduced growth and vigor and increased mortality. Dust accumulated on leaf surfaces also can effectively shade sunlight from leaves, also reducing photosynthesis. Dust accumulations on flower stigmas (the female part of flowers that receive pollen) can interfere with pollination and development of fertile seeds. Mining practices and dust abatement on the haul road are expected to help reduce these effects.

Microclimate changes due to removal of adjacent vegetation would include local increases in temperature, incident sunlight, and surface wind speeds. All of these can increase the incidence heat shock and drought stress for plants, reduce growth rates and reproductive success, and increase mortality associated with heat and drought.

Ground disturbance associated with either alternative may also increase the prevalence of cheatgrass and red brome, which can form a flashy and continuous fuelbed, and thereby increase the likelihood of ignition and frequency of wildfire. Too-frequent fire can ultimately lead to type conversion of pinyon-juniper woodlands, desert transition chaparral, and blackbrush shrubland. The disturbed areas and haul road may also form an effective fuelbreak in event of a wildfire. Design features to monitor and control weeds are expected to reduce the weed risk.

The duration of effects is proportional to severity. The effects of habitat removal are considered to be permanent. Associated effects to microclimate on adjacent habitats are considered long term, and tied with successful revegetation under the reclamation plan. The effects of invasive species establishment and spread are also considered to be permanent. Effects of erosion and deposition are long-term to permanent depending on extent and severity. Effects of dust are limited to operations – 120 or 40 years (depending on alternative).

II-3.2.5 – Spread or Establishment of Non-Native Invasive Species

See the Non-Native Assessment Report (**Part VII** of this report) for a discussion of the risk of non-native plant and animal establishment and spread in the analysis area.

II-3.2.6 – Potential Effects to Habitat Connectivity and Fragmentation

Movement corridors are distinguished by "passage" species (large wide-ranging animals) and "dweller" species (smaller animals with smaller ranges) (**Beier and Loe 1992**). Long-term impediments to movement or fragmentation of habitat can result in isolation of populations, making them more susceptible to localized extirpation due to stochastic events or diminished resource availability.

Habitat continuity and connectivity on the North Slope has already been significantly affected as a result of mine development and the existence of Highway 18. **Figure 19** displays the relationship of the proposed expansion with the existing and approved operations on the North Slope.

The current conditions in the analysis area and North Slope already include some impediments to wildlife movement, pollinators, and seed dispersal (large, deep quarries; haul roads with steep cuts, areas devoid of vegetative cover, etc.) affecting some animals, including deer and bighorn sheep.

The Proposed Action and alterative would result in a narrow strip of undisturbed habitat between the Cushenbury East/West Quarries to the north, and the SQ. At its narrowest, the habitat strip would be less than ¼ mile wide (~1,100 feet), and 0.6 miles wide at the widest. The east-west strip of habitat would be about one mile long. To the south, the habitat changes from desert transition to pinyon/juniper and some mixed conifer. Under Alternative 1 or 2, that narrow strip would be further bisected by the haul road (50-60' wide plus berms, etc.) that would have a high cut wall (in some places, 40' tall).

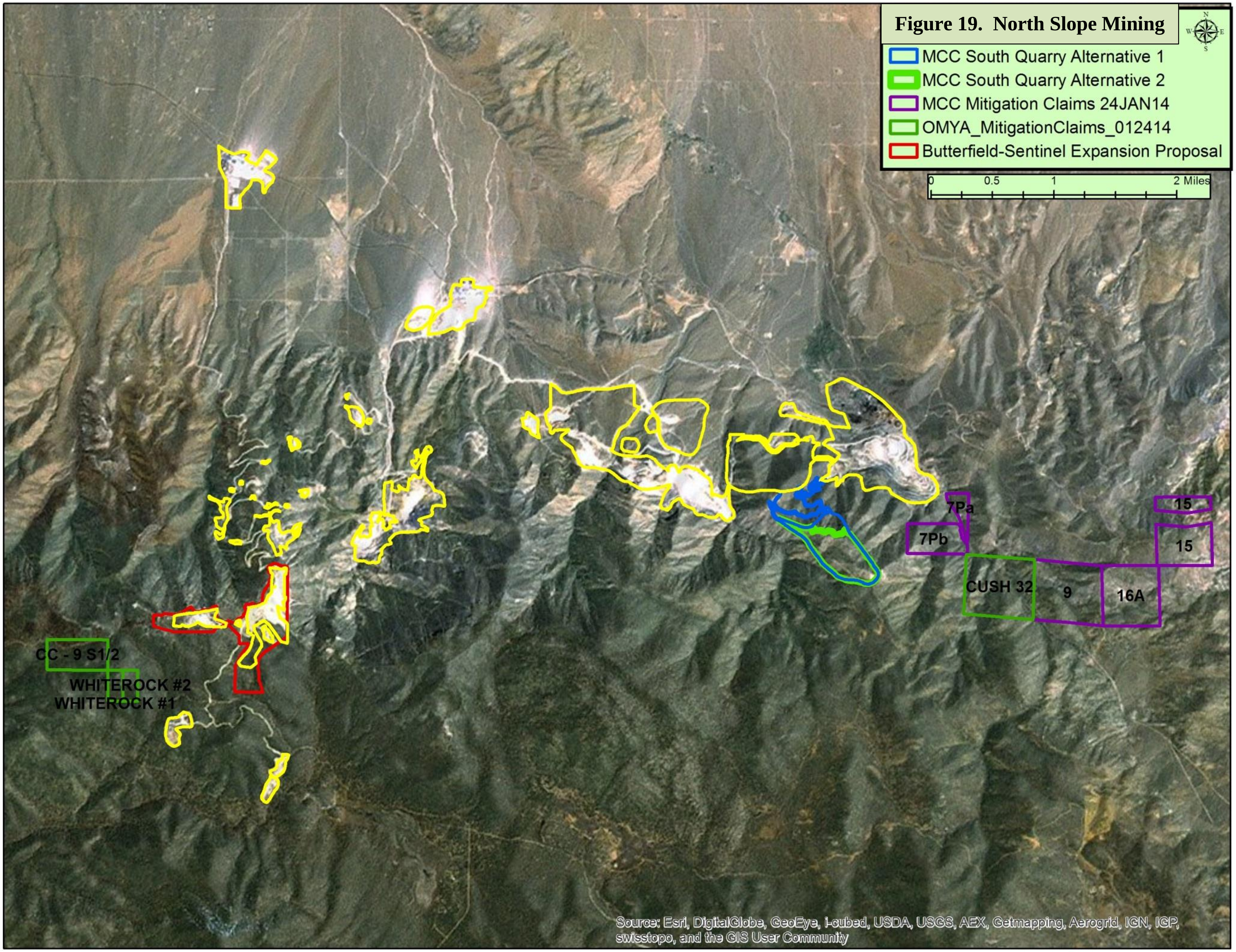


Figure 19. North Slope Mining
MCC South Quarry Alternative 1
MCC South Quarry Alternative 2
MCC Mitigation Claims 24JAN14
OMYA_MitigationClaims_012414
Butterfield-Sentinel Expansion Proposal
0
0.5
1
2 Miles
N
S
E
W
7Pa
7Pb
15
15
CUSH 32
9
16A
CC - 9 S1/2
WHITEROCK #2
WHITEROCK #1
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Either of the alternatives would substantially change the landscape in that area of the North Slope, resulting reduced connectivity of habitat areas, increased fragmentation, and the potential for isolation of groups of animals due to inhospitable or terrain and inability to move across the haul road. The movement of both "dweller" and "passage" species may be affected by development of a large-scale quarry and haul road which may be impossible for some species to cross. Likewise, with the amount of open space available on the North Slope and habitat connectivity east-west and north-south would be affected.

The proposal would result in these conditions being present long-term (120 years for Alternative 1 and 40 years for Alternative 2 plus the reclamation period after completion of mining) after approval, depending on alternatives). The cleared haul road with tall steep cut slopes and use of the haul road would represent a challenge to animal movement, both in terms of finding feasible crossing sites and avoiding being hit by vehicles.

In addition to past and currently-approved operations, the North Slope habitat connectivity is likely to continue to be affected by future mining. Omya's proposed Butterfield-Sentinel quarry expansions and proposed White Knob expansion may further fragment habitat and pose movement impediments. The White Knob proposal is expected to affect 2.5 acres of ephemeral streams that function as wildlife corridors (**Lilburn 2013)**; Omya's Butterfield-Sentinel quarry proposal would not affect any new drainages. Over the life of the project, it is reasonable to assume that other mining operations may further affect connectivity and movement through fragmentation and creation of impediments to movement.

Both alternatives include mitigation through relinquishment of 540 acres of mining claims. The mitigation claims are located east of the proposed South Quarry site (**Figure 19**). Although data indicate that they are not important movement corridors for Nelson's bighorn sheep (see later discussions), they likely do provide movement corridors for other more common species. The prohibition of future mining at those claims combined with Omya's mitigation claim (Cushenbury #32) for its proposed Butterfield-Sentinel quarry expansion would prevent future fragmentation of the habitat in and across Cushenbury Canyon and preserve the movement corridor (**Figure 19**).

II-3.2.7 – Hydrologic Considerations and Potential Effects to Aquatic, Riparian, and Drainage Habitats

Several reports addressing hydrological considerations have been prepared for this project (**GLA 2012, Lilburn Corporation 2012, Golder Associates 2013, Barto 2012**).

On July 17, 2013, Golder Associates issued a report detailing a limited hydrogeological investigation at the Mitsubishi Cement Cushenbury Mine and Cement Plant. The work consisted of collecting water elevation data during different groundwater pumping scenarios to assess potential impacts on Cushenbury Springs from the anticipated increase in groundwater demand when the proposed South Quarry becomes operational.

Of the four wells within the MCC operating area, only Well 1 and Well 4 are active. There is no current intent to reactivate Well 2 and Well 3, and these wells were not included in the Golder investigation. There are also 4 monitoring wells (MW1-4). Of these, only MW-1 and MW-3 were used in the investigation. Surface water at Cushenbury Springs was also included in the investigation.

The report stated that data suggest that water from Monitoring Well 3 and the surface water of Cushenbury Springs is similar and distinct from Monitoring Wells 1, 2, and 4. The report documented a hydrological connection between Well 4 and Monitoring Well 1 (upslope and to the south), based on observations of depth to water during the pumping scenario tests. There was no indication, based on the pumping scenarios evaluated, that there is a significant current effect of pumping groundwater from Well 1 and Well 4 on water levels at Cushenbury Springs.

Since this investigation was of limited scope, and hydrogeological systems can change over time in response to climate and fault movements, a design feature of the project (**GEN-14**) provides a safety net for possible future effects of the SQ project water use to water levels at Cushenbury Springs.

Riparian Conservation Areas (RCAs) (**Figure 20**) are areas defined in the SBNF LMP to provide for management of riparian resources. They are areas that consist of geographically distinct resource values and characteristics, which are composed of the aquatic and riparian resources, floodplains, and wetlands. They include, but are not limited to, meadows, all areas within a horizontal distance of 328 feet (100 meters) from the edge of perennial streams, and lakes/reservoirs or within approximately 98 feet (30 meters) of the edge of seasonally flowing/intermittent streams (FSH 2509.22)**.**

The Jurisdictional Delineation Report (**GLA 2012**) addresses five unnamed drainages (identified in the report as drainages A-E) and Marble Canyon (**Figure 21, Figure 22,** and **Figure 24**). The report states that no riparian vegetation is present in any of the unnamed drainages or in Marble Canyon.

While lower portions of the unnamed drainages are not expected to be affected (see **GLA 2012)**, the upper portions of the drainages are in the footprint of the quarry haul road or development (**Figure 21**). In addition to Marble Canyon and the five unnamed drainages, the analysis area includes Cushenbury Springs, a small wetland/desert oasis with large cottonwood trees and other wetland associated vegetation. Cushenbury Springs supports wetland conditions and riparian vegetation.

North-facing drainages on the North Slope have relatively few wildlife surveys. It is likely that these drainages support important and isolated populations of terrestrial species. Additionally, many of the drainages have more moisture and stringers of vegetation that is different than the surrounding areas. Additionally, the unnamed drainages, Marble Canyon, and Cushenbury Springs provide important habitat for foraging, breeding, shelter, migratory refueling stopovers, and movement corridors. None of those areas support fish. However, the drainages and Cushenbury Springs likely support some amphibians (tree frogs, western toads, ensatina, and possibly red-spotted toads). Cushenbury Springs may support unique macro-invertebrates.

Figure 20. Riparian Conservation Areas

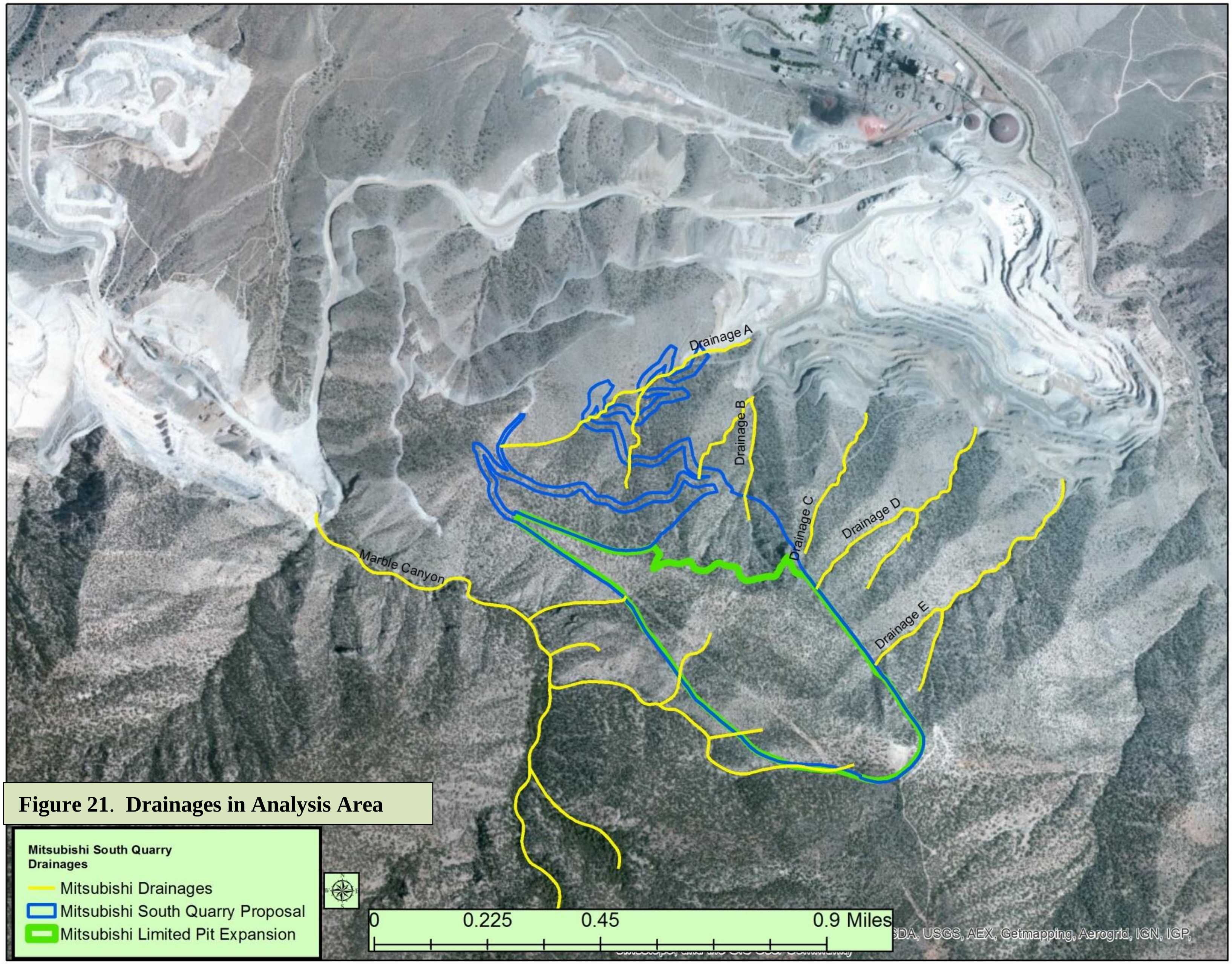


Figure 21. Drainages in Analysis Area

Figure 22. Drainages in the Analysis Area – looking towards the south.

Figure 24. **Drainages in Analysis Area – looking at Marble Canyon on West of South Quarry**

Effects to Drainages: Each of the alternatives would affect some of the five unnamed drainages **(Figure 21**). Under the Proposed Action and the alternative, there would be effects to Marble Canyon and drainages A-E from the quarry, haul road development, and haul road use and maintenance. The effects to A and B would be the greatest because the haul road and quarry would be in the drainages. The tops of drainages C-E would be affected by quarry development; the bottom of those drainages may not be affected except by occasional roll-down of rock. The northern fork of drainage A would be bisected by a haul road switchback and there would be an additional bisection lower down. A small portion of upper part of drainage B would be affected by the haul road. Under Alternative 2, the quarry would have a smaller footprint and not affect drainages A and B but drainage A would still be affected by the haul.

While none of the unnamed drainages or Marble Canyon support surface water or riparian vegetation, they have important for habitat and movement corridors that may be altered or eliminated due to haul road construction.

These drainages are likely to have deposition of rock and sediment due to side-casting and slope instability. Because of the instability of the slopes on site (due to steepness, the high cuts that would be required, and geology), it is likely that drainages would experience some roll-down deposition of rocks. Trees, shrubs and other vegetation on the slopes and in the canyon bottoms and ephemeral seasonal surface expression of water may be affected. This may also result in loss of available water and alterations in vegetation communities.

The continuity of affected drainages habitat may be fragmented in places and movement by some terrestrial animals impeded. Some of the micro-climate features of drainage bottoms may also affected.

Mining excavation methods are expected to reduce the potential for roll down effects. These methods include limiting the drilling and blasting when the outer quarry rim benches are being cut; blasting designed to undercut the outside wall; and excavating material by pulling it into the quarry. In addition, roll-down and deposition will be minimized by using the measures described in the Erosion and Sedimentation Control section of the Plan of Operation and Reclamation Plan.

Effects to Cushenbury Springs:
a) Baseline and Existing Environmental Conditions: See above for a discussion of baseline conditions related to groundwater extraction. In addition, MCC has a water pipeline through Cushenbury Springs that brings water from backup wells in Lucerne Valley to the MCC plant. There is an unpaved access road through the spring oasis for maintenance of the pipeline. Activities of MCC personnel in the Cushenbury Springs area, including road maintenance and water sampling at the spring, could disturb breeding birds and other animals.

Water quality sampling occurs twice a year in April and October. This is a low impact activity involving 1-2 people and hand-held equipment. The potential for disturbance of wildlife is relatively low.

The unpaved road is only used for pipeline inspection and maintenance. The pipeline inspections are not regular but occur after storms that have the potential to affect it. Likewise, road and pipeline maintenance is done infrequently in response to need. Inspections involve a single person in a pickup truck. Road or pipeline maintenance would involve several people and one or two pieces of equipment.

b) Potential Effects of Proposal: Under either action alternative, the development of the SQ would increase water extraction by 12.1% over existing conditions. Changes in surface or subsurface water (if any) at Cushenbury Springs could result in effects to wetland-dependent vegetation and habitats of associated species. The Golder investigation described above (see above) did not detect a significant connection between either of the production wells in current and proposed-continued usage and Cushenbury Springs. However, since this investigation was of limited scope, and hydrogeological systems can change over time in response to climate and fault movements, a Design Feature of the project (GEN-14) provides a safety net for possible future effects of the SQ project water use to water levels at Cushenbury Springs. No near-term effects from SQ to Cushenbury Springs are expected, and longer term effects, if any, would be minimized through application of Design Feature GEN-14.

II-3.2.8 – Disturbance/Displacement/Abandonment – Wildlife

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects discussed below would have a longer duration for the proposed action compared to Alternative 2.

Use of heavy equipment, small machinery, haul trucks, blasting, and presence of crews would result in higher noise levels and would likely displace animals that are foraging, denning, or breeding in the area. These effects and displacement distance would vary by species. It is likely that some species would completely abandon the area around the quarry and within a distance from the haul road.

Disturbance effects on wildlife species have been well-documented for a number of species including deer, small mammals, reptiles, and nesting and perching birds. Most species exhibit a "flight" response to disturbance resulting in temporary, or if disturbance is constant, permanent displacement. Flight responses and/or disturbances can negatively affect animal health by requiring increased energy expenditures.

Animals respond to disturbances through behavioral and/or physiological responses. Disturbance responses are typically classed in three ways: attraction (curiosity, food-seeking), tolerance, and aversion. Stress requires energy expenditure. In some cases, stress may require more energy than an animal can take in, so they must use body energy reserves. Continuous stress may eventually cause illness or death. Stress combined with other factors such as severe winter conditions or constant disturbance may cause individuals to die or fail to reproduce. In such cases, populations would decline. When disturbance occurs over a large region for many years, some animal populations may be unable to continue to reproduce and survive in the area (**Knight and Gutzwiller 1995**).

The distance of displacement depends on several factors: quality of vegetative and topographic cover (line-of-sight from disturbance points); amount and type of disturbance; timing of disturbance (*e.g.* noise during the day may not affect a nocturnal species, and animals may be more or less tolerant of disturbance during breeding season); and tolerance for disturbance (*e.g.* hunted populations are generally more likely to flee from disturbance than nonhunted/protected populations) (**Knight and Gutzwiller 1995**).

Potential disturbance effects include: alteration of habitat use (avoidance or abandonment of an area – either temporarily or permanently), interruption of reproductive activities (courtship, mating, prenatal care, nesting, etc.), and increased predation (especially of abandoned nests) (**Knight and Gutzwiller 1995**).

Birds are especially sensitive to background noises. Being able to differentiate vocalizations of the same and different species from background noise is important for pair bonding, breeding displays, territory defense, flock communication, etc. (http://www.fhwa.dot.gov/environment/noise/noise_effect_on_wildlife/effects/effects.pdf). Continuous or frequent background sounds may interfere with feeding, breeding, territory defense, and avoiding predators.

Noise and mining activities at night may also disturb nocturnal species. Blasting would not be conducted at night (due to safety reasons) but night-time mining activities would occur. Noise from night-time mining activities may interfere with interspecific and intraspecific vocalizations/communications, territory establishment and defense, courtship, breeding, and foraging success.

Animals in the areas around the active mining areas would be subjected to the greatest levels of disturbance-associated effects; effects would diminish with distance from the active mining areas. Disturbance-associated effects can be expected to last for the duration of the active mining and reclamation activities.

II-3.2.9 – Death and Injury of Individuals – Wildlife

Some losses of individual animals are likely due to the various activities associated with the proposed project. The potential for death or injury of animals depends on time of year, activity patterns of the individual species, and the activity taking place. One of the activities with a high risk of death/injury would be during the activities associated with initial ground clearing and construction of the roads, berms, and facilities. Animals nesting or denning in trees, shrubs, and under rocks may be injured or killed during ground clearing. Additional losses may occur during the blasting and moving of rock and overburden. Equipment use may result in losses of fossorial species if burrows or rotting logs are crushed or moved.

Because ground-clearing, construction, and mining activities would occur at any time of year, the risk includes loss of nests, eggs, and chicks of ground and shrub nesting birds. The Design Features include pre-clearance surveys for nesting birds and should help avoid some direct effects during that phase. Losses and injury to slow-moving terrestrial species, such as snakes, would also be likely.

Death or injury of individual animals would also be possible during the lifespan of the mining operations (until 2054 or 2134, depending on alternative). Blasting, digging, rock moving, and equipment use has the potential to kill or injure animals by crushing, burying, etc. Rock piles and rock outcrops that are left undisturbed for periods of time, even short, would likely become occupied by small mammals and reptiles; they would be at risk during blasting and mining operations. Small crevices in rock outcrops provide roosting, hibernating, and breeding habitat for several species of bats. They would also be at risk during mining operations.

Animal death or injury may also occur from collision with mining vehicles along the haul road to the South Quarry as well as along roads accessing the MCC plant (Highway 18) and internal mine access routes. Fully-loaded haul trucks, even when moving at slow speeds, have difficulty stopping quickly; thus, the risk of collisions with animals is higher for those vehicles. Small and difficult-to-see animals are at the highest risk.

Direct losses of animals may occur as a result of disturbance (*e.g.,* where flushing of adults off of nests or abandonment of nests results in loss of eggs or young birds due to predation or exposure). Increased abandonment of nests may occur in and adjacent to the project area (especially as a result of disturbance associated with blasting).

II-3.2.10– General Effects to Breeding Animals

Disturbances prior to nesting/breeding season may result in abandonment of breeding areas (*e.g.,* nests, lambing areas, etc.) and disruption of courtship behaviors resulting in failure to reproduce or moving to adjacent areas and competing with other individuals for resources. Disturbance after breeding has started may result in losses of the season's reproduction if the animals abandon existing nests, eggs, or offspring.

Nests in trees and bushes may be destroyed during vegetation removal. Additionally, nests on the ground or in rock outcrops are also susceptible to destruction by ground-based equipment and mining operations. For birds, adults are likely to escape injury or death since they would fly at the beginning of the disturbance. However, eggs and nestlings would not be able to escape and would either be killed or injured. The Design Features include pre-work surveys for nesting birds and should help avoid some direct effects during that phase.

II-3.2.11 – Potential Effects to Cliff and Rock Outcrop Dwelling Species – Wildlife

A number of animals, including some Forest Service Sensitive and SBNF Watchlist species, use rock outcrops and cliffs for denning, foraging, escape terrain, and breeding sites (including bats, ringtails, ground squirrels, badgers, raccoons, bighorn sheep, mountain lions, swallows, golden eagles, ravens, hawks, wrens, owls, snakes, lizards, salamanders, invertebrates, etc.).

The analysis area contains steep slopes, upon which there are some rock outcrops and prominences that are potential bird nesting sites. Where those occur within the footprint of the SQ or haul road, the proposed action would result in a permanent loss of those potential nest sites for these species. The SQ project would result in recontouring of existing cliff/rock outcrop habitat, thus reducing the availability of habitat for cliff/outcrop dependent species in the analysis area.

Ultimately, after mining activities and reclamation activities cease on each quarry bench, some of the quarry benches may become usable habitat for nesting, denning, and escape terrain for some species. Because of the difficulty replacing top soil on quarry benches, revegetation is expected to be sparse and patchy for many years after reclamation. As such, foraging habitat and cover on cliffs and rocky outcrops are expected to be limited for many years after reclamation.

Due to the extended lifespan of the project, there is a degree of uncertainty about the extent and scope of the effects of displacing some species from the steep terrain in the vicinity of the mining operations.

<u>II-3.2.12 – Potential Effects to Log-Dependent, Fossorial, and Small Terrestrial Animals</u>
Some Sensitive and Watchlist terrestrial species, such as salamanders, lizards, snakes, burrowing rodents, chipmunks, and badgers may be affected by the removal of downed logs and by equipment use during ground-clearing phases.

The project would result in removal of all surface materials within the quarry and haul road footprints. Habitat for log-dependent species would be eliminated over 134 or 154 acres, depending on alternative. Project activities would likely result in some losses of soil nutrients and soil production, and increased levels of soil compaction due to the use of heavy equipment. Compaction of soils may result in some effects to fossorial species if compaction occurs when they are in their burrows. It may also prevent burrowing in compacted areas over the life of the project.

After ground-clearing phases have been completed, the potential for effects to fossorial and log-dependent species would be reduced.

<u>II-3.2.13 – NEPA Cumulative Effects</u>
This discussion is using the NEPA definition for cumulative impacts (see **Part II-3.2).** The Endangered Species Act definition is used for the evaluation of Threatened and Endangered species in **Part III**. For the purposes of this cumulative effects evaluation, projects occurring within similar carbonate substrates and desert transition habitats are considered. The cumulative effects analysis area also includes projects occurring within the local distribution of affected species and habitat types. The cumulative effects analysis area varies by species group, and focuses on the area of maximum reach of direct and indirect effects of the project, including population-level effects to species.

II-3.2.13.1 –Past, Current, and Foreseeable Future Effects under NEPA Cumulative Effects
The LMP and supporting EIS contain discussions of various past influences on the SBNF; those discussions are incorporated by reference. Past activities and their effects to species/habitats are described in the "Baseline Condition" discussions for each species. Past actions that have affected the species addressed in this report include: Partin limestone mine, Blackhawk Mountain gold mine, SMI's (formerly Pfizer) existing and past operations, Omya's (formerly Pleuss Staufer) existing and past operations, Mitsubishi's (formerly Kaiser Cement) existing and approved mines, Right Star limestone mine in Cactus Flat, Bertha Peak communications site, and Lakeview tract recreation residences.

Ongoing activities are recurring activities that have occurred over time and affected the species and habitats discussed in this project, and will continue to occur. These include: road use and maintenance, trail use and maintenance, recreational use of the SBNF, hazard tree removal along Southern California Edison (SCE) powerlines (Doble Circuit) along and State/County highways, SCE' periodic replacement of deteriorated poles, and use and maintenance of State Route 18 on NFS land. In terms of the species and habitats included in the analysis area, the effects of past and ongoing activities are included in the species-by-species discussion of existing conditions/ baseline.

There are several current activities/actions in the cumulative effects analysis area that are in the implementation phase. Current Forest Service projects (including Forest Service authorized actions) occurring on the North Slope and in the habitats of the species discussed include: Omya Sentinel Quarry; reclamation at Omya's Cloudy and Claudia quarries and associated haul road; reclamation at SMI's Furnace Canyon quarry and associated areas, reclamation on Mitsubishi's Cushenbury 17a and 17b claims.

Non-federal activities that are currently being implemented and may contribute to the cumulative effects of this project include SMI's active mining operations on non-federal land, Mitsubishi's Cushenbury East quarry and West quarry on non-federal land, Omya's operations on non-federal lands; sand and gravel operations on non-federal land; SCE transmission lines on non-federal lands in Cushenbury Canyon, Furnace Canyon and Lucerne Valley, State Highway 18 use and maintenance, use and maintenance of the railway serving Omya, SMI and Mitsubishi processing plants, and rural residential development in Lucerne Valley. Past mining projects on private land have also created conservation areas on private land for carbonate habitats and bighorn sheep. These areas are accounted for in the baseline conditions.

MCC has ongoing activities in Cushenbury Springs (*e.g.,* maintenance of a road, wells, and pipeline). These activities are not project-related (that is, they would continue regardless of the proposed project) and are not considered indirect effects to the proposed project. The effects of these activities on the springs (including habitat quality and disturbance), are considered cumulative effects.

There are a number of actions/activities in the foreseeable future. These are federal and non-federal projects that are in planning stages or will be soon but have not yet been approved.

Currently, the SBNF is evaluating a proposal by Omya that entails development of a new limestone quarry at Butterfield 3 and an expansion of the existing Sentinel Quarry. That project is located several miles to the west of Mitsubishi's proposed project, between Furnace Canyon and Crystal Creek, on the North Slope. The suite of species and the habitat conditions are similar to those known/expected at the Mitsubishi site. The proposal would result in 29 – 77 new acres being developed into quarry and associated mining facilities, for a total of 166 – 215 acres for their permit area. The proposal predicts operations until 2045 or 2065, depending on alternative selected. Their current approval allows for mining of the Butterfield quarry until 2016 and the Sentinel quarry until 2036.

SCE has approached the SBNF about removing and replacing 300+ utility poles for their Doble 33 kV electrical transmission line. Part of that circuit is in Furnace Canyon on the North Slope.

The SBNF's North Big Bear Fuels Reduction project is in the analysis phase. The Baldwin Fuels Reduction project is approved but not yet in implementation. Vegetation management activities are focused on fuels reduction and forest health projects. Most of the Baldwin fuels reduction project and about half of the North Big Bear area is in pinyon/juniper habitat that is similar to that found at the site of the proposed SQ project. The SQ site is more desert-influenced but many of the species are the same as found in the two fuels-reduction project areas.

The SBNF is working with CalTrans and Federal Highways Administration on a "perfection of title" project that would grant easements on NFS lands to rights of way generally 100 feet on either side of the centerline of all State highways on the SBNF. Each State highway is being evaluated separately. It is likely that ownership along State Route 18, including the section that goes through pinyon/juniper and carbonate habitat (between Baldwin Lake and the Forest boundary near the Mitsubishi plant) will be evaluated for transfer of title within the next 5 years. As such, the Forest Service would likely lose some discretion over what occurs along the highway, and therefore may not provide CalTrans with project-level Design Features to protect rare species and the habitats in that area. Those authorities and responsibilities would fall to the Federal Highways Administration and CalTrans.

There are additional non-Forest Service actions that are in the foreseeable future in the cumulative effects analysis area. Omya has proposed an expansion of their existing approval for 145 acres at the White Knob quarry that would result additional 190 acres for a total of 335 acres of disturbance under their mining plan. Under Omya's expansion proposal, the White Knob operation would be extended from 2031 to 2055, with a 10-year reclamation period. As a result, any associated effects, including disturbance and risks of death/injury along haul and access roads, would be extended longer into the future.

Omya's proposed White Knob expansion would lead to no new loss of threatened or endangered plant occurrences, but would cause loss of pinyon pine woodland, a small patch of montane riparian habitat, and steep limestone outcrops potentially suitable as habitat for special-status plants. Mitigation measures are incorporated to minimize impacts to these species from the White Knob project. These include measures to minimize quarry operation disturbance to adjacent habitat and to reclaim the proposed expansion area at the completion of mining.

II-3.2.13.2 - Climate Change

In 2008, the Forest Service Chief made climate change a national priority for the Forest Service and formalized a process and responsibilities for addressing climate change (**USFS 2008, USFS 2009**). The SBNF LMP (**USFS 2006**) contains resource-specific discussions of the potential effects on climate change as part of the cumulative effects to those resources.

The specific effects of climate change in the analysis area over the long life of the project are impossible to predict. However, the patterns of climate change have been well-documented and are somewhat predictable. For the sake of this discussion, it is assumed that approval for this project would occur in 2015 and the mining operation would last until 2055 or 2135 plus the reclamation period.

In southern California, climate change is expected to result in the following changes: the average temperatures will rise, heat waves, droughts, and extreme precipitation events will become more frequent, snowpacks will decrease, and spring runoff and streamflow will occur earlier in the year (**Cayan *et al.* 2008**).

The levels of seasonal and annual temperatures are now higher than the highest temperatures recorded and the rate of change is fast. Models show that the amount of warming by 2100 will reach 4-10^{o}F above current averages, depending on greenhouse gas emissions rates. While the exact climate projections are uncertain, it is predictable that the rate of warming will increase substantially over the current rates. It is difficult to predict how the amount of warming may differ seasonally and how it will affect different parts of southern California's landscape. The models suggest that southern California's heat waves that typically occur in July and August will start earlier and extend into the fall. By the end of the century, the number of heat wave days may increase by a factor of four or more. (http://www.scag.ca.gov/sotr/climatechange.htm)

Climate change is also expected to result in changes in the amount and timing of precipitation, affecting surface and ground water conditions. More frequent drought periods and longer hotter summers are predicted. The models suggest that California's cool season Mediterranean patterns will remain due to the North Pacific winter storm tracks. (http://www.scag.ca.gov/sotr/climatechange.htm)

The effects of climate change on ecological function include changes for plants and animals in phenology, distribution, physiology, behavior, etc. (**Walther *et al.* 2002, Parmesan and Yohe 2003, Root *et al.* 2003, Walther *et al.* 2005, Parmesan 2006, Walther 2010**). **Parmesan (2006)** found a shift in species upslope and northward as climate changes. **Parmesan and Yohe (2003**) found shifts upper elevation and northern distribution in trees, insects, and birds as a result of climate change. Species with isolated or disjunct distributions or at their elevation limits are especially vulnerable.

Work in the Santa Rosa Mountains (**Kelly and Goulden 2008**) found that vegetation shifts as a result of climate change can be rapid. They documented rapid upslope shifts in vegetation over a 30-year period.

Over the life of the proposed project, climate change will almost certainly result in changes to the distribution and status of plants and animals in and near the analysis area. The distribution of some of the desert species may extend farther up in elevation in/around the analysis area. The vegetation community patterns may change over the landscape with the pinyon/juniper communities dying off at the northern/lower edges being replaced by desert transition vegetation.

Similarly, predicted changes in frequencies and durations of droughts and dry periods are likely to result in changes to water tables and surface water conditions. Species that depend on riparian areas and drainages (Cushenbury Springs, Marble Canyon, and Burnt Flats) may be vulnerable.

Because climate change is expected to result in longer and more severe drought conditions across the western United States, larger and more catastrophic wildfires, loss of resilience by vegetation following fire, and species extirpations are also likely to occur. (**MacKenzie *et al.* 2011**)

Climate warming associated with elevated greenhouse-gas concentrations may also create an atmospheric and fuel environment that is more conducive to large severe fires. General circulation model studies suggest that fire occurrence or area burned could increase across North America under a doubled CO_2 environment because of increases in lightning activity, the frequency of surface pressure and associated circulation patterns conducive to surface drying, and fire-weather conditions in general that are conducive to severe wildfires.

A warmer climate is expected to amplify the effects of drought and is expected to increase the number of days in a year with flammable fuels, thereby extending fire seasons and area burned in ecoregions where fire extent is linked to fuel conditions. Most forests in the western United States fall into this category. In arid ecosystems, increased drought could reduce fuels to the point at which annual fire extent actually decreases. Total forest area may also decrease with conversion of some forests to grasslands from the effects of more frequent fire. Further confounding predictions for arid ecosystems could be the continued spread of invasive plants such as cheatgrass, which will increase fuel connectivity and fire frequency. Overall, more fire is expected in western forests and rangelands for the foreseeable future, because of the preponderance of ecosystem types in which drought is strongly correlated with area burned. (**Source: McKenzie *et al.* 2011**; Wildland Fire and Climate Change -January 17, 2011. U.S. Department of Agriculture, Forest Service, Climate Change Resource Center. http://www.fs.fed.us/ccrc/topics/wildland-fire.shtml)

In a January 2014, the Forest Service issued a summary of current and probable future trends for climate and climate-driven processes for the SBNF (**USFS 2014**). The following two paragraphs summarize this report (see **USFS 2014** for a full discussion of current and predicted climate change effects in the SBNF).

Predictions are difficult due to the extent to which General Circulation Models (GCMs) that are used to simulate future climate scenarios disagree with respect to probable outcomes of climate change (*e.g.,* trends in temperatures, etc.). However, there was a consensus in the GCMs in terms of predicting a warming temperature for California. Drier summers and wetter winters were predicted by some models while the overall precipitation may not change. Even if precipitation levels do not change, increases in temperature lead to an increase in evapotranspiration and thus drier ecosystem conditions overall. With higher minimum nighttime temperatures and other changes, projected changes include replacement of conifer-dominated forests with broadleaf trees, expansion of shrublands into conifer types, and expansion of grasslands. (**USFS 2014)**

The models indicate that endemic plants that specialize in uncommon or sparsely-distributed habitat will have difficulty responding to changing climatic conditions by migrating. These species are at high risk of extirpation due to localized disturbances (*e.g.,* fire, floods, invasive species, etc.). An overall decrease in suitable habitat for some native animals, especially currently-rare species and those with limited distributions or specialized habitat types, leads to potential changes in animal community composition in southern California's National Forests. In addition, climate change may facilitate the spread of non-native animals (*e.g.,* Argentine ants) that are currently limited by nighttime minimum temperatures. Another indirect effect of climate change includes the loss of synchrony between reproductive or migratory phenology and resource availability (*i.e.,* mismatch of egg-laying relative to food availability, asynchrony of pollinators for plant species, etc.). (**USFS 2014)**

Over the life of the proposed project (120 years for Alternative 1; 40 years for Alternative 2), climate change may result in substantial changes to local plant and animal population size, distribution, and status.

II-3.2.13.3 - Cumulative Effects to Plants and Wildlife
Specific cumulative effects will be discussed for the Sensitive and Threatened/Endangered plants and animals in those sections of this document. In general, the continued development of the North Slope is expected to result in fragmentation of habitat, barriers to movement, and loss of habitat. These effects are cumulative across the North Slope. Continued development is also expected to result in further carbonate habitat reserve contributions under the CHMS, and management of these lands for the conservation of carbonate species and the habitat upon which they depend. This habitat protection and management effort is expected to substantially offset the cumulative effects of current and future development on the North Slope.

All of the potential effects discussed above in **Sections II-3.2.1** through **II-3.2.12** are occurring or are foreseeable as a result of other projects on and near the North Slope. Many of them are currently or will be expected to affect the same species.

II-3.2.14 – Degree of Uncertainty
Because of the longevity of the proposed project, there is a high degree of uncertainty in predicting the project effects between now and the completion of reclamation. Additional plants and animals and critical habitat may be listed/designated under to the federal Endangered Species Act. Some of those may include species that are currently on the Sensitive or Watch lists. Others may be down-listed from Endangered to Threatened or delisted. Some species may become extinct or be extirpated from the area. Likewise, the Regional Forester's Sensitive and SBNF's Watchlist species are likely to change over the duration of the project. Pertinent environmental laws, regulations and policies may change in fundamental ways over this time period.

The effects of climate change, as discussed above, will likely result in changes to distribution and status of rare species and vegetation patterns over the North Slope landscape. Species for which effects are evaluated may move out of the project area, and species that have not been evaluated may move in. Additional fragmentation of habitat and isolation of species may occur early in project development, as discussed for individual species. However, it is difficult to predict when, where and to which species habitat effects will affect species populations, and to what degree. Plants and associated species (*e.g.* pollinators) will likely shift upward in elevation over time in response to changing temperature and precipitation patterns, and barriers to dispersal could lead to loss of populations. Plants and pollinators, among other mutualistic interactions, may become decoupled as a result of these shifts. How, when, and to what extent the SQ project will ultimately affect the species and vegetation discussed in light of these concurrent changes is unknown.

II-4.0 – EFFECTS OF NO ACTION

Under the No Action, the baseline condition would persist. Mitsubishi would retain existing mineral rights but mining and reclamation would not occur under the subject mining and reclamation plan. Vegetation, including Threatened, Endangered, Sensitive, Watchlist, and common species, would not be removed or disturbed under the subject mining and reclamation plan. Individual plants, plant communities, and special soil types that support rare plant habitats would not be altered under the subject mining and reclamation plan. Associated carbonate habitat conservation measures would also not occur as proposed.

It is reasonable to expect that, in order the keep the Cushenbury Cement Plant operating, the calcium carbonate deposits that would be recovered under the SQ mining plan would be recovered under a future mining plan, or alternatively that the needed ore would be mined elsewhere in the region, and transported to the plant.

PART III: BIOLOGICAL ASSESSMENT OF EFFECTS TO THREATENED, ENDANGERED, PROPOSED, AND CANDIDATE SPECIES

III-1.0 - INTRODUCTION

This Biological Assessment (BA) part of this document addresses proposed and listed Threatened, and Endangered (T/E) species and their proposed and designated Critical Habitat. Under agreement with USFWS, the Forest Service only addresses Candidate species in programmatic consultations. Because this is a project-level analysis, Candidate species are not addressed in the Biological Assessment. (There are no Candidate species, proposed species, or proposed Critical Habitat that may be affected by this proposed action).

The primary purpose of this BA is to determine the character of the effects, if any, on the species present in the action area. As noted in the USFWS Consultation Handbook (USFWS and National Marine Fisheries Service 1998: xvi), "no effect" determinations are appropriate where the proposed action will not affect a listed species or designated Critical Habitat. Where species are not present in the action area and no effects are reasonably certain to occur on the species, "no effect" is the appropriate determination.

The Consultation Handbook clarifies that a "may affect, not likely to adversely affect" determination is appropriate where effects on listed species are "expected to be discountable, insignificant, or completely beneficial" (USFWS and National Marine Fisheries Service 1998: xv–xvi).

The Consultation Handbook further explains that "insignificant effects relate to the size of the impact and should never reach the scale where take occurs" (USFWS and National Marine Fisheries Service 1998:3–12). Conversely, where an effect is not discountable, insignificant, or completely beneficial or anticipated take is likely to occur as a result of the proposed action, the appropriate determination is "may affect, likely to adversely affect" (USFWS and National Marine Fisheries Service 1998: xv–xv).

The standard for determining whether or not an effect should be considered in the effects analysis is whether such effect is "reasonably certain to occur" (see 50 CFR 402.02, "Interagency Cooperation;" Final Rule, 51 *Federal Register* 19926, 19930–19934 [June 3, 1986]). Only those effects that are reasonably certain to occur are relevant to the effects analysis. That an effect is possible does not meet this standard; it must be shown that such effect is reasonably certain to occur to warrant consideration under ESA Section 7. The effects analysis must address the direct, indirect, interrelated, interdependent, and cumulative effects of an action.

In order to conduct an effects analysis for T/E plants and animals, there are many effects to consider in addition to those effects within the footprint of the mine. These include effects of noise, human activities, vehicle traffic, vibrations, light, air quality, and changes in groundwater and surface water quality and quantity that could occur resulting from mining and associated activities.

Federal Action Area: The *federal action area,* as defined by the Endangered Species Act and associated regulations, encompasses the maximum potential reach of direct and indirect effects of the project. The *federal action area* applies to listed species and designated Critical Habitat under the federal Endangered Species Act. For this project, the *analysis area* is considered for analysis under NEPA is the same as the *federal action area.*

The *project area* is smaller than the *federal action area* or *analysis area*; the project area only includes the footprint of ground that would be directly affected as a result of the project activities.

For the South Quarry project, the *federal action area* includes the project area and adjacent areas subject to project-related increased noise, dust deposition, and roll-down of materials, and the downstream reaches of drainages within the reaches of effects. The *federal action area* includes Cushenbury Springs and associated wetlands, because the project would increase water use from wells in the vicinity of Cushenbury Springs. The *federal action area* also includes the land contributions to the carbonate habitat reserve for this project.

III-2.0 – APPLICABLE CONSULTATIONS AND CONFERENCES TO DATE

The Endangered Species Act (ESA) requires that federal agencies evaluate effects to federally-listed species and Critical Habitat in consultation with USFWS when proposing federal actions. A request for a species list from the Information for Planning and Conservation (IPaC) for this project was generated on March 7, 2016 and updated on December 1, 2016 (**Appendix D**). The species included in the resource report (Consultation Code: 08ECAR00-2016-SLI-0448; Event Code for March 7, 2016: 08ECAR00-2016-E-00622; Event Code for December 1, 2016: 08ECAR00-2017-E-00237) were considered in this Biological Assessment. No conservation measures were automatically generated by IPaC.

This project was discussed in person and via email and phone calls with Geary Hund, John Taylor, and Joel Pagel (USFWS) on numerous occasions and during several field visits/meetings. The purpose and need for the project, threatened and endangered species analyzed, Design Features, and rationale for effects determinations were discussed.

Several programmatic and project-specific consultations have set the stage for this consultation.

Programmatic Consultation on Land Management Plans in 2000/2001

In 2000, the SBNF and the other National Forests in the Southern Province prepared a Programmatic BA for the existing LMPs at the time (**USFS 2000**). USFWS issued a Biological Opinion (1-6-00-F-773.2) in 2001 (**USFWS 2001a**). The 2001 LMP BO incorporated by reference the 1999 Riparian Consultation and kept in place the terms and conditions and the take statements from the 1999 Riparian Consultation.

Hazardous Fuels Management Programmatic Consultation 2004/2005

In 2004, the SBNF initiated consultation on the Forest's fuels reduction and vegetation management programs (**USFS 2004**). A USFWS letter dated August 29, 2005 (FWS-SB/WRIV-3468.2) included concurrence of the "not likely to adversely affect" determinations (by using the Proposed Action's Design Features) for several species.

The formal consultation for this programmatic BA was withdrawn due to a change in strategies; no BO was written for the species with "may adversely affect" determinations and no "incidental take" statement was issued to the SBNF.

Carbonate Habitat Management Strategy Consultation 2005 (1-6-05-F-4319)
Following the completion of the Carbonate Habitat Management Strategy in 2003, Consultation was jointly initiated in 2004 by the SBNF and BLM California Desert District on proposed implementation of the Strategy and associated effect to four Threatened and Endangered species endemic to carbonate soils in the San Bernardino Mountains. The 2005 Biological Opinion found that implementation of the strategy would not Jeopardize the four subject Carbonate Endemic Plant Species.

Programmatic Consultation on LMP in 2005
In 2005, the SBNF and the three other Southern Province National Forests initiated consultation on the updated LMPs (Biological Assessment for the Revised Land Management Plans, dated March 18, 2005) (**USFS 2005**). A BO was issued Sept. 15, 2005 (1-6-05-F733.9 – Biological and Conference Opinions on the Revised Land and Resource Management Plans for the Four Southern California National Forests, California) (**USFWS 2005a**).

That consultation did not cover site-specific ongoing effects from National Forest management and did not provide for incidental take. On June 9, 2006, USFWS adopted the Conference Opinions on the 2005 LMP for Critical Habitat for southwestern willow flycatcher.

A Supplemental EIS was subsequently prepared to amend LMP land use zone allocations for select Inventoried Roadless Areas and to amend LMP monitoring and evaluation protocols. Biological Assessments were prepared and informal consultation with USFWS was initiated on 9/5/2013. A Biological Opinion was issued by USFWS on 11/14/2013.

Programmatic Consultations for LMP Ongoing Activities 2012/2013
The purpose of the programmatic ongoing activities Biological Assessments was to facilitate consultation with USFWS in response to a court order (CBD v. US Fish and Wildlife Service, No. 08-cv-1278 [E.D. Cal. 2008]). In that order, the court concluded the USFWS did not act in accordance with law when it failed to include incidental take statements in the programmatic biological opinion it had prepared for the revised LMPs for the four southern California National Forests, including the SBNF. Several programmatic BAs have been prepared to evaluate ongoing Forest Service management activities implementing the revised LMPs that are believed to be affecting the federally-listed species.

These Section 7 consultations have been or are being conducted:

1. *Riparian Obligate Species*. In July 2008, the SBNF initiated consultation on the ongoing effects to eight riparian-dependent species; slender-horned spine flower, arroyo toad, mountain yellow-legged frog, unarmored threespine stickleback, southwestern willow flycatcher, least's Bell's vireo, San Bernardino kangaroo rat, and Santa Ana sucker. A BO was issued on December 6, 2012 (FWS-SB/WRlV-08B0680-09F0227).

In 2011, the SBNF requested that a separate BO be provided for the San Jacinto Ranger District's recreation activities in MYLF habitat; this BO was issued on August 8, 2013. The BA and BO updated and replaced an earlier consultation for ongoing effects to riparian-dependent species (**USFS 1998; USFWS 2000-**1-6-99-F-21)

2. *Desert Tortoise.* The SBNF initiated consultation with USFWS on December 10, 2012. A BO (FWS-SB-13B0290-13F0277) was issued on May 10, 2013 (**USFWS 2013a**).

3. *Mountaintop Plants.* In 1999/2000, the SBNF consulted with USWFS on the three groups of listed plants on the Mountaintop Ranger District (**USFS 1999a, 1999b, 1999c, 2000**). Three listed pebble plain plant species and five listed carbonate were included in Biological Opinions in 2001 (**USFWS 2001b, USFWS 2001c**). Four listed meadow plant species were included in Province Programmatic LMP Biological Opinion in 2001 (**USFWS 2001a**).

   On December 12, 2012, the SBNF initiated consultation with an updated BA (**USFS 2012**) that evaluated the ongoing effects to twelve listed species of plants on the Mountaintop Ranger District. This BO is pending at this time.

III-3.0 - BASELINE CONDITIONS AND POTENTIAL EFFECTS FOR THREATENED AND ENDANGERED SPECIES

Part I of this document contains descriptions of the methods/evaluation process, the Proposed Action, and habitat in the federal action area. **Part II** includes general effects discussions that may be applicable to T/E species.

Detailed species accounts for all of the T/E species are contained in the LMP or updates (**USFS 2006; USFS 2013**) and in the Mountaintop Plants Biological Assessment (**USFS 2012)**; they are incorporated by reference here and are summarized here generally without citations in the following discussions. See the other references for full species accounts including the citations. Where new information is available, the baseline and life history information is updated.

The following discussions focus on T/E species known to occur in the federal action area, those that have a high likelihood of occurrence based on proximity of the federal action area or those that have modeled or suitable habitat present in or adjacent to the federal action area. This is based on records from California Consortium of Herbaria, CNDDB, SBCM, SBNF, observations during surveys of the federal action area, and/or presence of modeled habitat mapped in or near the federal action area.

See **Part II-3.2** for an explanation of the analysis of direct, indirect, and cumulative effects. That section also contains discussions about present and foreseeable future projects that are considered in the cumulative effects discussions for each species. The cumulative effects discussions below include two definitions:

- Under the NEPA, "cumulative impacts" are those effects caused by past, present, and future federal, state, and private activities within or onto special status species and their habitats.
- Under the ESA, "cumulative effects" only consider future non-federal activities that are reasonably certain to occur. Future federal activities or activities permitted by federal agencies are not included under ESA "cumulative effects" because any proposed future federal activities or federally permitted activities must undergo future Section 7 consultation with the USFWS.

See **Part II-3.2.13** for a discussion of past and ongoing activities, current actions, and foreseeable future activities. Those discussions also apply to the following discussions. In this evaluation, past, present, and ongoing activities are addressed in the "baseline" discussions".

The expected likelihood, extent, severity, and duration of effects are addressed in the analysis.

III-3.1 - Threatened and Endangered Plants – Potential Effects from Alternatives 1 and 2

Table 9 lists the current T/E plants and Critical Habitat known from the SBNF; they are all considered in this evaluation. **Table 9** displays the occurrence of T/E plants in the federal action area and within the reach of potential effects for the development and operations of the project. This includes haul road, quarry, access roads, well maintenance, and mitigation parcels. **Table 10** summarizes the occurrences by project component and in the proposed mitigation parcels.

The action area was surveyed at times when detectability was high (as confirmed at reference localities). Thorough floristic surveys were completed for the action area, except for slopes that could not be safely traversed.

III-3.1.1– Cushenbury Puncturebract (*Acanthoscyphus parishii* var. *goodmaniana*)

Life History and Baseline Conditions for Acanthoscyphus parishii var. *goodmaniana*: This Endangered annual member of the buckwheat family, formerly treated as *Oxytheca parishii* var. *goodmaniana*, is endemic to carbonate soils of the northeastern San Bernardino Mountains. This taxon ranges about 15 miles in total, from White Mountain on the west end, across the north slope of the San Bernardino Mountains, and upper Holcomb Valley, to Blackhawk Mountain and the slopes above Terrace Springs at the east end.

About 88 acres of these 3,151 critical habitat acres have been lost to open pit calcium carbonate mining and associated activities, or are experiencing continued loss under fully-approved and permitted mining projects. Approximately 75 of these 88 acres are within the approved but not yet developed Mitsubishi Cement Cushenbury West Quarry. The remaining acres have either been lost to continued implementation of the SMI Arctic and Marble Canyon Quarries or are artifacts of critical habitat mapping and were lost to mining activities prior to designation.

Typical of annual buckwheats, this taxon exhibits high annual variability in population numbers in response to climate, mainly amount and timing of precipitation. Also typical of annual buckwheats, this taxon responds vigorously following fire, in population numbers, plant size, and reproductive output.

Table 9. Threatened, Endangered, Proposed, and Candidate Plant Species and the Likelihood of Occurrence in Areas Expected to be Affected by the MCC Project					
Species Name	**Common Name**	**Occurrence Information on Mountaintop District ***	**Critical Habitat On SBNF**	**Habitat Type**	**Occurs In/Near Federal Action Area**
Endangered Species					
Acanthoscyphus parishii* var. *goodmaniana	**Cushenbury puncturebract**	**Y**	**Designated**	**Carbonate soils**	**Y and CH**
Arenaria paludicola	marsh sandwort	N	None	Freshwater marsh	N
Astragalus albens	**Cushenbury milk vetch**	**Y**	**Designated**	**Carbonate soils**	**Y and CH**
Astragalus brauntonii	Braunton’s milk-vetch	N	Designated; not on SBNF	Limestone soils in chaparral	N
Astragalus lentiginosus var. *coachellae*	Coachella Valley milk vetch	N	Designated; not on SBNF	Sandy Sonoran desert scrub	N
Astragalus tricarinatus	triple-ribbed milk-vetch	N	None	Sandy/gravel, desert margin	N
Berberis nevinii	Nevin's barberry	N	Proposed; none on SBNF	Clay soils/vernally wet areas	N
Dodecahema leptoceras	slender-horned spineflower	N	None	Alluvial scrub	N
Eriastrum densifoloium subsp. *sanctorum*	Santa Ana River woollystar	N	None	Alluvial scrub	N
Eriogonum ovalifolium* var. *vineum	**Cushenbury buckwheat**	**Y**	**Designated**	**Carbonate soils**	**Y and CH**
Nasturtium gambelii	Gambel’s water cress	N	None	Freshwater marsh	N
Poa atropurpurea	San Bernardino bluegrass	Y	Designated	Meadows	N
Physaria kingii subsp. *bernardina*	San Bernardino Mtns. bladderpod	Y	Designated	Carbonate soils	N
Sidalcea pedata	bird's foot checkerbloom	Y	None	Meadows	N
Taraxacum californicum	California taraxacum	Y	Designated	Meadows	N
Thelypodium stenopetalum	slender-petaled mustard	Y	None	Meadows	N
Threatened Species					
Arenaria ursina	Bear Valley sandwort	Y	Designated	Pebble plain	N
Brodiaea filifolia	thread-leaved brodiaea	N	Designated; not on SBNF	Clay soils/vernally wet areas	N
Castilleja cinerea	ash-gray Indian paintbrush	Y	Designated	Pebble plains; openings in conifer forest	N
Erigeron parishii	**Parish's daisy**	**Y**	**Designated**	**Carbonate soils**	**Y and CH**
Eriogonum kennedyi var. *austromontanum*	southern mountain buckwheat	Y	Designated	Pebble plain	N

*Occurrence Information:
Y = Species is known to occur.
P = Occurrence of the species is possible; suitable habitat exists, and/or the species is known from nearby locations.
H = Part of the historical range but the species has been extirpated.
U = Occurrence of the species is unlikely based on habitat present.
N = Outside known distribution/range of the species.
CH=Designated Critical Habitat

Table 10. Summary of Acres of Occupied Habitat (Occ) and Critical Habitat (CH) in the Federal Action Area								
Location	**Acres of Habitat by Species[1]**							
	ACPAG		**ASAL4**		**ERPA3**		**EROVV**	
	Occ	**CH**	**Occ**	**CH**	**Occ**	**CH**	**Occ**	**CH**
Proposed Action – Quarry and Haul Rd	24.5	43.0	0.01	0	0.01	2.5	32.8	114.1
Alternative 2 – Reduced Quarry and Haul Rd	24.5	43.0	0.01	0	0.01	2.5	32.8	105.2
Mitigation Parcels								
Cushenbury 7P	0.8	19.1	9.5	65.1	29.9	79.0	3.8	47.4
Cushenbury 9	5.2	67.5	26.7	82.6	5.5	64.7	42.4	120.5
Cushenbury 15	37.6	76.3	33.1	97.5	0	0	46.3	91.6
Cushenbury 16A	14.6	65.2	20.1	72.2	0	0	19.8	80.4
Totals*	58.1	227.9	89.5	317.5	35.4	143.7	112.2	340.0

[1] USDA plant codes used in the table are Acanthoscyphus parishii var. goodmaniana (ACPAG), Astragalus albens (ASAL4), Erigeron parishii (ERPA3), and Eriogonum ovalifolium var. vineum (EROVV).
** For instances where totals do not exactly match the sum of individual acreages displayed, totals are accurate and apparent discrepancies are due to rounding of values for individual parcels.*

From six to nine miles farther southeast from Terrace Springs, in the area of Tip Top Mountain and Mineral Mountain, there are several populations of *Acanthoscyphus parishii* on carbonate soils that are intermediate between the endangered variety *goodmaniana* and the Forest Service Sensitive variety *cienegensis*. Occurrences in this area are not readily assignable to either variety.

There are a total of 663 mapped acres of habitat occupied by *Acanthoscyphus parishii* var. *goodmaniana*. Of this area, 588 acres are on National Forest System land under the management of the SBNF, 2 acres are on BLM land, and 73 acres are on private land (patented mining claims). Most of the federal lands occupied by this taxon are on the surface of unpatented mining claims.

About 30 of these 663 total mapped acres have been lost to open pit calcium carbonate mining and associated activities in the past 20 years, or are experiencing continued loss under fully approved and permitted mining projects. A total of approximately 1,600 acres of carbonate habitat within the range of *Acanthoscyphus parishii* var. *goodmaniana* has been lost to open pit calcium carbonate mining and associated activities, much of it before the 1990s, when concerted efforts began to accurately map this taxon's distribution.

There are a total of 3,151 acres of designated Critical Habitat for *Acanthoscyphus parishii* var. *goodmaniana*. Of this area, 2,475 acres are on National Forest System land under the management of the SBNF, 80 acres are on BLM land, and 595 acres are on private land (patented mining claims).

This taxon occurs on coarse-textured poorly-consolidated soils derived from limestone and other calcium-carbonate rocks (*e.g.* marble). It typically occurs on substrates with open habitat structure, away from tree or shrub canopies, and organic duff on the soil surface is low to absent.

The primary threat to the survival and recovery of this species is habitat loss associated with mining. Additional threats include competition from invasive plant species (especially cheatgrass), and ground-disturbing activities such as maintenance of Forest System roads, unauthorized vehicle travel off of Forest Roads, operation and maintenance of non-recreation special uses (*e.g.* Edison Doble Circuit, State Highway 18), and wildfire suppression. For a more detailed discussion or the environmental baseline, and ongoing effects to this taxon, please refer to the Mountaintop Plants Ongoing Activities BA **(USFS 2012)**.

Cheatgrass readily out-competes *Acanthoscyphus parishii* var. *goodmaniana* plants for space, light and soil resources, and it adversely alters the open structured low-organic characteristics of this taxon's habitat. Cheatgrass thrives following fire, especially on disturbed ground, and can result in increased fire frequency for areas where it becomes well established. Invasion and spread of cheatgrass is further exacerbated by the ground disturbing activities listed above, creating the potential for a cycle of ground disturbance, invasion, and fire that may ultimately lead to permanent type-conversion of habitat. In the absence of substantial ground disturbance, however, carbonate habitats are relatively resistant to invasion by cheatgrass and other invasive plants by virtue of nutrient-poor, high pH soils with low water-holding capacity.

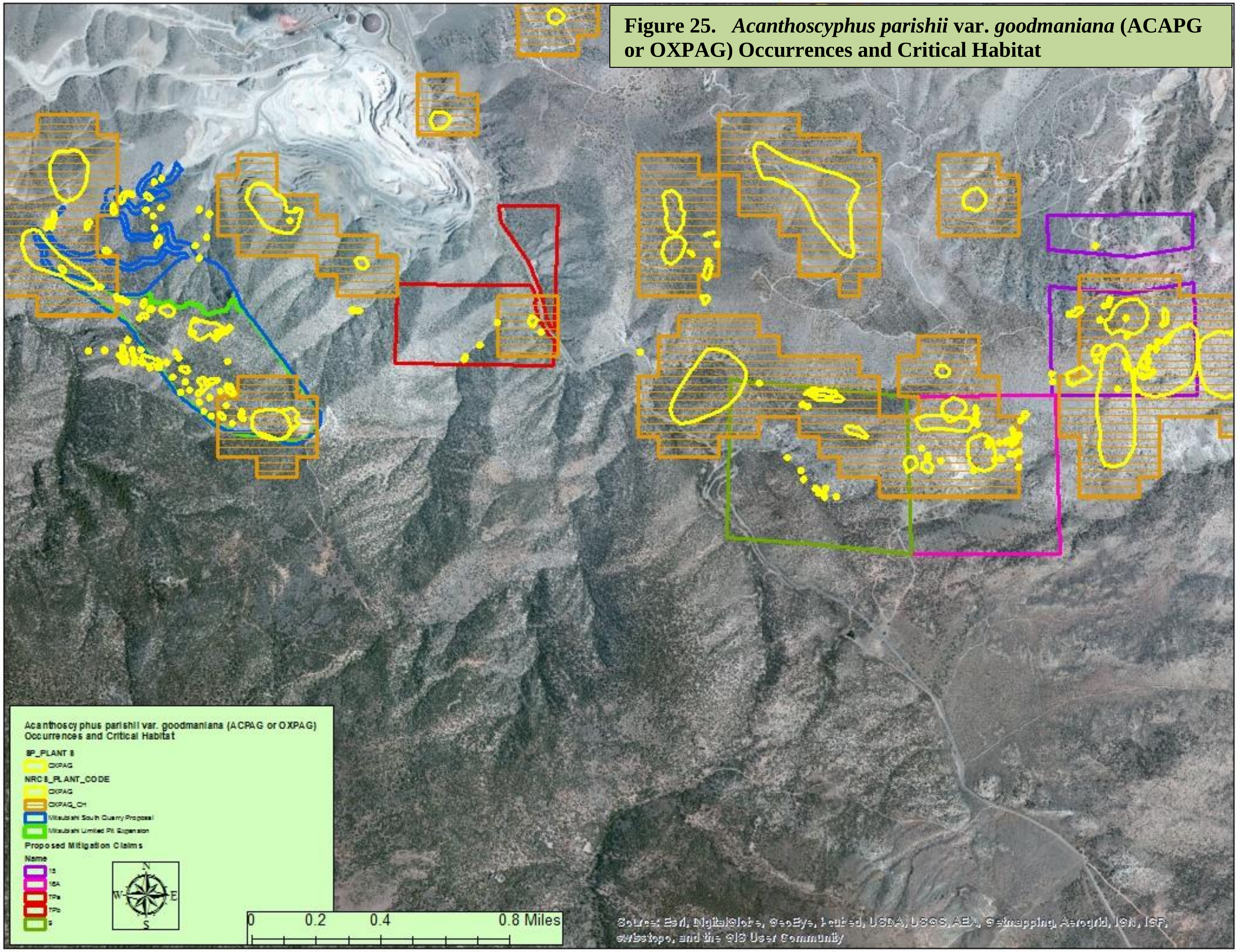
<u>*Occurrences in the Action Area*</u>: **Figure 25** displays the known occupied habitat and Critical Habitat for this species. The entire project area (153.6 acres for Alternative 1 or 133.6 acres for Alternative 2) lies within suitable habitat for *Acanthoscyphus parishii* var. *goodmaniana*.

This bears on the Conservation Value under the Carbonate Habitat Management Strategy, discussed below. For the habitat reserve contributions, all of Cushenbury 7P and Cushenbury 16a are suitable habitat, and most of Cushenbury 9 and Cushenbury 15 are suitable habitat.

Occupied habitat of *Acanthoscyphus parishii* var. *goodmaniana* is scattered throughout the federal action area. There are a total of 24.5 acres of occupied habitat, in many small patches, that would be lost within the SQ project area under either Alternative 1 or 2. There are a total of 58.1 acres of occupied habitat, in many small patches across all four habitat reserve contributions. The occupied and suitable habitat within the project area is high quality, with minimal disturbance and low incidence of invasive species. The occupied and suitable habitat within the habitat reserve contributions is of similar high quality, species composition, and vegetation characteristics.

Designated Critical Habitat blocks for *Acanthoscyphus parishii* var. *goodmaniana* exist in the upper and lower portions of the proposed SQ, and the upper half of the proposed haul road. Designated Critical Habitat that would be lost to the development of the SQ would total 43 acres. All of these acres possess the primary constituent elements of critical habitat for this taxon. There are a total of 228 acres of designated Critical Habitat distributed across all four habitat reserve contributions. All of these acres also possess the primary constituent elements of Critical Habitat for this taxon.

Figure 25. ***Acanthoscyphus parishii*** **var.** ***goodmaniana*** **(ACAPG or OXPAG) Occurrences and Critical Habitat**



Effects to Acanthoscyphus parishii var. goodmaniana And Its Designated Critical Habitat: The main direct effect from the development of SQ and associated facilities (*e.g.* haul road and berm) to this taxon and its designated critical habitat would be complete and permanent removal or burial of the land surface. This loss would include 24 acres of occupied habitat, 43 acres of critical habitat, and 153.6 acres of suitable habitat (133.6 for Alternative 2). While some revegetation would occur through mine reclamation, and some natural revegetation would occur over time, this is considered to be a permanent loss of habitat for this taxon.

The proposed contributions of carbonate habitat lands to the CHMS Habitat Reserve would provide an immediate and long term beneficial effect to this species and its critical habitat by removing the primary threat to its continued existence within these areas, *i.e.* mining. The mechanism of this benefit is quit-claim or fee-title conveyance (depending on the particular claim) in combination with a withdrawal from mineral location and entry under the Mining Laws of the United States. This would prevent future mining claims and associated mining activities on these lands for the life of the withdrawal.

Potential indirect effects to *Acanthoscyphus parishii* var. *goodmaniana* would include dust deposition on occurrences adjacent to the proposed quarry and haul road, increased weed risk, and microclimate changes.

Blasting, crushing, loading and hauling of mined calcium carbonate rock produces dust. Dust deposition on leaf surfaces can reduce photosynthesis and respiration (reducing plant growth and vigor), and deposition on the stigma of flowers can reduce successful pollination and the production of viable seeds (**Padgett *et al.* 2007**). Quantity and duration of dust deposition determines the severity and duration of effect. Quantity of deposition is a function of proximity to the source of dust, and wind speed and direction. Frequency of rainfall is also a factor, as rainfall events can wash dust from plants. Design Features to reduce dust, including those intended to meet air quality standards, would help to minimize these effects.

Weed risk would be elevated by increasing the likelihood of introduction and spread of invasive plant species. The increased risk of weed introduction as part of SQ would primarily be due to use of heavy equipment in an area not previously accessible to motorized vehicles. Heavy equipment can introduce weed seeds and other propagules to areas through soil and debris stuck in tire or track treads and undercarriage. Design Features requiring washing equipment before arrival to the project area would help to minimize this risk. The increased risk of spread of invasive species is based on increased acreage of disturbed ground. Weeds are typically well-adapted to establish on and rapidly spread across disturbed ground. Features like the quarry margin, road margins, soil stockpiles, and the berm are very susceptible to introduction and spread of weeds. Once weeds spread along these corridors of invasion, all adjacent habitat areas are at risk. The quarry floor, walls, and benches (prior to application of soil / growth media for revegetation) would be less susceptible, by virtue of minimal soil nutrients and very low water holding capacity.

Microclimate changes caused by the quarry and haul road developments could affect plants. Vegetation, even relatively sparse vegetation such as pinyon and juniper woodland, has a moderating effect on localized microclimate, reducing surface air and soil temperatures and surface wind speeds, and increasing localized relative humidity. Removal of 153 acres of vegetation will remove these moderating effects for adjacent vegetation around the edge of the quarry, and associated plant populations. This would be a more substantial effect for vegetation adjacent to south-aspect quarry faces, which receive more incident solar radiation and heating. The changes in topography associated with quarry development would also be expected to change surface wind patterns, increasing surface wind-speed in areas previously more sheltered. All of these microclimate effects would result in greater susceptibility to the effects of drought and heat shock on plants growing adjacent to the SQ. The severity of these effects to plants would be a complex function of proximity, slope, and direction from the altered landscape.

There are approximately 19 acres of occupied *Acanthoscyphus parishii* var. *goodmaniana* habitat outside the proposed South Quarry and haul road footprint of disturbance (*i.e.*, the 153.6 acre area), but within 100 feet of the edge of this area. It is impossible to predict the extent to which these indirect effects of dust and altered microclimate will reach these occurrences.

<u>*Cumulative Effects to Acanthoscyphus parishii* var. *goodmaniana*</u>: See **Part II-3.2.13** for a general discussion of current and foreseeable future activities.

Cumulative effects to this taxon as defined under the Endangered Species Act, *i.e.* effects of future non-federal activities that are reasonably certain to occur, include the following mining projects:

1. Ongoing development and proposed expansion of Omya's White Knob Quarry: There is occupied and suitable *Acanthoscyphus parishii* var. *goodmaniana* habitat above the White Knob Quarry at White Mountain. We are not aware of occupied habitat for this taxon within the existing operation area or the proposed expansion area, but we have not yet reviewed project survey information. The expansion area is within suitable habitat for this taxon.

2. Ongoing development and operation of Specialty Minerals' Arctic and Marble Canyon Quarries and continued reclamation in Furnace Canyon are expected to continue to result in continued losses of this species' suitable, occupied and critical habitat. This project is fully approved and permitted, so in some respects, these losses are in the species baseline, though they have not been fully realized on the ground.

3. Development of MCC West Quarry is also fully-approved and permitted, and not yet realized. The West Quarry project area is expected to result in the loss of about 16½ acres of occupied *Acanthoscyphus parishii* var. *goodmaniana* habitat.

The Carbonate Habitat Management Strategy addresses cumulative effects at the project scale by considering reserve design and the recovery needs of the species at the landscape scale. Directing project scale mitigation to CHMS priority areas, as the SQ project would do, contributes to the long term survival and recovery of the subject species. As a signatory to the CHMS, it is expected that the County of San Bernardino will follow the provisions of the

Strategy for current and future non-federal proposed mine developments (*e.g.,* White Knob Expansion).

Acanthoscyphus parishii var. *goodmaniana – Determination of Effects:* It is my determination that implementation of the Proposed Action may affect and would be likely to adversely affect *Acanthoscyphus parishii* var. *goodmaniana* and its designated Critical Habitat. Consultation under Section 7 of the Endangered Species Act is required.

III-3.1.2– Cushenbury Milk Vetch (*Astragalus albens*)

Life History and Baseline Conditions for Astragalus albens: This Endangered member of the pea family is endemic to carbonate soils of the northeastern San Bernardino Mountains. It is a short-lived perennial, but can be monocarpic in reaction to drought, with individual plants blooming only during one season before dying. This taxon ranges about 19 miles in total, from Dry Canyon on the west end, across the lower north slope of the San Bernardino Mountains, to Blackhawk Mountain and Terrace Springs, and south and east to Lone Valley at the east end.

There are a total of 1,289 mapped acres of habitat occupied by *Astragalus albens*. Of this area, 1,034 acres are on National Forest System land under the management of the SBNF, 150 acres are on BLM land, and 104 acres are on private land (mostly on patented mining claims). Most of the federal lands occupied by this taxon are on the surface of unpatented mining claims.

About 21 of these 1,289 total mapped acres have been lost to open pit calcium carbonate mining and associated activities in the past 20 years, or are experiencing continued loss under fully approved and permitted mining projects. A total of approximately 1,600 acres of carbonate habitat within the range of *Astragalus albens* has been lost to open pit calcium carbonate mining and associated activities, much of it before the 1990s, when concerted efforts began to accurately map this taxon's distribution.

There are a total of 4,366 acres of designated critical habitat for *Astragalus albens*. Of this area, 3,038 acres are on National Forest System land under the management of the SBNF, 839 acres are on BLM land, and 490 acres are on private land (mostly patented mining claims).

About 24 acres of these 4,366 critical habitat acres have been lost to open pit calcium carbonate mining and associated activities, or are experiencing continued loss under fully approved and permitted mining projects. These acres have either been lost to continued implementation of the SMI Arctic and Marble Canyon Quarries (about 16 acres) or are artifacts of critical habitat mapping and were lost to mining activities prior to designation (mostly at Parton Mine, about 8 acres).

This taxon occurs on soils derived from limestone and other calcium-carbonate rocks (*e.g.* marble). It typically occurs on substrates with open habitat structure, away from tree or shrub canopies, and organic duff on the soil surface is low to absent.

The primary threat to the survival and recovery of this species is habitat loss associated with mining. Additional threats include competition from invasive plant species (especially cheatgrass and red brome), and ground disturbing activities such as use and maintenance of Forest System roads (primarily 3N03 and 3N36), and unauthorized vehicle travel off of Forest System roads. For a more detailed discussion or the environmental baseline, and ongoing effects to this taxon, please refer to the Mountaintop Plants Ongoing Activities BA **(SBNF 2012)**.

<u>*Occurrences in the Action Area*</u>: **Figure 26** displays the known occurrences and Critical Habitat for this species. The entire project area (153.6 acres for Alternative 1 or 133.6 acres for Alternative 2) lies within suitable habitat for *Astragalus albens*. This bears on the Conservation Value under the Carbonate Habitat Management Strategy, discussed below. For the habitat reserve contributions, all of Cushenbury 7P and Cushenbury 16a are suitable habitat, and most of Cushenbury 9 and Cushenbury 15 are suitable habitat.

Occupied habitat of *Astragalus albens* is known from the project area only from the northern end of the temporary road to be built and used during construction of the SQ haul road. This 1.6 acre occurrence extends to the north into the Cushenbury West Quarry area, where it has been bisected by an exploration road that would connect to the SQ temporary road (which resulted in a loss of about 0.2 acres outside of the West Quarry project footprint). The northern half (about 0.8 acres) of this occurrence is expected to be lost to development of the West Quarry. The portion of this occurrence that would be lost to development of the SQ temporary road is about 0.1 acres. The remaining 0.5 acres of this occurrence outside the SQ temp road, the existing West Quarry exploration road, and West Quarry is expected to persist. The occupied and suitable habitat within the project area is high quality, with minimal disturbance and low incidence of invasive species. The occupied and suitable habitat within the habitat reserve contributions is of similar high quality, species composition, and vegetation characteristics.

There is no designated Critical Habitat for Astragalus albens in the proposed SQ project area. There are a total of 317 acres of designated Critical Habitat distributed across all four habitat reserve contributions. All of these acres possess the primary constituent elements of critical habitat for this taxon.

<u>*Effects to Astragalus Albens and its Designated Critical Habitat*</u>: The main direct effect from the development of SQ to this taxon would be complete and permanent removal or burial of the land surface. This loss would include 0.1 acres of occupied habitat at the temporary road, and 153.6 acres of suitable habitat (133.6 for Alternative 2). While some revegetation would occur through mine reclamation (including reclamation of the temporary road), and some natural revegetation would occur over time, this is considered to be a permanent loss of habitat for this taxon.

The proposed contributions of carbonate habitat lands to the CHMS Habitat Reserve would provide an immediate and long term beneficial effect to this species and its critical habitat by removing the primary threat to its continued existence within these areas, *i.e.* mining. The mechanism of this benefit is quit-claim or title conveyance (depending on the particular claim) in combination with a withdrawal from mineral location and entry under the Mining Laws of the United States. This would prevent future mining claims and associated mining activities on these lands for the life of the withdrawal.

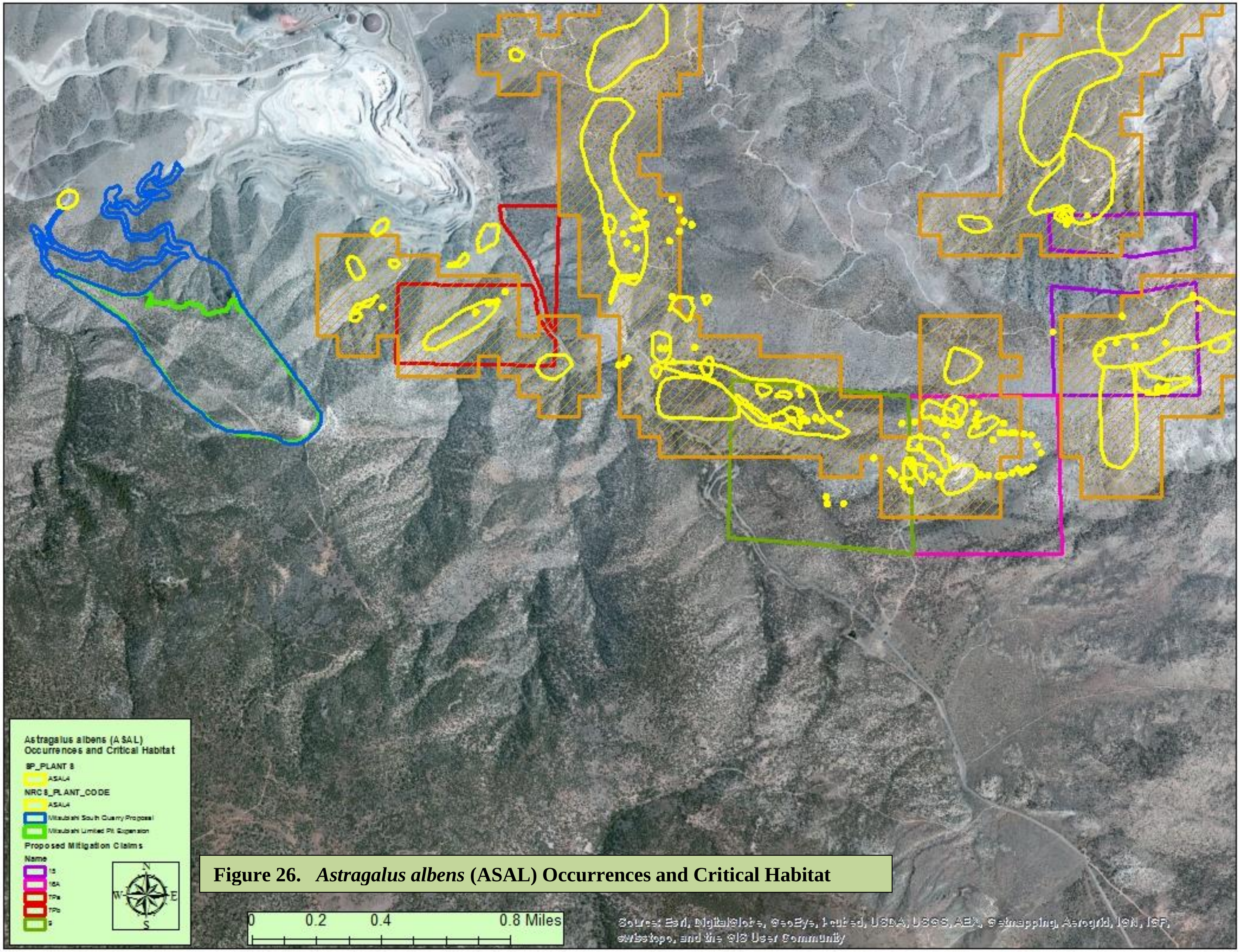


Figure 26. *Astragalus albens* **(ASAL) Occurrences and Critical Habitat**

Potential indirect effects to *Astragalus albens* would include dust deposition on occurrences adjacent to the proposed quarry and haul road, and increased weed risk. Blasting, crushing, loading and hauling of mined calcium carbonate rock produces dust. Dust deposition on leaf surfaces can reduce photosynthesis and respiration (reducing plant growth and vigor), and deposition on the stigma of flowers can reduce successful pollination and the production of viable seeds (**Padgett *et al.* 2007**). The portion of the1.6 acre *Astragalus albens* occurrence affected by the SQ project but not lost to road construction would be subject to the effects of dust deposition during the period of use (about 2 years).

At a later date when Cushenbury West Quarry is built out to its southern limit, half of this occurrence will be lost, and the remaining occupied habitat will be subject to the effects of dust deposition for the life of the West Quarry operations on the south (*i.e.,* north-facing) wall. Quantity and duration of dust deposition determines the severity and duration of effect. Quantity of deposition is a function of proximity to the source of dust, and wind speed and direction. Frequency of rainfall is also a factor, as rainfall events can wash dust from plants. Design Features to reduce dust, including those intended to meet air quality standards, would help to minimize these effects.

Weed risk to occupied and suitable habitat would be elevated by increasing the likelihood of introduction and spread of invasive plant species. The increased risk of weed introduction as part of SQ would primarily be due to use of heavy equipment in an area not previously accessible to motorized vehicles. Heavy equipment can introduce weed seeds and other propagules to areas through soil and debris stuck in tire or track treads and undercarriage. Design Features requiring washing equipment before arrival to the project area would help to minimize this risk. The increased risk of spread of invasive species is based on increased acreage of disturbed ground. Weeds are typically well-adapted to establish on and rapidly spread across disturbed ground. Features like the quarry margin, road margins, soil stockpiles, and the berm are very susceptible to introduction and spread of weeds. Once weeds spread along these corridors of invasion, all adjacent habitat areas are at risk. The quarry floor, walls, and benches (prior to application of soil / growth media for revegetation) would be less susceptible, by virtue of minimal soil nutrients and very low water holding capacity.

<u>*Cumulative Effects to Astragalus albens*</u>: See **Part II-3.2.13** for a general discussion of current and foreseeable future activities.

Cumulative effects to this taxon as defined under the Endangered Species Act are the effects of future non-federal activities that are reasonably certain to occur, include the following mining projects:

1. Ongoing development and operation of Specialty Minerals' Arctic and Marble Canyon Quarries and continued reclamation in Furnace Canyon are expected to continue to result in continued losses of this species' suitable, occupied and critical habitat. These projects are fully approved and permitted, so in some respects, these losses are in the species baseline, though they have not been fully realized on the ground.

2. Development of MCC West Quarry is also fully approved and permitted, and not yet realized. The West Quarry project area is expected to result in the loss of about 0.8 acres of occupied *Astragalus albens* habitat.

The Carbonate Habitat Management Strategy addresses cumulative effects at the project scale by considering reserve design and the recovery needs of the species at the landscape scale. Directing project scale mitigation to CHMS priority areas, as the SQ project would do, contributes to the long term survival and recovery of the subject species.

Astragalus albens – Determination of Effects: It is my determination that implementation of the Proposed Action may affect and would be likely to adversely affect *Astragalus albens*. The effects to *Astragalus albens* designated Critical Habitat would be entirely beneficial. Consultation under Section 7 of the Endangered Species Act is required.

III-3.1.3– Parish's daisy (*Erigeron parishii)*

Life History and Baseline Conditions: This federally-threatened member of the sunflower family is mostly endemic to carbonate soils of the northeastern San Bernardino Mountains, where it ranges from White Mountain on the west end of its distribution, to the eastern flanks of Mineral Mountain on the east end. However, this species does extend farther south and east, with widely-scattered occurrences recorded through the Burns Canyon area and into the Little San Bernardino Mountains, to the area of Quail Peak in Joshua Tree National Park. East of the San Bernardino Mountains, this species typically occurs on soils derived from granite. This taxon ranges about 23 miles west to east in the San Bernardino Mountains. The easternmost reported occurrences on the east slopes of Quail Peak are an additional 30 miles to the southeast.

There are a total of 1,080 mapped acres of habitat occupied by *Erigeron parishii* in the San Bernardino Mountains. This acreage does not include the 17 records of this species south and east of the San Bernardino Mountains. Of these 1,080 acres, 539 acres are on National Forest System land under the management of the SBNF, 244 acres are on BLM land, and 297 acres are on private land (mostly patented mining claims). Most of the federal lands occupied by this taxon in the San Bernardino Mountains are on the surface of unpatented mining claims.

About 20 of these 1,080 total mapped acres have been lost to open pit calcium carbonate mining and associated activities in the past 20 years, or are experiencing continued loss under fully approved and permitted mining projects. A total of approximately 1,600 acres of carbonate habitat within the range of *Erigeron parishii* has been lost to open pit calcium carbonate mining and associated activities, much of it before the 1990s, when concerted efforts began to accurately map this taxon's distribution.

There are a total of 4,426 acres of designated Critical Habitat for *Erigeron parishii*. Of this area, 2,249 acres are on National Forest System land under the management of the SBNF, 938 acres are on BLM land, and 1,238 acres are on private land (mostly on patented mining claims).

About 85 acres of these 4,426 critical habitat acres have been lost to open pit calcium carbonate mining and associated activities, or are experiencing continued loss under fully approved and permitted mining projects. About 70 of these 85 acres are within the approved but not yet developed Mitsubishi Cement Cushenbury West Quarry. The remaining acres have either been lost to continued implementation of the SMI Arctic and Marble Canyon Quarries or are artifacts of critical habitat mapping and were lost to mining activities prior to designation.

This taxon occurs on coarse-textured poorly-consolidated soils derived from limestone and other calcium-carbonate rocks (*e.g.,* marble). The species is often found in cracks or edges of carbonate rock outcrops, or on alluvial soils derived from upstream carbonate rocks. It typically occurs on substrates with open habitat structure, away from tree or shrub canopies, and organic duff on the soil surface is low to absent. Population numbers vary from year to year in response to amount and seasonality of rainfall, and are especially variable on alluvial substrates.

The primary threat to the survival and recovery of this species within the San Bernardino Mountains is habitat loss associated with mining. Additional threats include competition from invasive plant species (especially cheatgrass), and ground disturbing activities such as maintenance of Forest System roads, and unauthorized vehicle travel off of Forest Roads. For a more detailed discussion or the environmental baseline, and ongoing effects to this taxon, please refer to the Mountaintop Plants Ongoing Activities BA **(SBNF 2012)**.

<u>*Occurrences in the Action Area*</u>: **Figure 27** displays the known occurrences and designated Critical Habitat for this species. The entire project area (153.6 acres for Alternative 1 or 133.6 acres for Alternative 2) lies within suitable habitat for *Erigeron parishii*. This bears on the Conservation Value under the Carbonate Habitat Management Strategy, discussed below. For the habitat reserve contributions, most of Cushenbury 7P is suitable habitat, and about half of Cushenbury 9 is suitable habitat, and small portions of Cushenbury 16a and Cushenbury 15 are suitable habitat.

Occupied habitat of *Erigeron parishii* is known from the project area only from the northern end of the temporary road to be built and used during construction of the SQ haul road, and from three small occurrences along the edge of the proposed haul road alignment. The 1.6 acre occurrence at the site of the temporary road extends to the north into the Cushenbury West Quarry area, where it has been bisected by an exploration road that would connect to the SQ temporary road (which resulted in a loss of about 0.2 acres outside of the West Quarry project footprint). The northern half of this occurrence (about 0.8 acres) of this occurrence is expected to be lost to development of the West Quarry. The portion of this occurrence that would be lost to development of the SQ temporary road is about 0.1 acres. The remaining 0.5 acres of this occurrence outside the SQ temp road, the existing West Quarry exploration road, and West Quarry is expected to persist. For the three small occurrences along the proposed haul road alignment, all together amounting to about 0.3 acres, each overlaps the mapped haul road footprint by about 0.01 acres.

The occupied and suitable habitat within the project area is high quality, with minimal disturbance and low incidence of invasive species. The occupied and suitable habitat within the habitat reserve contributions is of similar high quality, species composition, and vegetation characteristics.

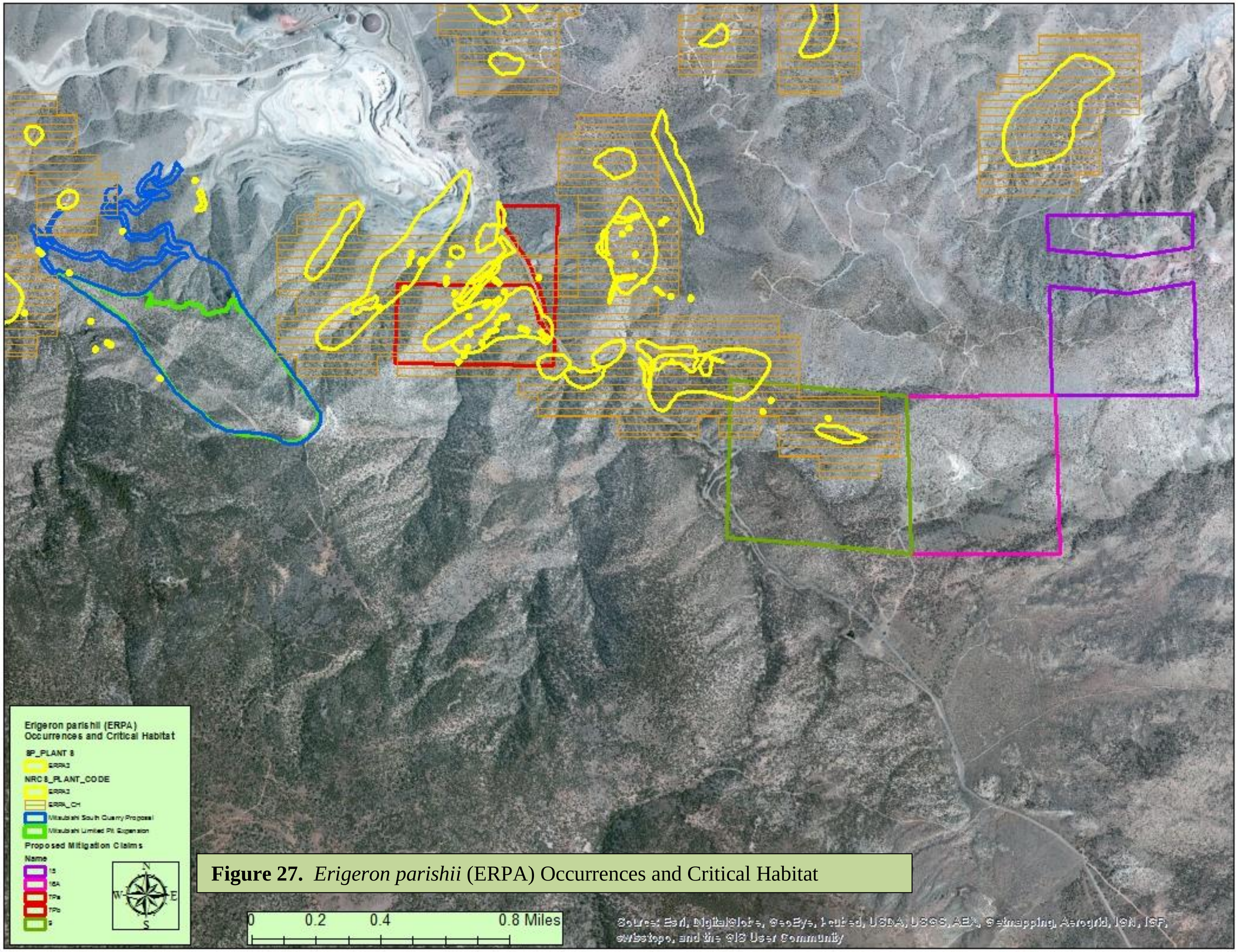


Figure 27. *Erigeron parishii* (ERPA) Occurrences and Critical Habitat

Designated Critical Habitat blocks for *Erigeron parishii* intersect the upper and middle portions of the proposed haul road, and about 0.02 acres of the SQ. Designated Critical Habitat that would be lost to the development of the SQ and haul road would total about 2.5 acres. All of these acres possess the primary constituent elements of Critical Habitat for this taxon. There are a total of 144 acres of designated Critical Habitat distributed across all four habitat reserve contributions. All of these acres also possess the primary constituent elements of critical habitat for this taxon.

Effects to Erigeron parishii and its Designated Critical Habitat: The main direct effect from the development of SQ and associated facilities (*e.g.,* haul road and berm) to this taxon and its designated Critical Habitat would be complete and permanent removal or burial of the land surface. This loss would include 0.1 acres of occupied habitat, 2.3 acres of critical habitat, and 153.6 acres of suitable habitat (133.6 for Alternative 2). While some revegetation would occur through mine reclamation, and some natural revegetation would occur over time, this is considered to be a permanent loss of habitat for this taxon.

The proposed contributions of carbonate habitat lands to the CHMS Habitat Reserve would provide an immediate and long term beneficial effect to this species and its critical habitat by removing the primary threat to its continued existence within these areas (*i.e.,* mining). The mechanism of this benefit is quit-claim or title conveyance (depending on the particular claim) in combination with a withdrawal from mineral location and entry under the Mining Laws of the United States. This would prevent future mining claims and associated mining activities on these lands for the life of the withdrawal.

Potential indirect effects to *Erigeron parishii* would include dust deposition on occurrences adjacent to the proposed quarry and haul road, increased weed risk, and microclimate changes.

Blasting, crushing, loading and hauling of mined calcium carbonate rock produces dust. Dust deposition on leaf surfaces can reduce photosynthesis and respiration (reducing plant growth and vigor), and deposition on the stigma of flowers can reduce successful pollination and the production of viable seeds (**Padgett *et al.* 2007**). The portion of the1.6 acre *Erigeron parishii* occurrence affected by the SQ project but not lost to road construction would be subject to the effects of dust deposition during the period of use (about 2 years). At a later date when Cushenbury West Quarry is built out to its southern limit, half of this occurrence will be lost, and the remaining occupied habitat will be subject to the effects of dust deposition for the life of the West Quarry operations on the south (*i.e.,* north-facing) wall.

The three small occurrences along the haul road, and as many as four additional small occurrences from 50 to 650 feet west the SQ, would be subject to effects of dust deposition for the life of the project. Quantity and duration of dust deposition determines the severity and duration of effect. Quantity of deposition is a function of proximity to the source of dust, and wind speed and direction. Frequency of rainfall is also a factor, as rainfall events can wash dust from plants. Design Features to reduce dust, including those intended to meet air quality standards, would help to minimize these effects.

Weed risk would be elevated by increasing the likelihood of introduction and spread of invasive plant species. The increased risk of weed introduction as part of SQ would primarily be due to use of heavy equipment in an area not previously accessible to motorized vehicles. Heavy equipment can introduce weed seeds and other propagules to areas through soil and debris stuck in tire or track treads and undercarriage. Design Features requiring washing equipment before arrival to the project area would help to minimize this risk. The increased risk of spread of invasive species is based on increased acreage of disturbed ground. Weeds are typically well-adapted to establish on and rapidly spread across disturbed ground. Features like the quarry margin, road margins, soil stockpiles, and the berm are very susceptible to introduction and spread of weeds. Once weeds spread along these corridors of invasion, all adjacent habitat areas are at risk. The quarry floor, walls, and benches (prior to application of soil / growth media for revegetation) would be less susceptible, by virtue of minimal soil nutrients and very low water holding capacity.

Microclimate changes caused by the quarry and haul road developments could effects plants. Vegetation, even relatively sparse vegetation such as pinyon and juniper woodland, has a moderating effect on localized microclimate, reducing surface air and soil temperatures and surface wind speeds, and increasing localized relative humidity. Removal of ~154 acres of vegetation will remove these moderating effects for adjacent vegetation around the edge of the quarry, and associated plant populations. This would be a more substantial effect for vegetation adjacent to south-aspect quarry faces, which receive more incident solar radiation and heating.

The changes in topography associated with quarry development would also be expected to change surface wind patterns, increasing surface wind-speed in areas previously more sheltered. All of these microclimate effects would result in greater susceptibility to the effects of drought and heat shock on plants growing adjacent to the SQ. The severity of these effects to plants would be a complex function of proximity, slope, and direction from the altered landscape.

There are approximately 0.3 acres (and about 0.1 acres not counting the temporary road) of occupied *Erigeron parishii* habitat outside the proposed South Quarry and haul road footprint of disturbance (*i.e.*, the ~154 acre area), but within 100 feet of the edge of this area. It is impossible to predict the extent to which these indirect effects of dust and altered microclimate will reach these occurrences.

<u>*Cumulative Effects to Erigeron parishii*</u>: See **Part II-3.2.13** for a general discussion of current and foreseeable future activities.

Cumulative effects to this taxon as defined under the Endangered Species Act (*i.e.,* effects of future non-federal activities that are reasonably certain to occur) include the following mining projects:

1. Ongoing development and proposed expansion of Omya's White Knob Quarry: There is occupied and suitable *Erigeron parishii* habitat above the White Knob Quarry at White Mountain, and also adjacent to the north of the active quarry. We are not aware of occupied habitat for this taxon within the existing operation area or the proposed expansion area, but we

have not yet reviewed project survey information. The expansion area is within suitable habitat for this taxon.

2. Ongoing development and operation of Specialty Minerals' Arctic and Marble Canyon Quarries and continued reclamation in Furnace Canyon are expected to continue to result in continued losses of this species suitable, occupied and critical habitat. This project is fully approved and permitted, so in some respects, these losses are in the species baseline condition, though they have not been fully realized on the ground.

3. Development of MCC West Quarry is also fully approved and permitted, and not yet realized. The West Quarry project area is expected to result in the loss of about 3 acres of occupied *Erigeron parishii* habitat, and about 76 acres of designated Critical Habitat for *Erigeron parishii*.

The Carbonate Habitat Management Strategy addresses cumulative effects at the project scale by considering reserve design and the recovery needs of the species at the landscape scale. Directing project scale mitigation to CHMS priority areas, as the SQ project would do, contributes to the long term survival and recovery of the subject species. As a signatory to the CHMS, it is expected that the County of San Bernardino will follow the provisions of the Strategy for current and future non-federal proposed mine developments (*e.g.,* White Knob Expansion).

Erigeron parishii – Determination of Effects: It is my determination that implementation of the Proposed Action may affect and would be likely to adversely affect *Erigeron parishii* and its designated Critical Habitat. Consultation under Section 7 of the Endangered Species Act is required.

III-3.1.4– Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*)
Life History and Baseline Conditions: This federally-endangered perennial member of the buckwheat family is endemic to carbonate soils of the northeastern San Bernardino Mountains. This taxon ranges about 25 miles in total, from North Peak of White Mountain on the west end, eastward across the north slope of the San Bernardino Mountains, and upper Holcomb Valley, to Blackhawk Mountain and Terrace Springs, then southeast to Mineral Mountain. There are two disjunct occurrence groups to the south of the main distribution axis, one at Bertha Ridge (4 mi south of the main axis) and the other at Heartbreak Ridge (about 1.5 mi south of the axis).

There are a total of 1,403 mapped acres of habitat occupied by *Eriogonum ovalifolium* var. *vineum*. Of this area, 1,106 acres are on National Forest System land under the management of the SBNF, 77 acres are on BLM land, and 221 acres are on private land (mostly on patented mining claims). Most of the federal lands occupied by this taxon are on the surface of unpatented mining claims.

About 81 of these 1,403 total mapped acres have been lost to open pit calcium carbonate mining and associated activities in the past 20 years, or are experiencing continued loss under fully approved and permitted mining projects. About 46 of these 81 acres are within the approved but not yet developed Mitsubishi Cement Cushenbury West Quarry. A total of approximately 1,600 acres of carbonate habitat within the range of *Eriogonum ovalifolium* var. *vineum* has been lost to open pit calcium carbonate mining and associated activities, much of it before the 1990s, when concerted efforts began to accurately map this taxon's distribution.

There are a total of 6,959 acres of designated Critical Habitat for *Eriogonum ovalifolium* var. *vineum*. Of this area, 5,449 acres are on National Forest System land under the management of the SBNF, 417 acres are on BLM land, and 1,092 acres are on private land (mostly on patented mining claims).

About 148 acres of these 6,959 designated Critical Habitat acres have been lost to open pit calcium carbonate mining and associated activities, or are experiencing continued loss under fully approved and permitted mining projects. Approximately 125 of these 148 acres are within the approved but not yet developed Mitsubishi Cement Cushenbury West Quarry. The remaining acres have either been lost to continued implementation of the SMI Arctic and Marble Canyon Quarries or are artifacts of critical habitat mapping and were lost to mining activities prior to designation.

This taxon occurs on coarse-textured poorly-consolidated soils derived from limestone and other calcium-carbonate rocks (*e.g.,* marble). It typically occurs on substrates with open habitat structure, away from tree or shrub canopies, and organic duff on the soil surface is low to absent.

The primary threat to the survival and recovery of this species is habitat loss associated with mining. Additional threats include competition from invasive plant species (especially cheatgrass), and ground-disturbing activities maintenance of Forest System roads, unauthorized vehicle travel off of Forest Roads, operation and maintenance of non-recreation special uses (*e.g.* Edison Doble Circuit, State Highway 18), and wildfire suppression. For a more detailed discussion or the environmental baseline, and ongoing effects to this taxon, please refer to the Mountaintop Plants Ongoing Activities BA **(SBNF 2012)**.

<u>*Occurrences in the Action Area*</u>: **Figure 28** displays the known occurrences and Critical Habitat in the vicinity of the action area. The entire project area (153.6 acres for Alternative 1 or 133.6 acres for Alternative 2) lies within suitable habitat for *Eriogonum ovalifolium* var. *vineum*. This bears on the Conservation Value under the Carbonate Habitat Management Strategy, discussed below. For the habitat reserve contributions, all of Cushenbury 7P and Cushenbury 16a are suitable habitat, and most of Cushenbury 9 and Cushenbury 15 are suitable habitat.

Occupied habitat of *Eriogonum ovalifolium* var. *vineum* is scattered throughout the project area. There are a total of about 33 acres of occupied habitat, in a few large patches and many small patches that would be lost within the SQ project area under either Alternative 1 or 2. There are a total of about 112 acres of occupied habitat, in several large and many small patches across all four habitat reserve contributions. The occupied and suitable habitat within the project area is high quality, with minimal disturbance and low incidence of invasive species. The occupied and suitable habitat within the habitat reserve contributions is of similar high quality, species composition, and vegetation characteristics.

Designated Critical Habitat blocks for *Eriogonum ovalifolium* var. *vineum* exist through most of the proposed SQ and haul road. Designated Critical Habitat that would be lost to the development of the SQ would total about 114 acres. All of these acres possess the primary constituent elements of critical habitat for this taxon. There are a total of about 340 acres of Designated Critical Habitat distributed across all four habitat reserve contributions. All of these acres also possess the primary constituent elements of critical habitat for this taxon.

Effects to Eriogonum ovalifolium var. vineum and its Designated Critical Habitat: The main direct effect from the development of SQ and associated facilities (*e.g.,* haul road and berm) to this taxon and its designated Critical Habitat would be complete and permanent removal or burial of the land surface. This loss would include 33 acres of occupied habitat, 114 acres of critical habitat, and 153.6 acres of suitable habitat (133.6 for Alternative 2). While some revegetation would occur through mine reclamation, and some natural revegetation would occur over time, this is considered to be a permanent loss of habitat for this taxon.

The proposed contributions of carbonate habitat lands to the CHMS Habitat Reserve would provide an immediate and long term beneficial effect to this species and its critical habitat by removing the primary threat to its continued existence within these areas (*i.e.,* mining). The mechanism of this benefit is quit-claim or title conveyance (depending on the particular claim) in combination with a withdrawal from mineral location and entry under the Mining Laws of the United States. This would prevent future mining claims and associated mining activities on these lands for the life of the withdrawal.

Potential indirect effects to *Eriogonum ovalifolium* var. *vineum* would include dust deposition on occurrences adjacent to the proposed quarry and haul road, increased weed risk, and microclimate changes.

Blasting, crushing, loading and hauling of mined calcium carbonate rock produces dust. Dust deposition on leaf surfaces can reduce photosynthesis and respiration (reducing plant growth and vigor); and dust deposition on the stigma of flowers can reduce successful pollination and interfere with the production of viable seeds (**Padgett *et al.* 2007).** The quantity and duration of dust deposition determines the severity and duration of effect. Quantity of deposition is a function of proximity to the source of dust, and wind speed and direction. Frequency of rainfall is also a factor, as rainfall events can wash dust from plants. Design Features to reduce dust, including those intended to meet air quality standards, would help to minimize these effects.

Weed risk would be elevated by increasing the likelihood of introduction and spread of invasive plant species. The increased risk of weed introduction as part of SQ would primarily be due to use of heavy equipment in an area not previously accessible to motorized vehicles. Heavy equipment can introduce weed seeds and other propagules to areas through soil and debris stuck in tire or track treads and undercarriage. Design Features requiring washing equipment before arrival to the project area would help to minimize this risk. The increased risk of spread of invasive species is based on increased acreage of disturbed ground. Weeds are typically well-adapted to establish on and rapidly spread across disturbed ground.

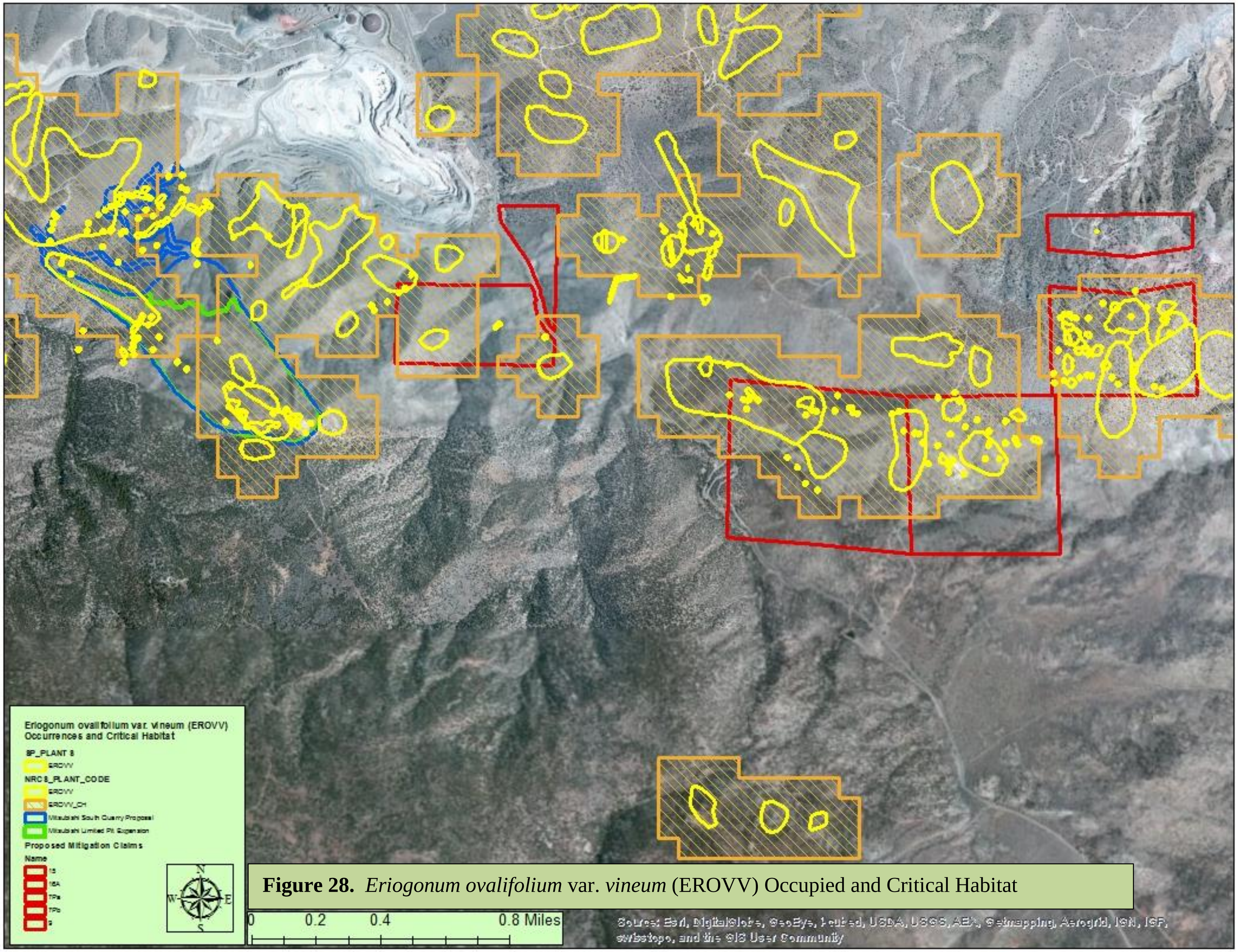


Figure 28. *Eriogonum ovalifolium* var. *vineum* (EROVV) Occupied and Critical Habitat

Features like the quarry margin, road margins, soil stockpiles, and the berm are very susceptible to introduction and spread of weeds. Once weeds spread along these corridors of invasion, all adjacent habitat areas are at risk. The quarry floor, walls, and benches (prior to application of soil / growth media for revegetation) would be less susceptible, by virtue of minimal soil nutrients and very low water holding capacity.

Microclimate changes caused by the quarry and haul road developments could effects plants. Vegetation, even relatively sparse vegetation such as pinyon and juniper woodland, has a moderating effect on localized microclimate, reducing surface air and soil temperatures and surface wind speeds, and increasing localized relative humidity. Removal of 153 acres of vegetation will remove these moderating effects for adjacent vegetation around the edge of the quarry, and associated plant populations. This would be a more substantial effect for vegetation adjacent to south-aspect quarry faces, which receive more incident solar radiation and heating. The changes in topography associated with quarry development would also be expected to change surface wind patterns, increasing surface wind-speed in areas previously more sheltered. All of these microclimate effects would result in greater susceptibility to the effects of drought and heat shock on plants growing adjacent to the SQ. The severity of these effects to plants would be a complex function of proximity, slope, and direction from the altered landscape.

There are approximately 33 acres of occupied *Eriogonum ovalifolium* var. *vineum* habitat outside the proposed South Quarry and haul road footprint of disturbance (*i.e.*, ~154 acre area), but within 100 feet of the edge of this area. It is impossible to predict the extent to which these indirect effects of dust and altered microclimate will reach these occurrences.

<u>*Cumulative Effects to Eriogonum ovalifolium var. vineum*</u>: See **Part II-3.2.13** for a general discussion of current and foreseeable future activities. Cumulative effects to this taxon as defined under the Endangered Species Act, *i.e.* effects of future non-federal activities that are reasonably certain to occur, include the following mining projects:

1. Ongoing development and proposed expansion of Omya's White Knob Quarry: There is occupied and suitable *Eriogonum ovalifolium* var. *vineum* habitat above the White Knob Quarry at White Mountain and in the immediate vicinity of the quarry. We are not aware of occupied habitat for this taxon within the existing operation area or the proposed expansion area, but we have not yet reviewed project survey information. The expansion area is within suitable habitat for this taxon.

2. Ongoing development and operation of Specialty Minerals' Arctic and Marble Canyon Quarries and continued reclamation in Furnace Canyon are expected to continue to result in continued losses of this species suitable, occupied and critical habitat. This project is fully approved and permitted, so in some respects, these losses are in the species baseline condition, though they have not been fully realized on the ground.

3. Development of MCC West Quarry is also fully approved and permitted, and not yet realized. The West Quarry project area is expected to result in the loss of about 46 acres of occupied *Eriogonum ovalifolium* var. *vineum* habitat.

The Carbonate Habitat Management Strategy addresses cumulative effects at the project scale by considering reserve design and the recovery needs of the species at the landscape scale. Directing project scale mitigation to CHMS priority areas, as the SQ project would do, contributes to the long term survival and recovery of the subject species. As a signatory to the CHMS, it is expected that the County of San Bernardino will follow the provisions of the Strategy for current and future non-federal proposed mine developments (*e.g.,* White Knob Expansion).

Eriogonum ovalifolium var. vineum – Determination of Effects: It is my determination that implementation of the Proposed Action may affect and would be likely to adversely affect *Eriogonum ovalifolium* var. *vineum* and its designated Critical Habitat. Consultation under Section 7 of the Endangered Species Act is required.

III-3.1.5 – Carbonate Habitat Management Strategy (CHMS)
The SQ project follows the provisions under the CHMS for calculating the conservation value of habitat that would be lost to proposed mining projects, and the habitat reserve contributions required to offset those losses. Because the Furnace Unit of the Carbonate Habitat Management Area is not fully Activated (*i.e.*, the Stage 1 Priority Lands have not yet been sufficiently added to the Habitat Reserve), acres of occupied and critical habitat to be lost and conserved are evaluated by species (as described above).

The conservation value of habitat that would be lost under Alternative 1 is 97 conservation units. (See the CHMS for details and definitions). The total conservation value of the proposed habitat reserve contributions is 359 conservation units. The habitat reserve contributions are mostly within the Furnace Unit of the Carbonate Habitat Management Area, and mostly within defined Stage 1 Priority Areas for establishment of habitat reserve. With the modifications described below, the contributions would be entirely with the Priority Habitat Reserve and the Furnace Unit. The reserve contributions would be made through donation of land in fee (Cushenbury 7P) and relinquishment of unpatented mining claims (Cushenbury 9, 16a, and 15). All of these contributions would be in conjunction (and contingent upon) a withdrawal from mineral location and entry under the mining laws of the US. Based on all these considerations, the proposed action is consistent with the CHMS.

There are two aspects of the project that require modifications to the CHMS, and information addressed through the CHMS consultation under Section 7 of the Endangered Species Act.

The first is that, under Alternative 1, about 16 acres of the proposed South Quarry encroaches upon lands identified under the CHMS as Stage 1 Priority Habitat Reserve. The proposed action for this project includes a proposal to remove these acres from the Stage 1 Priority Habitat Reserve designation under the CHMS. This 16 acre area includes 0.02 acres of designated critical habitat for *Erigeron parishii*, 1.0 acre of *Eriogonum ovalifolium* var. *vineum* occupied habitat, 15.4 acres of *Eriogonum ovalifolium* var. *vineum* designated critical habitat, 0.2 acres of *Acanthoscyphus parishii* var. *goodmaniana* occupied habitat, and a total conservation value of 8.39 conservation units under the CHMS. The entire 16 acres is suitable habitat for each of the four listed plant species. Under Alternative 2, the portion of the SQ in the Priority Habitat

Reserve is about 15 acres, there would include 0 acres of designated critical habitat for *Erigeron parishii*, 14.3 acres of *Eriogonum ovalifolium* var. *vineum* designated critical habitat, 15 acres of suitable habitat, and otherwise the same as Alternative 1. Regardless of which alternative is selected, for the purposes of consultation, the Proposed Action for this aspect of the project is Alternative 1.

The proposed action for this project also includes a proposal to add the Habitat Reserve contributions from this project that are not currently in the Priority Area to the Priority Area. This would add about 85 acres to the Priority Area. This area includes about 4.5 acres of *Eriogonum ovalifolium* var. *vineum* occupied and 19.4 acres of Critical Habitat, 1.4 acres of *Acanthoscyphus parishii* var. *goodmaniana* occupied and 2 acres of Critical Habitat, 0.1 acres of *Astragalus albens* occupied and 18.5 acres of *Astragalus albens* Critical Habitat.

The second aspect of this project that requires modifications to the CHMS, and information addressed through the CHMS consultation under Section 7 of the Endangered Species Act, is a shift of the boundary line between the Furnace and Hellendale Units of the Carbonate Habitat Management Area. With the configuration of the reserve contributions and the associated proposed mineral withdrawal, the current Unit boundary would bisect parcels and public land survey sections in an unmanageable way. The proposed action is to shift the Unit boundary to follow the proposed withdrawal boundary. This would follow the southern section line of Section 24 (T3N, R1E) and tie into the southern and eastern section lines of Section 19 and the eastern section line of Section 18 (T3N, R2E), then back on its original boundary line. This would shift about 572 acres in total from the Hellendale Unit to the Furnace Unit.

III-3.1.6 – Summary for T/E Plants and Critical Habitat

Effects to *Acanthoscyphus parishii* var. *goodmaniana*, *Astragalus albens*, *Erigeron parishii*, and *Eriogonum ovalifolium* var. *vineum* and their designated Critical Habitat would occur through implementation of this proposed action. The project Design Features would ensure avoidance and minimization of effects to the greatest extent practical.

III-3.2 - Threatened and Endangered Plants – Potential Effects of No Action

Under the No Action alternative, no effects to T/E Plant Species or Critical Habitat are expected to occur relative to the baseline condition. The discussion of the No Action Alternative in **II-3.3** is applicable for all T/E plant species that occur in the federal action area.

III-3.3 – Threatened and Endangered Wildlife – Potential Effects from Alternatives 1 and 2

Table 11 lists the current T/E animals known from the SBNF; they are all considered in this evaluation. **Table 11** also displays the occurrence probability of T/E animals in the federal action area and within the reach of potential effects for the development and operations of the project. This includes haul road, quarry, access roads, well maintenance, and mitigation parcels. Detailed species accounts for all of the T/E species are contained in the LMP and they are incorporated here by reference.

Four federally-listed species are known from or have the potential to occur at within the federal action area: desert tortoise, California condor, southwestern willow flycatcher, and least Bell's vireo. No suitable or modeled habitat occurs in the federal action area for any other federally-listed animal. No designated Critical Habitat is present or proposed in the federal action area.

III-3.3.1 – California Condor (*Gymnogyps californianus*)
The California condor is both a federally- and state-listed as Endangered. Critical Habitat was designated in 1976 but none is present in the federal action area. A Recovery Plan exists for this species.

Life History and Baseline Information for California Condor: From 100,000 to 10,000 years ago, the California condor ranged widely; with the extinction of the large Pleistocene mammals, the species declined in range and numbers. Condor remains reveal that the species once ranged over much of western North America, and as far east as Florida. Until about 2,000 years ago, the species nested in west Texas, New Mexico, and Arizona. When European settlers arrived on the Pacific coast of North America in the early 1800s, California condors occurred from British Columbia to Baja California, and also occasionally ranged into the American southwest.

Historically, California condors occurred in the Coast Ranges of California from Santa Clara and San Mateo Counties south to Ventura County, and east to the western slope of the Sierra Nevada and Tehachapi Mountains. This species occurred primarily from sea level to 9,000 feet and nested at 2,000-6,500 feet. Almost all of the historic nest sites used by California condors are located on the Los Padres, Angeles, and Sequoia National Forests.

California condor nesting sites are typically located in chaparral, conifer forest, or oak woodland communities. Historically, condors nested on bare ground in caves and crevices, behind rock slabs, or on large ledges or potholes on high sandstone cliffs in isolated, extremely steep, rugged areas. Cavities in giant sequoia (*Sequoiadendron giganteum*) have also been used. The nest site is often surrounded by dense brush.

The appearance of many nest sites suggests that they have been long-used, perhaps for centuries, whereas other apparently suitable sites in undisturbed areas show no signs of condor use.

Characteristics of condor nests include:
- large enough entrances for the adults to fit through;
- a ceiling height of at least 14.8 inches at the egg position;
- fairly level floors with some loose surface substrate;
- un-constricted nest site for incubating adults; and
- a nearby landing point.

Condors often return to traditional sites for perching and resting. Traditional roost sites include cliffs and large trees and snags (roost trees are often conifer snags 40-70 feet tall, often near feeding and nesting areas. Condors may remain at the roost site until midmorning, and generally return in mid- to late afternoon.

Table 11. Threatened, Endangered, Proposed, And Candidate Wildlife Species and the Likelihood of Occurrence Within the Area of Potential Effects of the MCC Project					
COMMON NAME	**LATIN NAME**	**OCCURRENCE On MOUNTAINTOP DISTRICT ***	**HABITAT TYPE****	**CRITICAL HABITAT ON SBNF**	**OCCURRENCE IN FEDERAL ACTION AREA?**
ENDANGERED SPECIES					
Quino checkerspot butterfly	*Euphydryas editha quino*	N	c	Designated	N – outside known distribution
unarmored threespine stickleback	*Gasterosteus aculeatus williamsoni*	Y	aq		N – no suitable habitat
arroyo toad	*Anaxyrus californicus*	Y	d,aq,r	Designated	N – no suitable habitat
mountain yellow-legged frog	*Rana muscosa*	Y	r, aq	Designated	N – no suitable habitat
California condor	*Gymnogyps californianus*	Y	mc,g,c,a,rk,wo		P
southwestern willow flycatcher	*Empidonax trailii extimus*	Y	r,m	Designated	P @ Cushenbury Springs
least Bell's vireo	*Vireo bellii pusillus*	N	r,m		Y @ Cushenbury Springs
San Bernardino kangaroo rat	*Dipodomys merriami parvus*	N	w	Designated	N – outside known distribution
Stephens' kangaroo rat	*Dipodomys stephensi*	N	g		N – outside known distribution
peninsular bighorn sheep	*Ovis Canadensis nelsoni*	N	wo, rk, d	Designated	N – outside known distribution
THREATENED SPECIES					
Santa Ana sucker	*Catostomus santannae*	N	aq	Designated	N-no suitable habitat
California red-legged frog	*Rana draytonii*	H	r,aq		N-no suitable habitat
desert tortoise	*Gopherus agassizii*	Y	d		Y near processing plant
coastal California gnatcatcher	*Polioptila californica californica*	N	c		N – outside known distribution
FEDERAL CANDIDATE SPECIES					
western yellow-billed cuckoo	*Coccyzus americanus*	P	r	N/A	N

*Occurrence Information:
Y = Species is known to occur.
P = Occurrence of the species is possible; suitable habitat exists, and/or the species is known from nearby locations.
B = Species is known or likely to nest in the area.
M = The species uses the area during migration as a stopover.
H = Part of the historical range but the species has been extirpated.
U = Occurrence of the species is unlikely based on habitat present.
N = Outside known distribution/range of the species.

**HABITAT TYPES/HABITAT COMPONENTS
a = aerial; usually seen in flight, often over several habitat types
r = riparian (streamside thickets and woodlands)
g = grasslands, fields, and agricultural areas
m = marshes, meadows; both freshwater areas and moist meadows
c = chaparral and coastal sage scrub
wo = woodlands; pinyon-juniper, oaks
mc = mixed conifer forests; Jeffrey pine, ponderosa pine, bigcone Douglas fir, coulter pine, sugar pine, white fir overstory
d = desert; Joshua tree woodlands, creosote bush scrub, blackbrush scrub
aq = aquatic; lakes, reservoirs, ponds, vernal pools/puddles
u = urbanized areas
w = washes and alluvial fans
rk = cliffs and rocky outcrops
s = snags and cavities

Most foraging occurs in open terrain of foothills, grasslands, potreros with chaparral areas, or oak savannah habitats. Historically, foraging also occurred on beaches and large rivers along the Pacific coast. Water is required for drinking and bathing.

California condors typically breed every other year, but can breed annually if they are not caring for dependent young. California condors usually lay a single egg between late January and early April. The egg is incubated by both parents and hatches after approximately 56 days. Both parents share responsibilities for feeding the nestling. Feeding usually occurs daily for the first 2 months, and then gradually diminishes in frequency. Juvenile condors leave the nest at 2-3 months of age, but remain in the vicinity of the nest and under their parents' care for up to a year. California condors are non-migratory. California condors are capable of extended flights (more than 100 miles in a day).

California condors are opportunistic scavengers, feeding exclusively on the carcasses of dead animals. Typical foraging behavior includes long-distance reconnaissance flights, lengthy circling flights over a carcass, and hours of waiting at a roost or on the ground near a carcass. California condors locate food by visual rather than olfactory cues, and require fairly open areas for feeding, allowing ease in approaching and leaving a carcass. California condors typically feed only 1-3 days per week.

Seasonal foraging behavior shifts may be the result of climatic cycles or changes in food availability. California condors maintain wide-ranging foraging patterns (*i.e.*, at least 2.8 to 11.6 square miles) throughout the year, an important strategy for a species that may be subjected to unpredictable food supplies.

Historically, condors probably fed on mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), pronghorn (*Antilocarpa americana*), and various marine mammals. More recently, domestic livestock made up the majority of their diet. (Source: **USFS 2006** LMP Species Account)

Population Status and Threats: The California condor has been one of the most highly endangered bird species in the world throughout its modern history. As the result of an aggressive management program, including capture of the last six individuals remaining in the wild in 1986-87, captive breeding, and reintroduction of captive progeny, the total population continues to increase from the low point in 1982, when only 21-22 individuals were thought to survive. The 9/30/12 California condor status report by the U.S. Fish and Wildlife Service showed a total population of 410 individuals, including 180 in captivity and 230 in the wild.

A high number of condors are still being lost to poisoning from lead ingested from carcasses, and this factor may preclude rapid recovery of the species in some areas. The ingestion of trash items, including glass fragments, china, plastic, and metal bottle tops, and non-digestible natural items such as small rocks, sticks, grass, wool, and fur, is a serious problem for condor chicks in California nests. (http://globalraptors.org/grin/SpeciesResults.asp?specID=8258)

Factors that led to California condor's century-long decline included illegal collection of adults and their eggs; secondary poisoning by substances used to eradicate livestock predators;

poisoning from ingestion of lead fragments of bullets embedded in animal carcasses; other forms of poisoning (DDT, cyanide, strychnine, compound 1080, antifreeze from car radiators); shooting; and collisions with structures such as transmission lines. In addition, the roads, cities, housing tracts, and weekend mountain retreats of modern civilization have replaced much of the open country condors need to find food. Their slow rate of reproduction and maturation undoubtedly make the California condor population as a whole more vulnerable to these threats.

Viability of this species is a definite concern due to the extremely small population and vulnerability to many factors. Greatest among these are shooting, lead contamination, collision with overhead transmission lines and towers, trash, and general human disturbance (**USFS 2006** LMP Species Account).

Rideout *et al.* (2012) documented the causes of death of free-ranging California condors between 1992 (the beginning of the reintroduction program) through 2009. Out of 76 dead condors for which the cause of death could be determined, 70% were from anthropogenic causes. Ingestion of trash was the most important cause of death for nestlings, and lead toxicosis was the most important factor for juveniles and adults. Other causes of death identified included: copper toxicosis (possibly from cattle troughs treated with copper sulfate to control algae), west Nile virus, powerline electrocution, powerline collision, ethylene glycol (antifreeze) ingestion, rattlesnake bite, predation, and gunshot. Deaths from mining-associated activities were not documented in that study.

There are many existing and ongoing threats to California condors, as described above. The risk to condors from man-made factors (trash, toxins, shooting, electrocution, and collisions) will continue and may increase in the foreseeable future as human populations in southern California grow.

Perhaps the greatest threat to condors in the foreseeable future is the expansion of renewable energy developments (solar and wind) throughout current condor's distribution as well as in areas where condors are expected to expand as the population continues to grow. The Bureau of Land Management has seen a surge in wind energy applications. Their website has data tables and maps displaying areas with existing applications for renewable energy projects (http://www.blm.gov/ca/st/en/prog/energy/wind.html).

<u>*Occurrence in the Federal Action Area – California Condor:*</u> California condors have been observed at several locations in the San Bernardino Mountains since 2002, including the White Mountain area of the North Slope (sighting of two condors approximately 6 miles west of the Butterfield quarry). USFWS records of radio-tagged condors suggest that as S. California's condor population continues to grow, the areas they cover is expanding (**G. Hund, pers. comm. 2013**). Condors appear to be traveling long distances from the main population sites on the coast on a more frequent basis.

Currently, condors are not thought to regularly forage over the San Bernardino Mountains and no nesting is known. The closest nests are approximately 120 miles away and the closest historic nest record was approximately 75 miles away (**J. Brandt, pers. comm. 2014**). Foraging likely occurs on an occasional basis and may increase in frequency as the population expands and if closer nest sites are established. Some cave nesting structures that condors prefer may occur on the North Slope. If condors chose to nest on the North Slope or in areas closer to the North Slope over the life of the project, foraging likelihood over the project and federal action area would increase.

Potential Effects to California Condor: While California condors are not currently frequent visitors to the North Slope, frequency of use may increase over the life of the project as the population recovers and range expands. The following discussion of potential effects assumes that they will occupy the North Slope sometime during the long life of the project.

Potential effects to California condors include habitat loss, disturbance and displacement, and death or injury from mining operations. See **Part II-3.2** for the discussion of effects common to many wildlife species.

Habitat Loss: The federal action area supports suitable habitat for nesting and foraging for California condor. The entire federal action area could be used for foraging. The project would result in permanent losses of the undisturbed foraging and nesting habitat. The proposed project would result in 154 (Alternative 1) or 134 acres (Alternative 2) of new areas of habitat being cleared and developed, resulting in a landscape that is mostly unsuitable for prey species. These areas would be cleared of vegetation and could no longer support habitat for many of the species that condors would scavenge.

While much of the North Slope's rock structures do not appear to have suitable cave-like formations preferred by condors for nesting, a systematic survey for suitable nest structures has not been conducted. Thus, it is possible that the project could result in a loss of a few suitable cave-like nest structures, particularly from development of the northern portion of the quarry and the haul road on that face. The northern portion of the SQ has steep rugged slopes with outcrops that may have suitable cave-like structures for nesting. Additionally, the slopes on either side of Marble Canyon may have some suitable nesting sites. Alternative 1 would affect more of the cliff habitat that might have suitable nesting sites than would be affected under Alternative 2.

The mitigation package for all alternatives includes relinquishment of 540 acres of claims and protection from future mining. The mitigation parcels provide suitable foraging habitat for California condor on a ratio of 3.5 to 4 acres protected for each acre lost, depending on alternative. Portions of Cushenbury #15 claim support some rock outcrops with some pock-holes that might be suitable for condor nesting. Suitable nest sites are probably not located on the other mitigation claims.

Because of the reliance on cave-type structures for nesting, the reclaimed quarry benches are not expected to provide suitable nest sites for California condors at the completion of mining. However, if condors became regular visitors to the North Slope over the life of the project, the Raptor Conservation Strategy provides for adaptive management measures that could potentially include the creation of cave-like structures on reclaimed quarry benches.

Additionally, the quarry site and overburden sites would be generally unsuitable for prey species and foraging for some time after reclamation (due to topography, access, scarcity of cover and forage); those acres of foraging habitat would be substantially degraded. Under the proposed project, MCC would be required to revegetate mined areas after completion of mining. Revegetation will restore some vegetation and cover for prey species. However, it is likely large areas of bare rock and the lack of top soil would limit the amount of revegetation and it may only be marginal for prey habitat for those prey species or activities dependent on vegetation for food and cover.

Disturbance: Disturbance effects may include noise disturbance from regular blasting as well as daily operations (loading rock, haul truck traffic, etc.). Humans and vehicles in the area also present a certain level of disturbance. Disturbance effects on wildlife species have been well-documented for a number of species including deer, small mammals, reptiles, and nesting and perching birds. Most species exhibit a "flight" response to disturbance resulting in temporary, or if disturbance is constant, permanent displacement. Flight responses and/or disturbances can negatively affect animal health by requiring increased energy expenditures.

Animals respond to disturbances through behavioral and/or physiological responses. Disturbance responses are classed in three ways: attraction (curiosity, food-seeking), tolerance, and aversion. Stress requires energy expenditure. In some cases, it may require more energy than an animal can take in, so they must use body energy reserves. Continuous stress may eventually cause illness or death. Stress combined with other factors such as severe winter conditions or constant disturbance may cause individuals to die or fail to reproduce. In such cases, populations would decline. When disturbance occurs over a large region for many years, the population may be unable to continue to reproduce and survive in the area (**Knight and Gutzwiller 1995**).

The distance of displacement depends on several factors: quality of vegetative and topographic cover (line-of-sight from disturbance points); amount and type of disturbance; timing of disturbance (*e.g.* noise during the day may not affect a nocturnal species, and animals may be more or less tolerant of disturbance during breeding season); and tolerance for disturbance (*e.g.* hunted populations are generally more likely to flee from disturbance than nonhunted/protected populations) (**Knight and Gutzwiller 1995**).

Potential disturbance effects include: alteration of habitat use (avoidance or abandonment of an area – either temporarily or permanently), interruption of reproductive activities (courtship, mating, prenatal care, nesting, etc.), and increased predation (especially of abandoned nests) (**Knight and Gutzwiller 1995**).

Birds are especially sensitive to background noises. Being able to differentiate vocalizations of the same and different species from background noise is important for pair bonding, breeding displays, territory defense, flock communication, etc. (http://www.fhwa.dot.gov/environment/noise/noise_effect_on_wildlife/effects/effects.pdf). Continuous or frequent background sounds may interfere with feeding, breeding, territory defense, and avoiding predators.

Disturbance impacts may include changes in behavior that result from noise disturbance from regular blasting as well as daily operations (moving/loading rock, haul truck traffic, etc.). Humans and vehicles in the area also present a certain level of disturbance, especially for that species are especially sensitive to visual stimuli.

Blasting associated with mining of the quarry is expected to occur twice a week between the hours of 10:00 am and 6 pm. Blasting during development of the haul road is expected to be smaller blasts but more frequent (up once/day). Disturbance can affect behavior, reduce amount of time foraging, affect physiology, increase the chances of predation of eggs or nestlings, and change use patterns. At some point, disturbance may cause them to abandon the areas where they have been foraging and nesting, or not use as much which may affect occupancy and reproductive success.

California condors may be disturbed if they nest or forage within line-of-sight of the haul road or quarry or if they nest close enough to be disturbed by the noise and vibrations associated with blasting. They may also be disturbed by activities that they are not accustomed to; if they nest or frequently forage within view of a road, or even blasting, they may have acclimatized to that activity already and have a higher tolerance for those types of disturbance. However, any activity outside of what they are accustomed to may be the cause of disuse or abandonment.

Background disturbance levels around the exiting quarry and cement plant (and adjacent SMI mining operations) are already relatively high. The highest potential for disturbance is probably during the development of the haul road and quarry when areas that previously had no or low disturbance levels are first entered. The blasting and human presence would be new in those areas.

The proposed haul road (especially the eastern portion) is close to some of the best nesting habitat. Condors using those areas for nesting or foraging during the 2-year construction period of the haul road (when there would be more frequent, if smaller, blasting) may be disturbed, resulting in abandonment of that area.

Once the quarry and haul road are developed and the mine is in an operational phase, the disturbance risks may be lower. For example, a condor pair choosing to nest close to the quarry or haul road vicinity would likely have a higher tolerance for those types of disturbance due to habituation.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

The Design Features include a several measures to help limit the potential for disturbance of raptors as a result of mining activities, including participation in a Raptor Conservation Strategy for the North Slope area that describes protective measures, inventories for nesting raptors, and behavioral response monitoring if nests are found in close proximity to active mining sites.

<u>Mortality and Injury from Mining Operations</u>: Because California condors are not currently known to regularly occupy or nest on the North Slope, the potential for death or injury is

considered unlikely at this time. However, if in the future, California condors become more regular visitors or start to nest within close proximity of the federal action area, there may be some risk.

The potential risks include death or injury of California condors that are scavenging on dead animals on the mine roads as a result of collisions with haul trucks and other mine vehicles. Because of the slow speeds of vehicles on the haul roads, this is considered unlikely but cannot be ruled out completely.

There is also a risk of death or injury as a result of disturbance from the mining operations, particularly blasting. Blasting during the mining operations typically occurs twice a week between 10:00 am and 6:00 pm. During the two-year haul road construction period, more numerous (up to once/day) blasts would occur.

Adult condors that nest or forage frequently close to the mine operations may become habituated to blasting and may not startle to the degree that injury or death would occur. Raptors often flush from the nest as a result of disturbance. Chilling and overheating of eggs or chicks or starvation of nestlings can result from human activities that appeared not to have caused an immediate response (http://wildlife.state.co.us/SiteCollection Documents/DOW/Wildlife Species/LivingWithWildlife/RaptorBufferGuidelines2008.pdf).

The greatest risk of death or injury would likely be to nesting condors if a nest were established in very close proximity to the active mining area. This would increase the probability because condors would be in the federal action area more frequently and in higher numbers (a pair or family compared to a single condor). The risk is likely highest to nestlings or young condors that are not adept at flying. Blasting or other unexpected noises or activities could startle young condors and result in them falling from the nest. Startled adult golden eagles have been known to knock eggs or young chicks from the nests (**Harmata *et al.* 1978**). Large explosions in close proximity to nests have been documented to cause destabilization/collapse of raptor nest substrates, causing hatch failure or nest destruction (**Holtuijzen *et al*. 1990**).

Although there are a number of studies evaluate disturbance distances for nesting raptors, the distances vary from 1/8 to 1 1/4 mile for a variety of activities (**Ruddock and Whitfield 2007**). There are few published studies that address the potential effects of blasting on raptors. In a study of frequent construction and experimental blasting, **Holtuijzen *et al*. (1990**) found that prairie falcons had behavioral responses to blasting events in over 50% of the time. Incubating and brooding falcons flushed 22% of the time but returned to the nest within an average of 3.4 minutes. They recommended that blasting does not need to be restricted for distances over 410 feet from prairie falcon aeries provided that peak noise levels do not exceed 140 dB at the aerie and that no more than three blast occur on a given day or 90 blasts during the nesting season. It is difficult to extrapolate these date to California condors because of the substantially different behavioral responses among raptor species.

After monitoring sounds, seismic, and behavioral activity for bald eagle nests close to a construction site, **Morgan (2012; pers. comm. 2013**) stated that the maximum distance they detected a disturbance was 1620 feet. However, they observed a blast within 700 feet of a nest that did not cause a disturbance. The variability is based on the size and methods used for the blast (*i.e.,* noise attenuation and explosive type/technique).

The Design Features include a several measures to help limit the potential for death/injury of raptors as a result of mining activities, including participation in a Raptor Conservation Strategy (RCS) for the North Slope area that describes protective measures, inventories for nesting raptors, and behavioral response monitoring if nests are found close to active mining sites.

The mining operations would have a variety of environmental hazards that could pose a threat to individual California condors. Liquids used by equipment and vehicles (*e.g.,* hydraulic fluid, antifreeze, oil, fuel, etc.) that are spilled, even in small quantities, may be ingested by small mammals resulting in illness or death. California condors scavenging on dead animals would be at risk of secondary poisoning. Additionally, condors are known to ingest micro-trash and antifreeze, becoming ill or dying. Mitsubishi operates a landfill at their plant site; it is covered daily and subject to State and County landfill standards and inspections. The Design Features include a several measures to limit the potential risk from spills, dead animals, etc.

In summary, the current likelihood of death or injury of condors from the proposed action is considered negligible because condors are currently such uncommon visitors to the North Slope. However, the conditions may change over time as the condor population continues to expand in size and range.

<u>*Cumulative Effects for California Condor:*</u> See **Part II-3.2.13** for a discussion of current and foreseeable future activities. There are many existing and ongoing threats to California condors, as described above. The risk to condors from man-made factors (trash, toxins, shooting, electrocution, and collisions) will continue and may increase in the foreseeable future as human populations in southern California grow.

Perhaps the greatest threat to condors in the foreseeable future is the expansion of renewable energy developments (solar and wind) throughout current condor's distribution as well as in areas where condors are expected to expand as the population continues to grow. The Bureau of Land Management has seen a surge in wind energy applications. Their website has data tables and maps displaying areas with existing applications for renewable energy projects (http://www.blm.gov/ca/st/en/prog/energy/wind.html).

Taken cumulatively with other existing, proposed, and future limestone mine developments (including the entire period until final reclamation in 2054 or 2134, depending on alternative) on the North Slope, the availability of habitat for food species may be reduced. Over the long life of the proposed mining operations, it is likely that more California condor habitat will be affected by limestone mines and condors may avoid the area.

Given the current situation for California condors, there are concerns about cumulative effects for this species from multiple threats. Because of the long life of the proposed project, it is very likely that the cumulative effects over time will continue to pose losses of suitable foraging and nesting habitat. Because of the extreme longevity of the proposed project, there is a very high degree in uncertainty in predicting the types and levels of effects over 40-120 years. The effects of climate change will likely result in dramatic changes to vegetation patterns over the North Slope landscape. See **Part II-3.2.13** for more discussion of climate change effects.

As described in the cumulative effects discussion in **Part II-3.2.13**, the future activities and projects that may occur on the landscape and in the habitats important to affected species are impossible to evaluate further than a few years in the future. The potential for effects to California condors and their habitat from continued growth and development on non-Federal lands and continued demands on NFS lands is very high over the long duration of the project.

If nesting occurs on the North Slope over the life of the project, there may also be risks to individuals. The effects of this proposed project have the potential to add to the cumulative effects to California condors if this species colonizes the San Bernardino Mountains during the project life.

Take for California Condor: The Endangered Species Act of 1973, as amended, makes it unlawful for a person to "take" a listed animal without a permit. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Through regulations, the term "harm" is defined as "an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."

Because there are currently no nests known in the federal action area, "take" of nesting California condors is not expected. If an active nest were established in very close proximity of the active mine, there would be an increased potential for "take". The likelihood of this is considered very low due to a lack of optimal cave nest structures preferred by California condors. The Raptor Conservation Strategy contains provisions for annual surveys and nest monitoring and for actions (including coordination with USFWS for "take") if active condor nests are found in close proximity.

Summary for California Condor: California condors are currently infrequent visitors to the San Bernardino Mountains and no nesting has been recorded or suspected. However, as the condor population recovers and expands their range, they may become more frequent, even regular, visitors to the North Slope. While the likelihood of nesting on the North Slope is considered relatively low because favored nesting cave-like features are thought to be uncommon (but systematic habitat assessments have not been conducted), it is reasonable to assume that visits by foraging condors will likely increase over the life of the project. If condors regularly use the North Slope at some point during the life of the project, the SQ project may affect them.

The proposed project would result in permanent losses of habitat for food animals but the mitigation parcel would provide long-term protection of more acres than would be lost for the mining operations. The proposed project would result in high levels of disturbance at and around the project area. Within the project area footprint for Alternative 1, the cliff faces on the north edge of the proposed quarry that may support suitable some cave-like structures. Alternative 2 would affect less of the cliff substrate that may have suitable cave-like structures.

There is a potential for death or injury of individuals as a result of mine operations if a nest were established on the North Slope (*e.g.,* blasts startling chicks in the nest resulting in young or eggs falling from the nest; vehicle collisions with condors scavenging on road kills; secondary poisoning by scavenging on poisoned animals; direct effects to health through ingestion of micro-trash or toxins such as antifreeze, etc.).

There is a degree of uncertainty about the potential effects to the California condors on the North Slope, especially for a project that is expected to last between 40 and 120 years. We cannot adequately predict the other activities and events over the next 10-20 years (much less 120 years) that may affect this California condor population. Taken cumulatively, there is a high degree of concern for California condor populations.

A Raptor Conservation Strategy (**Appendix C)** has been developed that includes avoidance and minimization measures for this species. It contains provisions for USFWS coordination and "take" if a condor nest is built close to the mining operations.

California Condor – Determination of Effects: Because California condors are such infrequent visitors to the North Slope, it is my determination that implementation of either action alternative would have no effect on California condors. If the population of condors continues to expand eastwards and they regularly visit or nest on the North Slope, the potential for effects might change over the life of the project and a new analysis may be needed.

III-3.3.2 – Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

The southwestern willow flycatcher is federally- and state-listed as endangered and has a federal Recovery Plan (**USFWS 2002**). Critical Habitat has been designated but none is present in the federal action area (**USFWS 2005b)**.

The species accounts prepared for the LMP revision (**USFS 2006)** are summarized below for life history, baseline conditions, status, and threats. Refer to the full species account for a complete discussion and associated literature citations.

Life History and Baseline Information: The southwestern willow flycatcher is a riparian bird known to nest in riparian woodlands and dense willow thickets within meadows and streams. It feeds primarily on insects and occasionally on seeds and berries. An important habitat component is the dense growth of the lower branches within willow thickets or a dense shrub understory.

Riparian communities provide both nesting and foraging habitat for the southwestern willow flycatcher. Southwestern willow flycatcher nests are in thickets of trees and shrubs approximately 13 to 23 feet tall with a high percentage of canopy cover and dense foliage up to 13 feet above ground. Plant communities at nest sites are typically even-aged, structurally homogeneous, dense, and near surface water or saturated soil. Other characteristics such as dominant plant species, size and shape of habitat patch, canopy structure, and vegetation height vary widely among sites. Along the upper San Luis Rey River, in San Diego County, approximately 90% of southwestern willow flycatcher nests were in coast live oak.

Southwestern willow flycatchers were once considered widely-distributed and common in California, occurring wherever suitable habitat existed in the Los Angeles Basin, San Bernardino, Riverside, and San Diego Counties, and the lower Colorado River. California once may have supported the majority of nesting. Currently in California, southwestern willow flycatchers exist only in small disjunct groups and have been extirpated from the lower Colorado River.

Southwestern willow flycatcher is a Neotropical migrant. Spring migration occurs late in the year, usually lasting from mid-May through early June. Fall migration usually begins by early August.

Southwestern willow flycatchers usually arrive in California to nest by mid-May and construct their nests in horizontal forks or branches above the ground or water in trees or shrubs, usually with dense vegetation providing a canopy over the nest. The breeding cycle of the southwestern willow flycatcher, from laying of the first egg to fledging, is approximately 28 to 30 days.

Most returning flycatchers show site fidelity to breeding territories; however, a significant number move within and among sites. Therefore, if a site is surveyed in one year and determined to be unoccupied, that does not mean it will not be occupied in successive years. (Source: **USFS 2006** LMP Species Account)

Status and Threats: The primary cause for the decline of the southwestern willow flycatcher is widespread fragmentation and extensive loss of both structural components and habitat resulting from hydrological changes in low-elevation cottonwood-willow riparian habitat across the species' range. Other factors contributing to habitat losses include urban development, road development and maintenance, livestock grazing, high intensity and frequent wildfire, and human recreational activities. Additional threats include brood parasitism by brown-headed cowbirds, replacement of native riparian vegetation by invasive nonnative species, pesticide contamination, predation, water management, and probable loss of winter habitat due to tropical deforestation.

Maintaining viability of this subspecies is complicated by the current size and structure of the remaining southwestern willow flycatcher populations. The total population size of the southwestern willow flycatcher is small. Moreover, the subspecies is patchily distributed over its range, with several sites supporting small populations and few sites having larger populations. The small size and dispersion of these populations leave them susceptible to local extirpation as a result of environmental stochasticity (*e.g.,* severe weather events or natural disturbance) or demographic stochasticity (*e.g.,* random shifts in birth or death rates).

The present distribution of southwestern willow flycatchers across its range presents complex management challenges. Most breeding sites are relatively isolated from other breeding sites. Such isolation potentially reduces the rate of dispersal among populations, and recolonization of small or isolated habitat patches following a local extirpation or population decline is less likely than recolonization of large habitat areas.

Brood parasitism of southwestern willow flycatcher nests by brown-headed cowbirds has substantially reduced southwestern willow flycatcher productivity in many locations.

Extensive loss of low elevation riparian habitat across its range and brood parasitism by the brown-headed cowbird were identified as the primary cause of this species' decline. Habitat for southwestern willow flycatchers is being affected by development and encroachment throughout southern California.

Throughout southern California, another ongoing effect to this species is from encroachment into the riparian zones by recreationists using the area for off-road vehicle use, enjoying nature, cooling off in the water, mountain biking, dog walking, etc. This type of encroachment can be expected to disturb nesting birds, possibly causing displacement, nest abandonment, lowered breeding success, degraded habitat, and individual mortality. It is also likely that desert-influence springs and riparian zones that once supported southwestern willow flycatcher habitat has been degraded or lost through water diversions and development.

About 25 nesting territories have been identified in the San Bernardino Mountains in lower Metcalf Creek, Mill Creek near Thurman Flat picnic area, Jacoby Canyon, Van Dusen Creek, Terrace Springs, Holcomb Creek, Santa Ana River, and Deep Creek. Due to varying survey efforts (due to budget constraints), it is not known what percentage nest consistently. Several new pairs were found on the SBNF from 1999 to 2001. Severe drought conditions occurred in 2001 and 2002. Between 2003 and 2006, virtually no breeding took place at territories that had been fairly reliable breeding sites. The cause of the apparent abandonment is speculative – it could be a reflection of the local drought conditions; it could indicate some loss of individuals in the wintering areas; or it could be result of something completely different. Breeding since 2006 has been intermittent at the known sites.

This paragraph from the SBCM 2008 report summarizes the current understanding of southwestern willow flycatcher population status in the San Bernardino Mountains (**SBCM 2008**):

> There is an emerging pattern at the larger scale of overall southwestern willow flycatcher occurrences in the San Bernardino Mountains. Since southwestern willow flycatcher surveys by SBCM began in 1999, the percentage of surveyed sites that had territories gradually increased from 39% in 1999, to 68% in 2000, and to an overall high of 76% in 2001. The following three years saw a steady reduction in the percentage of surveyed sites with territories until in 2004 there were no surveyed sites with territories. The most recent three years have yielded a small but steady increase in the percentage of surveyed sites with territories from 3% in 2005, to 6% in 2006, and 36% in 2007. The reason(s) for these apparent trends are not clear, but there does appear to be a cyclic nature to the occurrence of southwestern willow flycatcher in the San Bernardino Mountains. Ultimate factors driving the cyclic occupancy pattern are unknown at this time, but surveys in subsequent years may help to resolve this question.

The primary cause for the decline of the southwestern willow flycatcher is widespread fragmentation and extensive loss of both structural components and habitat resulting from hydrological changes in low elevation cottonwood-willow riparian habitat across the species' range. Other factors contributing to habitat losses include urban development, road development and maintenance, livestock grazing, high intensity and frequent wildfire, and human recreational activities. Additional threats include brood parasitism by brown-headed cowbirds, replacement of native riparian vegetation by invasive nonnative species, pesticide contamination, predation, water management, and probable loss of winter habitat due to tropical deforestation.

In southern California, high intensity recreation, off-highway vehicle activity, and roads may pose a threat to southwestern willow flycatcher population populations. Campgrounds and other recreational facilities tend to be concentrated near water and in riparian areas where southwestern willow flycatchers could breed. Recreation activities concentrated near riparian habitats, along with development and maintenance of access routes (*e.g.,* roads and trails) to these areas could disturb southwestern willow flycatchers during the breeding season or remove or degrade breeding habitat. (Source: **USFS 2006** LMP Species Account)

Occurrence in the Federal Action Area – Southwestern Willow Flycatcher: Nesting of southwestern willow flycatchers has been documented in the Big Bear area not too far from the federal action area.

In 2000, the SBNF and USFWS developed a computer model of suitable habitat for T/E species. **Table 12** displays the presence of modeled habitat in the federal action area and whether the modeled habitat is suitable for southwestern willow flycatcher.

Table 12. Summary of Modeled Habitat for Southwestern Willow Flycatcher

Area	Modeled Habitat?	Suitable Habitat?
Mining Areas		
Alternative 1 and 2 – South Quarry	N	N
Alternative 1 and 2 - Haul Road	N	N
Within ¼ mile of quarry or haul road	Y	N
Mitigation Lands		
7P-a	Y	N
7P-b	Y	N
9	Y	N
15	N	N
16A	N	N
Other Affected Areas		
Cushenbury Springs	Y	Y

Cushenbury Springs supports suitable habitat for this species. The riparian habitat occupies about 30 acres and supports willows, overstory cottonwoods and sycamores, and dense grape vine thickets. Sightings of willow flycatchers during migration suggest that breeding could occur at the site. No records of protocol-level surveys at Cushenbury Springs were found. Southwestern willow flycatchers are known to breed within several miles of Cushenbury Springs. None of the rest of the modeled habitat in the federal action area is considered suitable habitat due to lack of typical vegetation composition and structure.

Due to habitat suitability and proximity to known nesting territories, southwestern willow flycatchers may breed at Cushenbury Springs or could during the long life of the proposed project.

<u>*Potential Effects to Southwestern Willow Flycatcher*</u>
Disturbance Effects: The maintenance of the wells, pipeline, and road through Cushenbury Springs would occur regardless of this project; thus, potential effects from those actions are not considered part of this action (they are discussed part of the baseline condition). Thus, no project-associated activities would occur in the Cushenbury Springs area and no disturbance effects are expected from the project.

Habitat Effects: Because none of the unnamed drainages or Marble Canyon support suitable habitat for southwestern willow flycatchers, no effects to habitat would be expected from development either of the haul roads or quarry.

The proposed project would result in continued and extraction of water from wells between the Mitsubishi plant and Cushenbury Springs and the backup wells in Lucerne Valley. The proposed project would result in a 12.1% increase in water extractions from MCC's wells near Cushenbury Springs (**Barto 2012**). The Hydrology report prepared for this project did not identify a direct connection between the proposed increases in water extraction (**Barto 2013)**. Thus, no changes to the suitable habitat for southwestern willow flycatcher are expected from the proposed project.

The Design Feature **GEN-14** provides added assurance that if changes to the water table (*e.g.,* an earthquake results in a change in fault alignment and water connectivity) at Cushenbury Springs arise due to water extraction from the project, they would be detected and addressed.

<u>*Southwestern Willow Flycatcher – Cumulative Effects*</u>: Because no effects to southwestern willow flycatcher are expected from this project, there are no cumulative effects.

<u>*Take for Southwestern Willow Flycatcher*</u>: No "take" is expected as a result of the proposed project.

<u>*Summary for Southwestern Willow Flycatcher:*</u> While the baseline conditions at Cushenbury Springs may be affecting habitat for and causing disturbance to southwestern willow flycatcher, the proposed project would not result in any changes to the baseline conditions.

<u>*Southwestern Willow Flycatcher – Determination of Effects*</u>*:* It is my determination that implementation of either alternative would have no effect on southwest willow flycatchers.

III-3.3.3 – Least Bell's Vireo (*Vireo bellii pusillus*)

The least Bell's vireo is federally- and state-listed as endangered. Critical Habitat has been designated but none is present in or near the federal action area. This species has a draft Recovery Plan that has not been finalized.

Life History and Baseline Information for Least Bell's Vireo: During the breeding season, least Bell's vireo is an obligate low-elevation riparian species. It inhabits dense, low-elevation, willow-dominated riparian habitats with lush understory vegetation in the immediate vicinity of watercourses.

The most important structural habitat characteristic for least Bell's vireos is a dense shrub understory approximately 2 to 10 feet above ground. According to the USFWS, the habitat elements essential for conservation of the taxon can be described as riparian woodland vegetation that generally contains both canopy and shrub layers and includes some associated upland habitats. Examples of suitable breeding habitat are broad cottonwood-willow woodlands with a dense shrubby understory and mule fat scrub. Most areas that support least Bell's vireo populations are in early stages of succession where most woody vegetation is 5 to 10 years old.

Least Bell's vireos nest primarily in willows but also use a variety of shrubs, trees, and vines. Nests are generally located in branch fork in a forb, shrub, or tree within 3 feet of the ground. These areas generally have an open midstory with an overstory consisting of willows (*Salix* spp.), cottonwoods (*Populus* spp.), sycamores (*Platanus* spp.) or oaks (*Quercus* spp.). Significant overstory species include mature arroyo willow (*S. lasiolepis*) and black willows (*S. goodingii*).

Occasional cottonwoods and western sycamore (*P. racemosa*) occur in some least Bell's vireo habitats. Coast live oak (*Q. agrifolia*) may also comprise some of the overstory. Canopy cover is generally greater than 50 percent with occasional small openings. The understory frequently contains dense subshrub or shrub thickets. These thickets are often dominated by sandbar willow (*S. hindsiana*), mule fat (*Baccharis salicifolia*), young individuals of other willow species such as arroyo or black willows, and one or more herbaceous species.

Although extensive riparian areas with heavy undergrowth provide important habitat for least Bell's vireos, large areas are not required for successful breeding. The birds' center of activity is typically in understory vegetation, and their nest sites and song perches are seldom higher than 6 feet above ground. Least Bell's vireos forage in riparian and adjacent upland habitats.

The least Bell's vireo is a Neotropical migrant, wintering in Baja California, Mexico. The species is known to be a nocturnal migrant. Least Bell's vireos generally leave their breeding areas by early October. Spring migrants begin arriving at their breeding grounds by early to mid-March.

Least Bell's vireos primarily eat insects and spiders/ they often forage on willows, usually within riparian habitat. Foraging occurs in all vegetation strata up to 65.6 feet above ground. (Source: **USFS 2006** LMP Species Account)

Status and Threats: No other passerine in California has declined as dramatically as least Bell's vireo. In the last several decades, least Bell's vireo has undergone a precipitous decrease in numbers. This decline has been attributed primarily to extensive loss and degradation of breeding habitat, as well as brood parasitism by brown-headed cowbirds.

By the time least Bell's vireo was federally listed in 1986, the statewide population was estimated at 300 pairs. In 1996, the population had increased to 1,346 pairs; in 2000, the population had increased to 2,000 pairs. The tremendous growth that most populations have experienced is attributed to an intensive cowbird removal program that was initiated in some southern counties upon the listing of the species.

As cowbird parasitism declined, least Bell's vireo productivity increased resulting in the increase of bird numbers and expansion or recolonization of areas used by the least Bell's vireo. As populations continue to grow and disperse northward, they could reestablish in the central and northern portions of their historical breeding range. No evidence exists that least Bell's vireos are capable of sustaining their current rate of growth without continuing widespread cowbird trapping. Without land use changes to minimize brown-headed cowbirds, if human intervention (trapping/control) is removed it is likely that least Bell's vireo populations will return to the low numbers documented when the species was listed.

Habitat degradation and nest parasitism by brown-headed cowbirds were identified as the biggest threats to least Bell's vireo populations on NFS lands in southern California. On private lands, urban or agricultural development and subsequent loss of habitat are the major threats; these are not considered threats on NFS lands.

Habitat degradation can occur when the structure or composition of riparian vegetation is altered. Unlike other subspecies of Bell's vireo, this subspecies does not frequent upland sites; therefore, it is especially vulnerable to degradation or destruction of riparian habitats.

Dense shrub cover within 3 to 6.5 feet of the ground is important for least Bell's vireos, and this cover and vegetation composition can be significantly reduced by roads, overgrazing, off-highway vehicle activity, concentrated recreation use, channel clearing, diversions, and large discharges of water from upstream reservoirs. Additional threats to riparian habitats come from fire and invasive nonnative species. Activities that result in habitat fragmentation can cause a loss of habitat and create a greater edge that is favored by the brown-headed cowbird and certain nest predators. Disturbances (maintenance, presence, noise) by humans or machines associated with these activities may lead to courtship disruption or nest abandonment. (Source: **USFS 2006** LMP Species Account)

Occurrence in the Federal Action Area – Least Bell's Vireo: Least Bell's vireo is only known from four sites in the San Bernardino Mountains. One of those sites is Cushenbury Springs just north of MCC's plant. The other sites are on the coastal side of the mountains near San Bernardino. Most of the suitable habitat for this species has not been systematically surveyed using protocol methodology.

There is an occurrence record for a single least Bell's vireo exhibiting courtship behavior at Cushenbury Springs from 1993 by Robert McKernan (**Kielhold 1993**). See the discussion above for southwestern willow flycatcher for a description of the habitat.

Potential Effects to Least Bell's Vireo: No effects to least Bell's vireo or their habitat are expected from the project. See the discussion above for southwestern willow flycatcher – the effects would be the same as those described for southwestern willow flycatcher.

Least Bell's Vireo – Cumulative Effects: Because no effects to least Bell's vireo are expected from this project, there are no cumulative effects.

Take for Least Bell's Vireo: No take of least Bell's vireo is expected as a result of the project.

Summary of Potential Effects to Least Bell's Vireo: While the baseline conditions at Cushenbury Springs may be affecting habitat for and causing disturbance to least Bell's vireo, the proposed project would not result in any changes to the baseline conditions.

Least Bell's Vireo – Determination of Effects: It is my determination that implementation of either alternative would have no effect on least Bell's vireo.

III-3.3.4 – Desert Tortoise (*Gopherus agassizii*)

The desert tortoise is federally-listed as threatened in 1990 (55 FR 12178) and listed as threatened under the California Endangered Species Act in 1989. The desert tortoise has a revised Recovery Plan (**USFWS 2011**). Critical habitat for the desert tortoise was designated on February 8, 1994 (59 FR 5820). No designated or proposed Critical Habitat for desert tortoise occurs on or near the SBNF.

The desert tortoise was treated as one species for 150 years despite a large range and apparent differences in appearance, life history, geographical distribution, and habitat preferences. In 2011, genetic studies confirmed suspicions that there are two distinct species. The Agassiz's desert tortoise (*Gopherus agassizii)* is found west and north of the Colorado River in Utah, Nevada, northern Arizona and California. The newly-recognized species, Morafka's desert tortoise (*Gopherus morafkai)* is found east and south of the Colorado River, from Arizona and extending into Mexico (http://www.usgs.gov/newsroom/article.asp?ID=2842&from=rss).

Life History and Baseline Information for Desert Tortoise: The desert tortoise is a large, herbivorous reptile and the only naturally occurring tortoise in the Mojave Desert. Large individuals can reach 15 inches in length. Their shells are generally highly domed and unhinged (**Stebbins 1985**); some variation in the shape of the shell occurs among individuals, particularly across its range. Desert tortoises in California have a box-like shell shape and are generally higher-domed than those in Utah (http://www.werc.usgs.gov/outreach.aspx?recordid=82).

Desert tortoises occur in the California desert from below sea level to an elevation of 7,300 feet, but the most typical habitat is below 5,500 feet (**USFWS 2011**). The desert tortoise is most commonly found within the desert scrub vegetation type, primarily in creosote bush scrub vegetation, but also in succulent scrub, cheesebush scrub, blackbush scrub, hopsage scrub, shadscale scrub, microphyll woodland, and Mojave saltbush-allscale scrub (**USFWS 1994**). Desert creosote bush is often present in occupied habitat (**Stebbins 1985**). Creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), Mojave yucca (*Yucca schidigera*), and blackbrush (*Coleogyne ramosissima*) generally distinguish desert tortoise habitat. At higher elevations, Joshua tree (*Yucca brevifolia*) and big galleta grass (*Pleuraphis rigida*) are common indicators of tortoise habitat (**USFWS 1994**).

Within these vegetation types, desert tortoises potentially can survive and reproduce where their basic habitat requirements are met. Throughout most of the Mojave Region, tortoises occur most commonly on gently sloping terrain with soils ranging from sand to sandy-gravel and with scattered shrubs, and where there is abundant inter-shrub space for growth of herbaceous plants. Throughout their range, however, tortoises can be found in steeper, rockier areas. This species normally excavates a burrow under bushes, overhanging soil or rock formations, or digs into soil in the open.

Desert tortoises in the Mojave Desert are primarily active between May and June, with a secondary activity period from September through October. During inactive periods, tortoises hibernate, aestivate, or rest in subterranean burrows or caliche caves, spending as much as 98 percent of their time underground (**USFWS 1994**). During active periods, they usually spend nights and the hotter portion of the day in their burrow. Tortoises construct and maintain a series of single opening burrows, which may average from 7 to 12 burrows at a given time (**USFWS 1994**).

Distribution: Prior to the split into two species, the range was considered to cover deserts in portions of the California, Arizona, Nevada, Utah, and Sonora and Sinaloa, Mexico. However, the Agassiz's desert tortoise is only found in California, the extreme southern Nevada, and extreme southern Utah, and extreme northwest Arizona (areas west and north of the Colorado River in Utah, northern Nevada, and California (http://www.californiaherps.com/turtles/pages/g.agassizii.html) **(Figure 29**).

Range-wide Trends and Current Threats: Common ravens, gila monsters (*Heloderma suspectum*), kit foxes (*Vulpes macrotis*), badgers (*Taxidea taxus*), roadrunners (*Geococcyx californianus*), and coyotes are all natural predators of the desert tortoise. These predators typically prey upon 2- to 3-inch long juveniles, which have a thin, delicate shell (**USFWS 1994**).

Desert tortoise decline is attributed to destruction and degradation of habitat by urbanization, agriculture, mining, livestock grazing, and off-road vehicle activity; predation; and disease.

The number of desert tortoises within the Western Mojave Recovery Unit (of which the SBNF is part of) has continued to decline since the time of listing, although no recovery unit-wide surveys have been conducted that would allow us to estimate actual numbers of individuals. The factors which led to the listing of the desert tortoise continue to cause declines in numbers and loss of habitat. Conversion of the native habitats into urban and agricultural areas has continued; the indirect effects of these land uses continue to cause the loss of individuals at the boundaries with desert habitat. Upper respiratory tract disease, which prompted the emergency listing of the desert tortoise, has continued to spread across the recovery unit. At least some common ravens (*Corvus corax*) continue to consume large numbers of young desert tortoises. Although some roads have been fenced to prevent entry by desert tortoises, individuals continue to be killed by vehicular traffic.

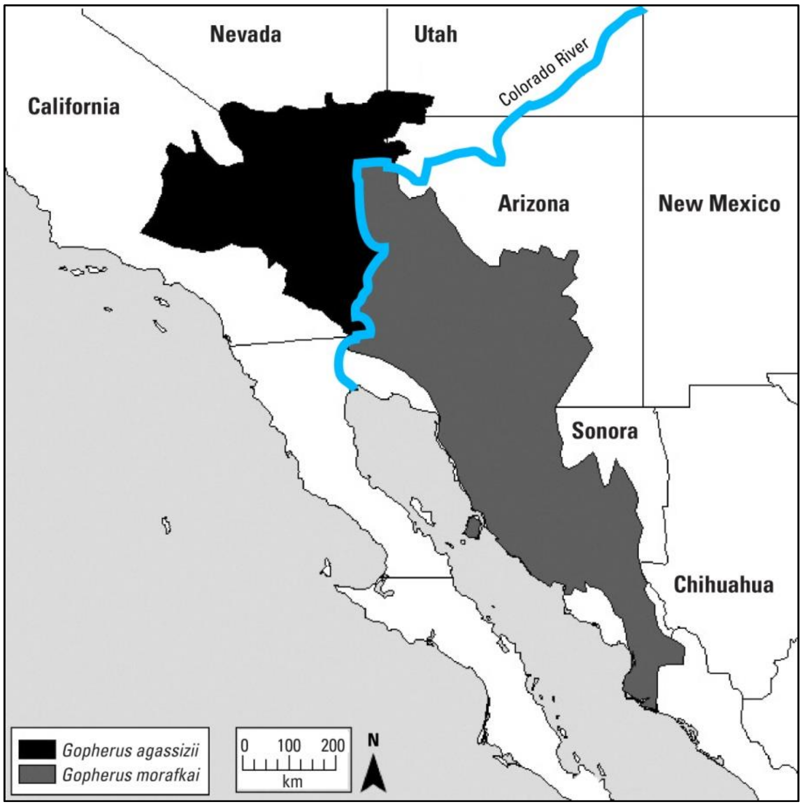


Figure 29. Desert Tortoise Distribution.

Source: http://www.usgs.gov/newsroom/images/ 2011_06_28/tortoise_spp_map.jpg

Desert tortoises occur in low numbers along the northern edge of the San Bernardino Mountains and at the Baldy Mesa area in the transition zone with the San Gabriel Mountains. Most NFS lands near the desert's edge are at higher elevations than desert tortoises typically inhabit. However, while much of the literature suggests an upper elevational range of 4,200 feet, SBNF records are from higher (up to 5,600').

The Recovery Plan (**USFWS 2011**) for desert tortoise listed a number of threats for this species, including those that result in mortality and permanent habitat loss across large areas, such as urbanization, and those that fragment and degrade habitats, such as proliferation of roads and highways, off-highway vehicle activity, poor grazing management, and habitat invasion by nonnative invasive species. Indirect impacts to desert tortoise populations and habitat are also known to occur in areas that interface with intense human activity.

Another threat is the increased frequency of wildfire due to the changes in desert plant communities from invasions by non-native plant species. These changes affect fire frequency and can negatively affect the desert tortoise by altering habitat structure and species available as food plants. Off-highway vehicle activity, roads, livestock grazing, agricultural uses, and other activities contribute to the spread of non-native species.

Landfills potentially affect desert tortoises and their habitat through fragmentation/loss of habitat, introduction of toxins/trash, increased road kill of tortoises on access roads, and increased predator populations. Large-scale renewable energy projects have been approved and proposed within desert tortoise habitat, threatening more effects to habitat and tortoises. Additional threats include disease and predation, illegal collections, and climate change.

<u>*Occurrences in the Federal Action Area – Desert Tortoise*</u>*:* The desert tortoise habitat north of the San Bernardino Mountains is delineated in the Recovery Plan as the "western Mojave recovery unit" (with the boundary being defined by the actual distributional limit of the desert tortoise) (**USFWS 2011**). Suitable desert tortoise habitat occurs around MCC's processing plant and Cushenbury Springs. This area is designated as Category 3 Desert Tortoise habitat, meeting criteria such as "not essential to maintenance of viable populations and having low to medium population density not contiguous with medium or high population density areas".

Systematic protocol-level surveys have not been conducted on the SBNF for this species. Much of the Mountaintop District's northern and eastern edges between Silverwood Lake on the west and Rattlesnake Canyon on the east are also presumed to be occupied in low densities. Tortoises are known from desert habitat adjacent to the Forest boundary and similar habitat occurs on the adjacent NFS lands.

The densities are likely low and it is considered the periphery of the desert tortoise distribution. Because of the proximity of known occurrences and presence of suitable habitat, the SBNF considers areas adjacent to occupied habitat that support suitable habitat and topography (roughly under 5600' in elevation and not extremely steep) as "presumed occupied".

Desert tortoises are presumed to occur in very low densities around the MCC plant, the Cushenbury Springs access road, and along Highway 18 where it accesses the plant. Surveys in 1990 and 1993 found an active desert tortoise burrow just north of Cushenbury Springs at approximately 4100' (**Biosystems 1993**). The only record that MCC has for desert tortoise is for one, or possibly two, tortoise observed about 25 years ago near Cushenbury Springs (**David Rib, pers. comm. 2013**). There are several records for desert tortoise near Omya's mining operations about 4 miles to the west at a similar elevation.

Desert tortoises are not expected to occur at the proposed quarry site due to habitat conditions. While they could occur rarely in the lower portions of the proposed haul road, it is considered unlikely due to high levels of habitat fragmentation and movement impediments (*e.g.,* large quarries, wide roads with high cuts, etc.) between there the higher quality habitat.

<u>*Potential Effects to Desert Tortoise*</u>: No direct or indirect effects to tortoises or their habitat would be expected as a result of the development of the haul road and the South Quarry site. The areas that are proposed for development under the proposal do not support suitable habitat for desert tortoise (due to elevation, steepness of slopes, presence of physical impediments to movement between the occupied areas and the project area, and generally unsuitable substrate).

The potential for injury or death of individual tortoises from continued operation of the processing plant, the wells and roads in/near Cushenbury Springs, and vehicles accessing that area through sparsely occupied desert tortoise habitat is considered part of the baseline effects from the ongoing operations and would not be increased as a result of this project.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

The Design Features include several protective measures for desert tortoise in the unlikely event of a desert tortoise occurring in the federal action area. The Design Features include an education measure for mining personnel; this measure would help reduce the potential for effects to individual tortoises. The Design Features also commit to development of protective measures if effects to tortoises are observed over the life of the project. Additionally, there are Design Features to discourage ravens from concentrating in the area. All of these measures will help further reduce the potential effects to desert tortoise within the federal action area.

Cumulative Effects – Desert Tortoise: Because no effects to desert tortoise are expected from this project, the proposed project would not contribute to the cumulative effects to desert tortoise.

Take for Desert Tortoise: No "take" is expected as a result of this proposal.

Summary of Potential Effects to Desert Tortoise: The development of a haul road and the proposed quarry would not directly or indirectly affect desert tortoises or their habitat. No "take" is expected. There may be some ongoing effects to desert tortoise and their habitat as a result of the baseline conditions around MCC's processing plant.

Desert Tortoise – Determination of Effects: It is my determination that implementation either of the alternatives would have no effect on desert tortoises. Endangered Species Act Section 7 consultation with USFWS will be conducted.

III-3.4 - Threatened and Endangered Wildlife – Alternative 1 (No Action)
If No Action is taken, the conditions for federally-listed animals in the federal action area would remain the same.

III-4.0 – SUMMARY OF DETERMINATION OF EFFECTS FOR T/E SPECIES

Table 13. Summary of Determination of Effects for T/E Species for SQ Project

Species	Federal Status	Determination of Effects – Species [1]	Determination of Effects – Critical Habitat	Take Expected
Acanthosycphus parishii var. *goodmaniana*	Endangered	MA	MA	n/a
Astragalus albens	Endangered	MA	MA	n/a
Erigeron parishii	Threatened	MA	MA	n/a

Table 13. Summary of Determination of Effects for T/E Species for SQ Project				
Species	**Federal Status**	**Determination of Effects – Species [1]**	**Determination of Effects – Critical Habitat**	**Take Expected**
Eriogonum ovalifolium var. *vineum*	Endangered	MA	MA	n/a
Desert Tortoise	Threatened	NE	n/a	No
Southwestern Willow Flycatcher	Endangered	NE	n/a	No
Least Bell's Vireo	Endangered	NE	n/a	No
California Condor	Endangered	NE	n/a	No
[1] *NE=No Effect; NLAA = Not Likely To Adversely Affect; MA=May Affect, Likely to Adversely Affect*				

<u>Consultation Requirements:</u> Formal consultation under Section 7 of the Endangered Species Act will be conducted for this project.

PART IV: BIOLOGICAL EVALUATION OF EFFECTS TO FOREST SERVICE SENSITIVE SPECIES

IV-1.0 – INTRODUCTION

Part I of this document contains descriptions of the methods/evaluation process, the proposed action and alternatives, and existing conditions for this project. **Part II** addresses general wildlife and plant species, Watchlist species, and effects that are common to those species as well as special status species that are discussed in depth in **Parts III, IV, and V.**

This part, **Part IV,** covers discussions of direct, indirect, and cumulative effects to species on the Region 5 Forest Service Sensitive species lists (as revised in 2013). Detailed species accounts for all of the Sensitive species discussed below are contained in the LMP, with updated accounts available in the project record; relevant species account information is summarized in the following discussions. References are included in the full LMP species accounts or updates (**USFS 2006; USFS 2013)** and generally are not repeated here. The LMP species accounts and updated species accounts (in Project Record) are incorporated by reference.

See **Part II-3.2** for an explanation of the analysis of direct, indirect, and cumulative effects. That section also contains discussions about present and foreseeable future projects that are considered in the cumulative effects discussions for each species.

IV-2.0 – BASELINE AND POTENTIAL EFFECTS FOR SENSITIVE SPECIES

IV-2.1 – Sensitive Plants – Potential Effects of Alternatives 1 and 2

See the existing environment described in **Part II-2.0** and the effects analyses common to general vegetation and special status plant species in **Part II-3.0**.

Table 14 lists the current Sensitive plants known from the SBNF; they are all considered in this evaluation. **Table 14** displays the occurrence probability of Sensitive plants in the analysis area and within the reach of potential effects for the development and operations of the project. This includes haul road, quarry, access roads, well maintenance, and mitigation parcels.

There are 10 Sensitive plant taxa known or likely to occur in or near the analysis area (**Figure** 30**).** It is possible that other Sensitive plant occurrences are present but undetected/unmapped in the analysis area. Sensitive plant species known from the area are individually addressed below and listed in **Table 14**.

IV-2.1.1 – Coville's Dwarf Abronia (*Abronia nana* var. *covillei*)

Life History and Baseline Information: *Abronia nana* var. *covillei* is in the four o'clock family (Nyctaginaceae). It is the only subspecies of *A. nana* that is known to occur in California. *Abronia nana var. covillei* (Nyctaginaceae) is a densely tufted perennial. This species blooms in May through August.

Table 14. Sensitive Plant Species - Occurrences within the Reach of Potential Effects from the Proposed MCC Project			
Species Name	**Common Name**	**Occurrence Information**	
		Mountaintop District	**Occurs In/ Near Analysis Area**
Abronia nana* var. *covillei	**Coville's dwarf abronia**	**Y**	**Y**
Abronia villosa var. *aurita*	chaparral sand verbena		
Acanthoscyphus parishii var. *cienegensis*	Cienega Seca puncturebract	Y	
Allium marvinii	Yucaipa onion		
Antennaria marginata	white-margined everlasting	Y	
Arctostaphylos glandulosa subsp. gabrielensis	San Gabriel Manzanita		
Arctostaphylos parryana subsp. tumescens	interior manzanita	Y	
Arenaria lanuginosa subsp. *saxosa*	rock sandwort	Y	
Astragalus bernardinus	**San Bernardino milkvetch**		**P**
Astragalus bicristatus	crested milk vetch	Y	
Astragalus lentiginosus var. *antonius*	San Antonio milk vetch		
Astragalus lentiginosus var. *sierrae*	Bear Valley milk vetch	Y	
Astragalus pachypus var. *jaegeri*	Jeager's milkvetch		
Astragalus tidestromii	**Tidestrom's milkvetch**		**P**
Atriplex parishii	**Parish's brittlescale**	**P**	**H @ Cushenbury Springs**
Boechera johnstonii	Johnston's rockcress		
Boechera parishii	Parish's rock cress	Y	
Boechera peirsonii	San Bernardino rockcress		
Boechera shockleyi	**Shockley's rock-cress**	**Y**	**Y**
Botrychium crenulatum	scalloped moonwort	Y	
Calochortus palmeri var. *munzii*	Munz's mariposa lily		
Calochortus palmeri var. *palmeri*	Palmer's mariposa lily	Y	
Calochortus striatus	**alkali mariposa lily**	**P**	**Y @ Cushenbury Springs**
Calyptridium pygmaeum	pygmy pussypaws	Y	
Canbya candida	pygmy poppy	Y	
Castilleja lasiorhyncha	San Bernardino Mountains owl's clover	Y	
Castilleja plagiotoma	Mojave paintbrush	Y	
Caulanthus simulans	Payson's jewelflower		
Chorizanthe parryi var. *parryi*	Parry's spineflower		
Chorizanthe xanti var. leucotheca	white-bracted spineflower		
Cladium californicum	California saw grass	Y	
Claytonia lanceolata var. *piersonii*	Pierson's spring beauty		
Deinandra mohavensis	Mojave tarplant	P	
Delphinium hesperium subsp. *cuyamacae*	Cuyamaca larkspur		

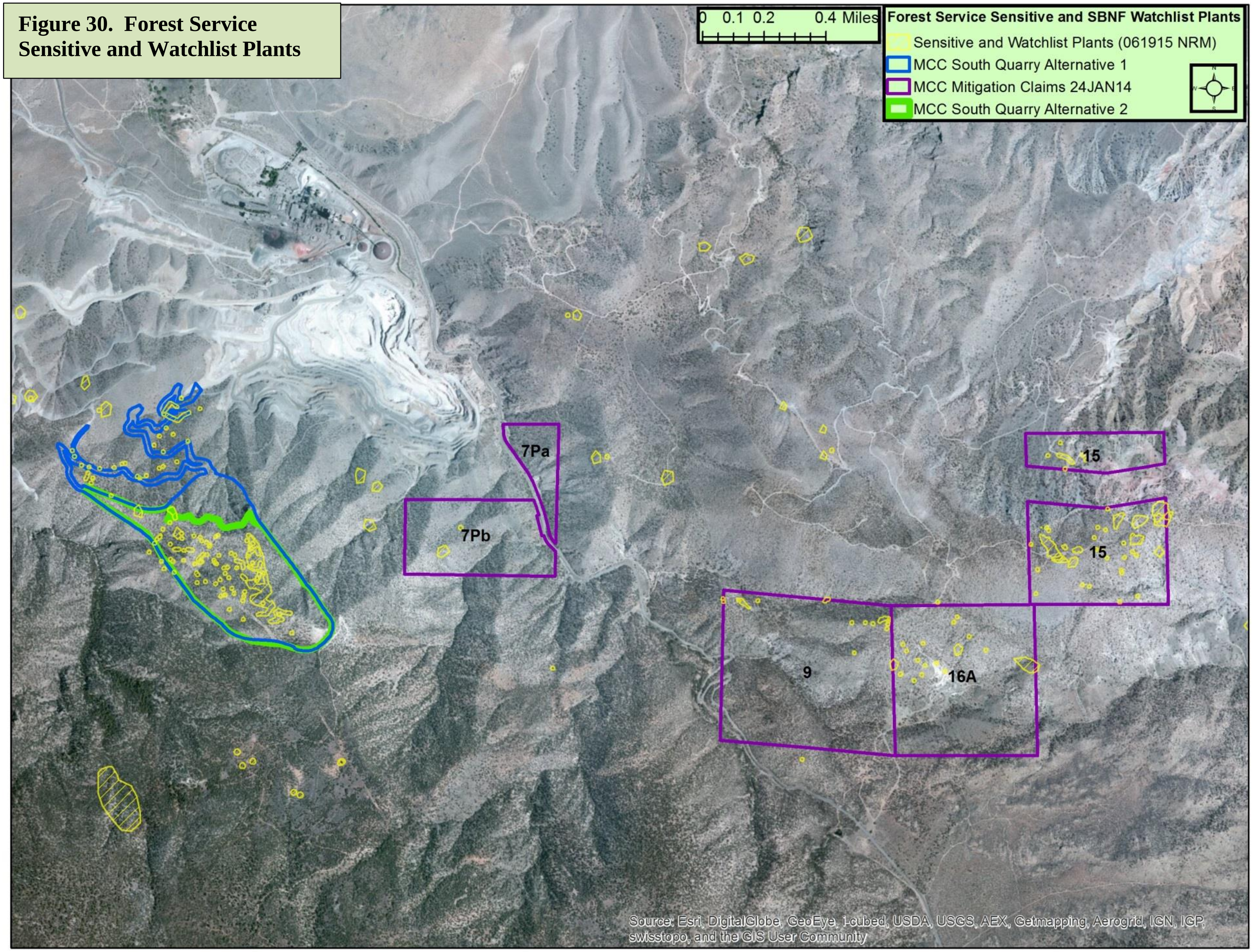
Table 14. Sensitive Plant Species - Occurrences within the Reach of Potential Effects from the Proposed MCC Project			
Species Name	**Common Name**	**Occurrence Information**	
		Mountaintop District	**Occurs In/ Near Analysis Area**
Dieteria canescens var. *ziegleri*	Ziegler's aster		
Draba saxosa	rock draba		
Drymocallis cuneifolia var. *cuneifolia*	wedgeleaf woodbeauty	Y	
Dudleya abramsii* subsp. *affinis	**San Bernardino Mts. dudleya**	**Y**	**Y**
Ericameria parryi var. imula	Parry’s rabbitbrush	Y	
Eriogonum evanidum	vanishing wild buckwheat	Y	
Eriogonum kennedyi var. *alpigenum*	southern alpine buckwheat		
Eriogonum microthecum var. *johnstonii*	Johnston’s buckwheat	Y	
Eriogonum microthecum var. *lacus-ursi*	Bear Lake buckwheat	P	
Galium angustifolium subsp. *jacinticium*	San Jacinto Mts bedstraw		
Galium californicum subsp. *primum*	California bedstraw		
Gentiana fremontii	moss gentian		
Gilia leptantha subsp. *leptantha*	San Bernardino gilia	Y	
Heuchera abramsii	Abrams’ alumroot		
Heuchera caespitosa	urn-flowered alumroot		
Heuchera hirsutissima	shaggy-haired alum root		
Heuchera parishii	Parish's alumroot	Y	
Horkelia cuneata subsp. *puberula*	mesa horkelia		
Horkelia wilderae	Barton Flats horkelia	Y	
Hulsea vestita subsp. *gabrielensis*	San Gabriel Mountains sunflower		
Hulsea vestita subsp. *pygmaea*	pygmy hulsea	Y	
Imperata brevifolia	California satintail		
Ivesia argyrocoma var. *argyrocoma*	Silver-haired ivesia	Y	
Ivesia callida	Tahquitz ivesia		
Lepechinia fragrans	fragrant pitcher sage		
Leptosiphon floribundus subsp. *hallii*	Santa Rosa Mts linanthus		
Lewisia brachycalyx	short-sepaled lewisia	Y	
Lilium parryi	Lemon lily	Y	
Limnanthes alba var. *parishii*	Parish’s meadowfoam		
Linanthus concinnus	San Gabriel linanthus		
Linanthus jaegeri	San Jacinto prickly phlox		
Linanthus killipii	**Baldwin Lake linanthus**	**Y**	**P**
Malaxis monophyllos var. *brachypoda*	Adder’s mouth		
Marina orcuttii var. *orcuttii*	California marina		

Table 14. Sensitive Plant Species - Occurrences within the Reach of Potential Effects from the Proposed MCC Project			
Species Name	**Common Name**	**Occurrence Information**	
		Mountaintop District	**Occurs In/ Near Analysis Area**
Matelea parvifolia	spearleaf		
Meesia uliginosa	Broad-nerved hump moss		
Mimulus exiguus	San Bernardino Mountain monkeyflower	Y	
Mimulus purpureus	purple monkeyflower	Y	
Monardella australis subsp. jokersti	Jokerst's monardella		
Monardella macrantha subsp. *hallii*	Hall's monardella		
Monardella nana subsp. *leptosiphon*	San Felipe monardella		
Monardella saxicola	rock monardella		
Navarretia peninsularis	Baja navarretia	Y	
Opuntia basilaris var. *brachyclada*	Short-joint beavertail	P	
Oreonana vestita	woolly mountain parsley	P	
Orobanche valida subsp. *valida*	Rock Creek broom-rape		
Oxytropis oreophila var. oreophila	rock loving point vetch		
Packera bernardina	San Bernardino butterweed	Y	
Parnassia cirrata var. *cirrata*	Fringed grass-of-Parnassus		
Penstemon californicus	California penstemon		
Phlox dolichantha	Bear Valley phlox	Y	
Plagiobothrys collinus var. ursinus	Cooper's popcorn flower	Y	
Potentilla rimicola	cliff cinquefoil		
Pyrrocoma uniflora subsp. *gossypina*	Bear Valley pyrrocoma	Y	
Saltugilia latimeri	**Latimer's woodland gilia**	**Y**	**P**
Schoenus nigracans	black sedge		
Scutellaria bolanderi subsp. *austromontanum*	southern mountain skullcap	P	
Sedum niveum	Davidson's stonecrop	Y	
Sidalcea hickmanii subsp. *parishii*	Parish's checkerbloom	Y	
Sidalcea malviflora subsp. dolosa	Dwarf checkerbloom	Y	
Sidalcea neomexicana	Salt Spring checkerbloom	P	
Sidotheca caryophylloides	chickweed starry puncturebract	Y	
Sidotheca emarginata	white-margined puncturebract		
Sisyrinchium longipes	Timberland blue-eyed grass	Y	
Streptanthus campestris	southern jewelflower	Y	
Symphyotrichum defoliatum	**San Bernardino aster**	**Y**	**H @ Cushenbury Springs**
Thelypteris puberula var. *sonorensis*	Sonoran maiden fern		
Thysanocarpus rigidus	rigid fringepod		

Table 14. Sensitive Plant Species - Occurrences within the Reach of Potential Effects from the Proposed MCC Project			
Species Name	**Common Name**	**Occurrence Information**	
		Mountaintop District	

*Occurrence Information:
Y = Species is known to occur.
P = Occurrence of the species is possible; suitable habitat exists, and the species is known from nearby locations.
H = Part of the historical range but the species has likely been extirpated.
U = Occurrence of the species is unlikely based on habitat present.
N = Outside known distribution/range of the species.

Figure 30. Forest Service Sensitive and Watchlist Plants



This species occurs mainly in the eastern San Bernardino Mountains, with widely-scattered records from the White and Inyo Mountains and the higher mountains of the Mojave Desert. Occurrences are closely associated with carbonate soils, with generally dry and open forest or woodland vegetation. In the San Bernardino Mountains, this species occurs across the northern and eastern slopes of the range mainly on limestone or marble-derived soils, and on dolomite-derived soils at Bertha Ridge and Sugarlump. The elevation range for this species in the San Bernardino Mountains is from about 4,900 to 8,800 feet.

This species generally occurs in rugged and remote areas of the SBNF. However, the species has lost hundreds of acres of habitat through the development and expansion of calcium carbonate mines across the North Slope. The approved and permitted (but not yet built) Cushenbury West Quarry will remove over 100 acres of habitat for this species, and is considered part of the baseline condition even though it is not fully realized.

Occurrences in the Analysis Area: Occurrences are sparsely scattered throughout the SQ project area and associated carbonate habitat reserve lands. All of these lands constitute suitable habitat for this species.

Potential Effects to Abronia nana var. covillei: For occurrences within the SQ analysis area, the primary effect will be permanent habitat loss through removal or burial of the land surface. The habitat loss of 154 acres of suitable habitat represents a small fraction of the approximately 10,000 acres of suitable carbonate habitat of the Furnace Unit (as defined under the CHMS), and approximately 20,000 acres of suitable carbonate habitat of the San Bernardino Mountains. This habitat loss would be offset by the proposed additions to the carbonate habitat reserve. A few occurrences along the proposed haul road would be affected by dust deposition. This effect would be reduced by proposed design features to reduce dust.

Cumulative Effects to Abronia nana var. covillei: Omya's Butterfield 3 quarry expansion would remove additional suitable habitat for this species. Mitsubishi's Cushenbury West quarry and Omya's White Knob quarry, each would result in over 80 acres of permanent suitable habitat loss for this species. Multiple ongoing activities on the SBNF, including use and maintenance of roads and trails, use of unauthorized roads and trails, dispersed recreation, and non-recreation special uses result in ongoing effects to this species, including minor habitat loss and degradation, and crushing or uprooting of individual plants. The portion of the analysis area that supports this species represents a small fraction of this species' range in the San Bernardino Mountains.

Determination of Effects – Abronia nana var. covillei: It is my determination that implementation of either one of the action alternatives may impact individuals and habitat, but would not likely result in a trend toward Federal listing for *Abronia nana* var. *covillei*. The project is not expected to interfere with maintaining viable well-distributed populations of *Abronia nana* var. *covillei*.

IV-2.1.2– San Bernardino Milkvetch (*Astragalus bernardinus*)
This species was added as a Forest Service Sensitive species in 2013.

Life History and Baseline Conditions: *Astragalus bernardinus* (pea family) is a perennial herb from a thick root, often found twining among shrubs. *Astragalus bernardinus* is found in the southern Mojave Desert from the eastern San Bernardino Mountains to the Pinto Basin in Joshua Tree National Park, and northeast in the New York and Ivanpah Mountains. There are unconfirmed reports from the Charleston Mountains of Clark County, Nevada. The species has been documented on the SBNF in the northeastern part of the San Bernardino Mountains at Cactus Flat, Horsethief Flat, Terrace Springs, and near Cushenbury Springs.

The reported elevational range for *A. bernardinus* is 2950-7545 feet. This species is found in rocky areas on slopes, ridges, hills, mesas, or in small washes. These areas are usually sunny and dry, and may be level to steeply-sloped. The only reported aspects are all north-facing. The soil or rock type is often granite, but may be alluvial or calcareous (limestone). Soil texture can be loamy, sandy, gravelly, or rocky. The surrounding vegetation may be creosote bush-Joshua tree scrub, Joshua tree woodland, Joshua tree-pinyon woodland, pinyon woodland, pinyon-juniper woodland, pinyon-oak woodland, juniper woodland, black brush scrub, buckwheat scrub, or sagebrush scrub. Often this species is found growing up through shrubs. *Astragalus bernardinus* begins flowering in April, and is in fruit through June.

Although *A. bernardinus* occurs over a fairly large geographic area, population sizes are observed to be small. The largest number of plants documented recently at one site was 34, but other reports noted only 1 to 5 plants at a site. Most often, the species is noted to be rare, scarce, occasional, uncommon, or scattered.

The few threats that have been suggested include drought stress, mining, development, grazing, and recreational activities. (Source: **USFS 2013**)

Occurrences in the Analysis Area: This species is not known from within the analysis area, and was not found during project surveys. It has been documented from nearby (near Cushenbury Springs) and the entire analysis area is suitable habitat. This taxon is also not known from the Habitat Reserve contributions, but these lands also support suitable habitat for this species.

Effects to Astragalus bernardinus: No effects are expected based on current information. However, if this species occurs undetected in the project area, its habitat would be permanently lost.

Cumulative Effects to Astragalus bernardinus: As there are no effects expected, there are no cumulative effects.

Determination of Effects – Astragalus bernardinus: It is my determination that implementation of either one of the action alternatives would not impact *Astragalus bernardinus*.

IV-2.1.3 – Tidestrom's Milkvetch (*Astragalus tidestromii*)
This species was added as a Forest Service Sensitive species in 2013.

Life History and Baseline Conditions: *Astragalus tidestromii* (pea family) is a perennial herb with a tufted habit. Flowering occurs from March-July. *Astragalus tidestromii* grows in Nevada and California. Within California, its distribution is limited to Inyo and San Bernardino counties. The known distribution within the SBNF is on Monarch Flat near Cushenbury Canyon.

Astragalus tidestromii inhabits Mojave Desert scrub communities and is associated with limestone substrates, as well as sandy or gravelly soils between 1960 - 5200 feet in elevation. It also grows in open areas and in foothills. On Monarch Flat, *A. tidestromii* was observed growing on the flats and slopes, and was largely associated with limestone.

The estimated number of plants at Monarch Flats was over 1,000 in March 2011. The occurrence at Monarch Flat appears to have high recent recruitment, due to most of the individuals being juvenile. The occurrences on BLM land support much smaller populations (between 1-100 plants) when surveyed in 2010. Due to limited information throughout the years, population trends are difficult to discern.

Astragalus tidestromii is threatened by grazing, activity by burros and humans, and vehicles. Mining and solar energy development projects are also of concern. At Monarch Flat, where most occurrences are in close proximity to the road, the possible threats are road maintenance, unauthorized vehicle travel off of roads, and mining activities. On BLM land, maintenance of wells and power lines might also be a threat to populations growing along roads to these locations. (Source: **USFS 2013**)

Occurrences in the Analysis Area: This species is not known from within the analysis area, and was not found during project surveys. It is known from nearby (Monarch Flat) and the entire analysis area is suitable habitat. This taxon is also not known from the project Habitat Reserve contributions, but these lands also support suitable habitat for this species.

Effects to Astragalus tidestromii: No effects are expected based on current information. However, if this species occurs undetected in the project area, its habitat would be permanently lost.

Cumulative Effects to Astragalus tidestromii: As there are no effects expected, there are no cumulative effects.

Determination of Effects – Astragalus tidestromii: It is my determination that implementation of either one of the action alternatives would not impact *Astragalus tidestromii*.

IV-2.1.4– Parish's Brittlescale (*Atriplex parishii*)
Life History and Baseline Conditions: *Atriplex parishii* (Chenopodiaceae) is a very small annual with a prostrate to decumbent habit. Flowering occurs from June-October. *Atriplex parishii* grows in the inland valleys of southern California in the Los Angeles, Riverside, San Bernardino, San Diego, and Orange counties, as well as in Baja California, Mexico. There are no known

occurrences of *Atriplex parishii* on NFS lands. However, this species is historically reported from two areas adjacent to the SBNF, including possibly at Cushenbury Springs (CNDDB). *Atriplex parishii* inhabits alkaline playas, chenopod scrubs, meadows, seeps, vernal pools, and wetlands between 80-6200 feet in elevation.

Many occurrences of *Atriplex parishii* have been extirpated due to development and habitat loss, and during the 1980s and 1990s the species was presumed extinct. If this species occurs undetected on the SBNF, it would be associated with alkali margins with seeps or springs. (Source: **USFS 2013**)

Occurrences in the Analysis Area: This species is not known from within the project area, and was not found during project surveys. It is historically reported from nearby, at Cushenbury Springs, which is the only suitable habitat in or near the analysis area. No recent surveys have found this species at or near Cushenbury Springs. This taxon is also not known from the project Habitat Reserve contributions, nor do these lands support suitable habitat for this species.

Effects to Atriplex parishii: No direct effects are expected based on lack of suitable habitat in the project area. However, if this species has persisted at Cushenbury Springs, its habitat would only be affected by the project if associated water extraction has effects on the hydrology and vegetation of Cushenbury Springs. Current information suggests that such effects are not expected, and design features will help minimize such effects if they arise in the future.

Cumulative Effects to Atriplex parishii: As there are no effects expected, there are no cumulative effects.

Determination of Effects – Atriplex parishii: It is my determination that implementation of either one of the action alternatives would not impact *Atriplex parishii*.

IV-2.1.5 – Shockley's Rock Cress *(Boechera shockleyi*)

Life History and Baseline Conditions: *Boechera shockleyi* (formerly treated as *Arabis shockleyi*) occurs mainly in the eastern San Bernardino Mountains, with a few records from the White and Inyo Mountains. Occurrences are closely associated with carbonate soils, with generally dry and open forest or woodland vegetation. In the San Bernardino Mountains, this species occurs across the northern and eastern slopes of the range (on limestone or marble-derived soils), and on dolomite-derived soils on Bertha Ridge. The elevation range for the San Bernardino Mountains is from about 4000 to 8000 feet.

Over 200 acres of habitat for this species have been lost to large scale calcium carbonate mining on the north slopes of the San Bernardino Mountains. These threats and effects from large scale mining continue on the North Slope. Some occurrences, mainly at Bertha Ridge along Van Dusen Canyon, are vulnerable to small-scale mining activities and associated vehicle travel off of system roads. Occurrences near the north shore of Big Bear Lake experience moderate to heavy foot and mountain bike traffic. Many occurrences in the San Bernardino Mountains are remote and inaccessible.

Occurrences in the Analysis Area: This species occurs in at least twenty small occurrences scattered across the proposed SQ project area, at least 300-500 individual plants at the time of project surveys. All of the documented occurrences in the project are in the proposed quarry area - none are along the proposed haul road. Project surveys also documented this species scattered with similar density and habitat quality across all of the Habitat Reserve contributions, with at least 50 scattered occurrences totaling at least 1000 individuals at the time of project surveys.

Effects to Boechera shockleyi: For occurrences within the SQ project area, the primary effect will be permanent habitat loss through removal or burial of the land surface. The habitat loss of 154 acres of suitable habitat represents a small fraction of the approximately 10,000 acres of suitable carbonate habitat of the Furnace Unit (as defined under the CHMS), and approximately 20,000 acres of suitable carbonate habitat of the San Bernardino Mountains. This habitat loss would be offset by the proposed additions to the carbonate habitat reserve.

Cumulative Effects to Boechera shockleyi: Omya's Butterfield 3 quarry expansion would remove additional suitable habitat for this species. Mitsubishi's Cushenbury West quarry and Omya's White Knob quarry would each result in over 80 acres of permanent suitable habitat loss for this species. Multiple ongoing activities on the SBNF, including use and maintenance of roads and trails, use of unauthorized roads and trails, dispersed recreation, and non-recreation special uses result in ongoing effects to this species, including minor habitat loss and degradation, and crushing or uprooting of individual plants. The portion of the analysis area that supports this species represents a small fraction of this species' range in the San Bernardino Mountains.

Determination of Effects – Boechera shockleyi: It is my determination that implementation of either one of the action alternatives may impact individuals and habitat, but would not likely result in a trend toward federal listing of *Boechera shockleyi*. The project is not expected to interfere with maintaining viable well-distributed populations of *Boechera shockleyi*.

IV-2.1.6– Alkali Mariposa Lily (*Calochortus striatus*)

Life History and Baseline Conditions: *Calochortus striatus* (lily family) is a perennial herb that grows from a bulb. *Calochortus striatus* is a rare endemic of moist alkaline areas in the arid interior of southern California and southern Nevada. *Calochortus striatus* grows in calcareous sandy soil, in seasonally moist alkaline habitats such as alkali meadows, ephemeral washes, vernally moist depressions, and at seeps within saltbush scrub at 300-4500 feet in elevation. Plants are not found in soils with surface salts, or wetter areas with permanent standing surface water. The bulb remains dormant and does not sprout in dry years.

Calochortus striatus occurs in the southern Sierra Nevada, in the western, central and southern Mojave Desert, at the north base of the Bernardino Mountains, in the southern San Joaquin Valley, and in southern Nevada.

In California, populations are scattered in Kern, Tulare, northeastern Los Angeles, and southern and central San Bernardino counties. The largest populations of this species occur at several localities within Edwards AFB. In Nevada, the only two populations occur in Clark County near Las Vegas and in Nye County near Ash Meadows.

Known occurrences near the SBNF include Cushenbury Springs, Box S Springs, and Rabbit Springs, all in Lucerne Valley. A historical occurrence (1926) at Whiskey Springs within the SBNF was probably extirpated by subsequent Highway 18 improvements. There are no known extant occurrences of this species on National Forest lands in southern California.

Suitable habitat for *Calochortus striatus* may be vulnerable to grazing impacts within the Rattlesnake Allotment on NFS and Bureau of Land Management lands. All *Calochortus* species are vulnerable to removal by collectors. This species is associated with moist soils in the desert, and is therefore highly vulnerable to habitat loss and degradation resulting from water diversions that affect surface hydrology.

Occurrences in the Analysis Area: This species is not known from within the project area, and was not found during project surveys. It is known to occur nearby at Cushenbury Springs, which is the only suitable habitat in or near the analysis area. This taxon is also not known from the project Habitat Reserve contributions, nor do these lands support suitable habitat for this species.

Effects to Calochortus striatus: No direct effects are expected based on lack of suitable habitat in the project area. However, where this species occurs at Cushenbury Springs, its habitat would only be affected by the project if associated water extraction has effects on the hydrology and vegetation of Cushenbury Springs. Current information suggests that such effects are not expected, and Design Features will help minimize such effects if they arise in the future.

Cumulative Effects to Calochortus striatus: As there are no effects expected, there are no cumulative effects.

Determination of Effects – Calochortus striatus: Implementation of either of the action alternatives would not be expected to impact *Calochortus striatus*.

IV-2.1.7– San Bernardino Mountains Dudleya (*Dudleya abramsii* subsp. *affinis*)
Life History and Baseline Information: This perennial succulent species is endemic to the northeastern San Bernardino Mountains, on pebble plains and also on outcrops of granite, quartzite, and carbonate rocks, from Deep Creek and Coxey Creek on the western limit of its range to Delamar Mountain, Bertha Ridge and Gold Mountain, Gold Hill, Nelson Ridge, and Lone Valley to Rattlesnake Canyon at the eastern extent of the range.

Historically through the present, much of the habitat of this species on private land has been lost to residential and commercial development. Most large occurrences of this species on public land (mainly NFS) are protected by virtue of protections in place for its pebble plain habitat. However, adverse effects from mining, woodcutting, dumping, habitat loss, competition from non-native species, road construction and maintenance, and unauthorized off-highway vehicle use are ongoing. Where the species grows off of pebble plains, occurrences are small and widely scattered, but less risk of impacts due to rugged terrain.

Occurrences in the Analysis Area: This taxon was recorded during SQ project surveys on the 6,403 peak in the center of the proposed quarry, and down the west flank of this peak to just west of the proposed SQ. Plants are widely-scattered on very rugged terrain, growing in and among large limestone outcrops. There are seven occurrence groups of plants recorded within the SQ footprint, supporting about 650 plants in total. There are an additional two small occurrences as a continuation of this group, just west of the SQ footprint, with about 40 plants in total. One occurrence of about 75 individual *Dudleya abramsii* subsp. *affinis* plants was recorded during project surveys at the northwest corner of Cushenbury 9 (one of the Habitat Reserve contributions) on the southern flanks of Blackhawk Mountain. These occurrence groups represent two of only four reported localities of this species in the carbonate habitat on the North Slope of the San Bernardino Mountains, with the others reported from Bousic Canyon and above Terrace Springs.

Effects to Dudleya abramsii subsp. *affinis:* For occurrences within the SQ project area, the primary effect to this taxon will be permanent habitat loss through removal or burial of the land surface. Indirect effects of dust weeds and microclimate changes are also possible where plants occur just outside the SQ footprint. This habitat loss would be offset to a limited extent by the proposed additions to the carbonate habitat reserve. The carbonate habitat on North Slope supports a very small proportion of the known occupied habitat for this species, most of which occurs on quartzite outcrops and pebble plains across the northern and eastern rim of Bear Valley. Where this taxon is known to occur on the North Slope, it tends to occur in very rugged and remote areas that are generally not thoroughly explored for botanical resources. Based on distribution and habitat documented within well surveyed areas of the North Slope, it is likely that there are undiscovered occurrences widely scattered across the North Slope from White Mountain to Mineral Mountain.

Cumulative Effects to Dudleya abramsii subsp. *affinis:* Omya's Butterfield 3 quarry expansion would remove additional suitable habitat for this species. Mitsubishi's Cushenbury West Quarry and Omya's White Knob quarry would each result in over 80 acres of permanent suitable habitat loss for this species. Multiple ongoing activities on the SBNF, including use and maintenance of roads and trails, use of unauthorized roads and trails, dispersed recreation, and non-recreation special uses result in ongoing effects to this species, including minor habitat loss and degradation, and crushing or uprooting of individual plants. The portion of the analysis area that supports this taxon represents a small fraction of this taxon's range in the San Bernardino Mountains.

Determination of Effects– Dudleya abramsii subsp. affinis: It is my determination that implementation of either one of the action alternatives may impact individuals and habitat, but would not likely result in a trend toward federal listing of *Dudleya abramsii* subsp. *affinis*. The project is not expected to interfere with maintaining viable well-distributed populations of *Dudleya abramsii* subsp. *affinis*.

IV-2.1.8 – Baldwin Lake Linanthus *(Linanthus killipii*)
Life History and Baseline Information: This diminutive annual species is endemic to the eastern San Bernardino Mountains. It ranges from Moon Ridge and Gold Mountain east and southeast through the Baldwin Basin, Nelson Ridge, Deadman's Ridge, Broom Flat, Arrastre Creek, Lone

Valley, Rose Mine to Rattlesnake Canyon and Viscera Springs. This species mainly occurs on or near pebble plains and associated areas of clay soils, open vegetation structure, and flats to gentle slopes. It grows infrequently in other habitats that are dry, open and have coarse soils.

Historically through the present day, habitat of this species on private land has been lost to residential and commercial development. These loses have centered on the areas of Sugarloaf town and rural residential areas of Baldwin Lake. Many large occurrences of this species on public land (mainly NFS) are protected by virtue of protections in place for pebble plain habitat. However, adverse effects from mining, woodcutting, dumping, habitat loss, competition from non-native species, road construction and maintenance, and unauthorized off-highway vehicle use are ongoing throughout its range.

In the Big Bear area, habitat has been affected by use and maintenance of multiple system roads and trails, dispersed recreation uses, and unauthorized off-highway vehicle use.

Occurrences in the Analysis Area: This species is not known from within the project area and was not found during project surveys. It is recorded from nearby (near Whiskey Springs in 2005) and reported historically from near Cushenbury Springs from 1901. The analysis area and outlier occurrence at Whiskey Springs are not typical habitat for this species and the sites are about three miles north (and about 1500 feet lower in elevation) from the nearest occupied habitat at Nelson Ridge. This taxon is also not known from the Habitat Reserve contributions. While it is possible that occurrences exist undetected in the analysis area, it is considered unlikely.

Effects to Linanthus killipii: No effects are expected based on current information. However, if this species occurs undetected in the analysis area, its habitat would be permanently lost.

Cumulative Effects to Linanthus killipii: As there are no effects expected, there are no cumulative effects.

Determination of Effects– Linanthus killipii: It is my determination that implementation of either of the action alternatives would not impact *Linanthus killipii*.

IV-2.1.9– Latimer's Woodland Gilia (*Saltugilia latimeri)*

This species was added as a Forest Service Sensitive species in 2013. *Saltugilia latimeri* was described in 2002.

Life History and Baseline Conditions: *Saltugilia latimeri* (Polemoniaceae) is an annual herb that flowers between March-June. *Saltugilia latimeri* is recorded from Riverside, San Bernardino, Kern and Inyo counties. *Saltugilia latimeri* is documented in the San Bernardino Mountains by three historic records (1926, 1927, and 1955) along Cushenbury Grade between Whiskey Springs and Cactus Flat. There is also a 1996 record from near Silver Creek just south of the White Knob Quarry haul road.

Saltugilia latimeri occurs in rocky or sandy substrate in chaparral or Mojavean desert scrub from 1300 - 6200 feet in elevation. There are 17 occurrences for this species documented but many are historic or questionable. There is no information on population sizes of any occurrences.

Occurrences in the Analysis Area: This species is not known from within the project area and was not found during project surveys. This taxon is also not known from the Habitat Reserve contributions. While it is possible that occurrences exist undetected in the analysis area, it is considered unlikely.

Effects to Saltugilia latimeri: No effects are expected based on current information. However, if this species occurs undetected in the analysis area, its habitat would be permanently lost.

Cumulative Effects to Saltugilia latimeri: As there are no effects expected, there are no cumulative effects.

Determination of Effects – Saltugilia latimeri: It is my determination that implementation of either of the action alternatives would not impact *Saltugilia latimeri*.

IV-2.1.10– San Bernardino Aster *(Symphyotrichum defoliatum*)

Life History and Baseline Information: This species, formerly treated as *Aster bernardinus*, is endemic to southern California, with a wide range including the San Gabriel, San Bernardino, San Jacinto Mountains, and Peninsular Ranges of Riverside and San Diego Counties, from the costal and desert bases of these ranges to about 7000 feet. Despite this wide range, it is known from relatively few widely-scatted records, and few of those have been reported in recent decades. It is described as occurring in grasslands and disturbed places, and usually where at least seasonally wet and somewhat alkaline.

In the San Bernardino Mountains it is known from only four records: Clark's Ranch (1994), Cushenbury Springs (1932), Arrowhead Springs (1939), and the east end of Baldwin Lake (1924). Virtually nothing is known of the current status of this species in the San Bernardino Mountains.

Occurrences in the Analysis Area: This species is not known from within the project area and was not found during project surveys. It is historically reported from nearby at Cushenbury Springs (which is the only suitable habitat in the analysis area). No recent surveys have found this species at or near Cushenbury Springs. This taxon is also not known from the project Habitat Reserve contributions and those lands do not support suitable habitat for this species.

Effects to Symphyotrichum defoliatum: No direct effects are expected based on lack of suitable habitat in the analysis area. However, if this species has persisted at Cushenbury Springs, its habitat would only be affected by the project if associated water extraction has effects on the hydrology and vegetation of Cushenbury Springs. Current information suggests that such effects are not expected, and design features will help minimize such effects if they arise in the future.

Cumulative Effects to Symphyotrichum defoliatum: As there are no effects expected, there are no cumulative effects.

Determination of Effects – Symphyotrichum defoliatum: It is my determination that implementation of either of the action alternatives would not impact *Symphyotrichum defoliatum*.

IV-2.2 – Sensitive Plants – Potential Effects of No Action

Under the No Action Alternative, no effects to Sensitive Plant Species are expected to occur relative to the baseline condition. The discussion in **Part II-3.3** is applicable for Sensitive plant species that occur in the analysis area.

IV-2.3 – Sensitive Animals – Potential Effects of Alternatives 1 and 2

Table 15 lists the Sensitive animals known from the SBNF; they are all considered in this evaluation. Table 15 displays the occurrence information for Sensitive animals in the analysis area and vicinity.

The potential effects for those Sensitive species with known occurrences or high probabilities of occurring in the analysis area are discussed in detail.

The species shown as "Unlikely" are considered unlikely to occur in the analysis area for a variety of factors including: 1) the analysis area is outside the currently-known distribution or range of the species; 2) the analysis area does not support suitable habitat in general terms (*e.g.,* vegetation types) or specifically (*e.g.,* host plant, nesting substrate, etc.); 3) the nearest occurrences of the species are not connected and the species is not likely to be able to move into the project area; and, 4) the species is so rare and in such low densities that occurrence is very unlikely.

See the existing environment described in **Part II-2.0** and the effects analyses common to wildlife species/habitats in **Part II-3.2.** The following species and site-specific evaluations tier to those discussions.

IV-2.3.1 – Large-Blotched Ensatina (Ensatina klauberi) and Yellow-Blotched Ensatina (Ensatina *eschscholtzii croceater*)

Large and yellow-blotched ensatina are Forest Service Sensitive species and CDFW Species of Special Concern. The yellow-blotched ensatina is also a BLM Sensitive species. Large-blotched ensatina salamanders found in the San Bernardino Mountains have color patterns similar to yellow-blotched salamander but appear to be genetically closer to *E. klauberi.* In the San Bernardino Mountains, the yellow-blotched ensatina intergrades with the large-blotched ensatina (**Stebbins 2003**).

There is a "hybrid swarm" for *Ensatina* in the San Bernardino Mountains where Monterey, yellow-blotched, and large-blotched ensatina hybridize. Recent treatments (**Stebbins and McGinnis 2012**) list *E. klauberi* as a species broken out from *E. eschscholtzii* (as previously treated). The genetics for these three species is yet to be resolved (**Stebbins and McGinnis 2012**). For the purposes of this analysis, both yellow-blotched and large-blotched are considered to be present in the San Bernardino Mountains. Further research in the future may result in a better understanding of the taxonomy.

Table 15. Sensitive Animal Species – Occurrences Within the Reach of Potential Effects from the MCC Project				
Common Name	**Latin Name**	**Mountaintop District Record[1]**	**Habitat [2]**	**Potential for Occurrence[1]**
San Emigdio blue butterfly	*Plebulina emigdionis*	P	r, dry riverbeds; Host=*Atriplex* is host plant	U-host present but alkali sink habitat is not
San Gabriel Mountains blue butterfly (golden blue butterfly)	*Plebejus saepiolus aureoles*	H	m; Host=*Trifolium wormskioldii* is host plant	N-host plant not present
Arrowhead Blue Butterfly	*Glaucopshyce piasus (sagittigera)*	Y	c, m; host= *Lupinus excubitus*	N-outside known distribution
Ehrlich's checkerspot butterfly	*Euphydryas editha ehrlichi*	Y	d, c, pebble plain; host=*Castilleja plagiotoma*	N-host plants not present
Dammer's Blue Butterfly	*(Euphilotes enoptes near dammersi ssp.) (Arrastre Creek near Dammersi ssp. + Baldwin Lake near Dammersi ssp.*	Y	Baldwin=pebble plain; Host= *Eriogonum kennedyi var. austromontan*um and *E. wrightii*. Arrastre=wo (py/ju), r; host= *Eriogonum davidsonii*	N-host plants not present
vernal blue butterfly (Coxey Meadow)	*Euphilotes baueri (battoides) vernalis*	Y	Pebble plain; host= *Eriogonum kennedyi var. kennedyi*	N- host plants not present
Pratt's blue butterfly	*Euphilotes enoptes cryptorufes*	N	*Eriogonum davidsonii* is host plant	N–outside known distribution
San Gabriel Mountains elfin	*Incisalia mossii hidakupa*	N	rk, on *Sedum spathulifolium*	N-outside known distribution
Santa Ana speckled dace	*Rhinichthys osculus* ssp.	N	aq	N – outside known distribution
arroyo chub	*Gila orcutti*	Y	aq	N – outside known distribution
large-blotched ensatina	*Ensatina klauberi*	Y	r, mc	Y @ Marble Canyon and Arctic Cyn; P @ drainages and Cushenbury Springs
yellow-blotched ensatina	*Ensatina eschscholtzii croceater*	Y?	r, mc	Y @ Marble Canyon and Arctic Cyn; P @ drainages and Cushenbury Springs
San Gabriel Mountain slender salamander	*Batrachoseps gabrieli*	N	talus, mc, r	N – outside known distribution
western pond turtle	*Emys marmorata*	H/P	aq, r	N – outside known distribution
California legless lizard	*Anniella pulchra*	P	c, d, alluvial fan	P
Orange-throated whiptail	*Aspidoscelis hyperythrus*	N	w, rk, c, wo (oaks)	N-outside known distribution
southern rubber boa	*Charina umbratica*	Y	mc, c, r	P
three-lined boa	*Lichanura orcutti*	Y	c, g, rk, r	P
San Bernardino ringneck snake	*Diadophis punctatus modestus*	Y	c, g, rk, r	P

Table 15. Sensitive Animal Species – Occurrences Within the Reach of Potential Effects from the MCC Project

Common Name	Latin Name	Mountaintop District Record[1]	Habitat [2]	Potential for Occurrence[1]
San Diego ringneck snake	*Diadophis punctatus similis*	N	c, g, rk	N
San Bernardino mountain kingsnake	*Lampropeltis zonata parvirubra*	Y	mc, c, pj, r	P
San Diego mountain kingsnake	*Lampropeltis zonata pulchra*	N	mc, r	N – outside known distribution
Two-striped garter snake	*Thamnophis hammondii*	Y	r, aq	P @ Cushenbury Springs and Marble Canyon
red diamond rattlesnake	*Crotalus ruber*	Y	c, wo, d, rk	N– outside known distribution
brown pelican	*Pelicanus occidentalis*	Y	aq	N – no suitable habitat
northern goshawk	*Accipiter gentilis*	Y	mc	U – no suitable habitat
bald eagle	*Haliaeetus leucocephalus*	Y	aq,r,m	U – no suitable habitat
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	P	r	N
California spotted owl	*Strix occidentalis*	Y	mc	Y @ upper Marble Canyon
Willow flycatcher (migrant)	*Empidonax traillii*	Y	r	Y @ Cushenbury Springs; U @ project
San Diego cactus wren	*Campylorhynchus bruneicapillus sandiegense*	N	d, c	N – outside known distribution
gray vireo	*Vireo vicinior*	Y	wo (pj),ch	Y
Townsend's big-eared bat	*Corynorhinus townsendii*	Y	mc, r, aq, wo, c, mines	Y @ Cushenbury Springs; P @ project ; Y@ North Slope
fringed myotis	*Myotis thysanodes*	Y	R, wo, m, g, mc	Y @ Cushenbury Springs; P @ project; Y@ North Slope
pallid bat	*Antrozous pallidus*	Y	c, wo, mc, d, rk	Y @ Cushenbury Springs; P @ project; Y@ North Slope
San Bernardino flying squirrel	*Glaucomys sabrinus californicus*	Y	mc, r	U – no suitable habitat
white-eared pocket mouse	*Perognathus alticolus*	H	mc, wo; bracken fern understory	U – no suitable habitat
San Gabriel Mountains bighorn sheep	*Ovis canadensis nelsoni*	N	wo, rk, d	N – outside known distribution

[1] Occurrence Information:
Y = Species is known to occur.
P = Occurrence of the species is possible; suitable habitat exists, and/or the species is known from nearby locations.
B = Species is known or likely to nest in the area.
M = The species uses the area during migration as a stopover.
H = Part of the historical range but the species has been extirpated.
U = Occurrence of the species is unlikely based on habitat present.
N = Outside known distribution/range of the species.

[2] HABITAT TYPES/HABITAT COMPONENTS
a = aerial; usually seen in flight, often over several habitat types
r = riparian (streamside thickets and woodlands)
g = grasslands, fields, and agricultural areas
m = marshes, meadows; both freshwater areas and moist meadows
c = chaparral and coastal sage scrub
wo = woodlands; pinyon-juniper, oaks
s = snags and cavities
mc = mixed conifer forests; Jeffrey pine, ponderosa pine, bigcone Douglas fir, coulter pine, sugar pine, white fir overstory
d = desert; Joshua tree woodlands, creosote bush scrub, blackbrush scrub
aq = aquatic; lakes, reservoirs, ponds, vernal pools/puddles
u = urbanized areas
w = washes and alluvial fans
rk = cliffs and rocky outcrops

Life History and Baseline Information: Both species of ensatina occur in woodlands dominated by oak (*Quercus sp.)* and in open forests dominated by yellow pines (*Pinus sp.),* white fir (*Abies concolor*), and incense cedar (*Calocedrus decurrens).* They extend onto slopes supporting California scrub habitats. Colonies of ensatina salamanders seem best developed in marginal belts between dense and sparse vegetation (*e.g.,* edge habitat).

Downed logs, leaf litter, and woody debris appear to be important habitat elements. Populations of ensatina in drier regions of southern California primarily occur on north-facing slopes of deep canyons and in other microhabitats that provide cool, moist conditions. Ensatina salamanders are frequently found near streams where soils are relatively moist, or in shaded, moist habitats where there is good canopy cover.

This species is nocturnal and difficult to see near the surface, so it could be more widespread than current data suggest.

Juveniles and adults are most active when the ground is wet and temperatures are moderate. Ensatinas remain underground throughout dry weather. Except in areas where severe winter weather occurs, ensatinas emerge with the first rains of autumn and are active on the ground through spring. Ensatina salamanders are commonly found in areas with considerable leaf litter. In one study, the average distance moved was 66 feet for mature males and 33 feet for mature females. The home ranges of females were 20-75 feet in greatest dimension; the home ranges of males were 33-135 feet.

Habitat for this species has been dwindling in the San Bernardino Mountains due to development and degradation of riparian habitat. Past vegetation management projects on federal and non-federal lands have likely resulted in disturbance to this species, in short-term and, potentially, in long-term alterations of habitat where stands have been altered enough to change micro-climate conditions.

Other effects to ensatina and its habitats include being killed on the highways, roads, and trails, and being collected by Forest visitors. Another threat to these species includes losses in habitat quality due to firewood collecting (cutting of snags and logs) that may remove downed log cover. Other threats to these species, past and current, include fragmentation of habitat for residential development and vegetation management treatments that remove the continuity of log habitat across the landscape.

Occurrence in the Analysis Area - Large/Yellow-Blotched Ensatina: Large/yellow blotched ensatinas have been found in Crystal Creek in 2000 and 2005 (SBNF records), Arctic Canyon and Marble Canyon in 2005 (CNDDB), and likely occur in all or most of the north-facing canyons/drainages on the North Slope. There is a high likelihood they occur at Cushenbury Springs. Because they are known in Marble Canyon and Cushenbury Springs, it is very likely that they may also occur in some of the north-facing drainages (drainages A and B as identified in GLA **2012**) that would be affected by the development of the quarry and haul road. The Arctic and Marble Canyon records are from 5800 feet and the Crystal Creek occurrences were from ~6400 feet, similar in elevation to the drainages that would be affected by the quarry or haul road development.

Potential Project-Related Effects to Large/Yellow-Blotched Ensatina: Mortality or injuries of ensatinas are likely during quarry and haul road development where drainages would be permanently affected. Habitat in those drainages would become permanently unsuitable for this species. Because ensatinas have short home ranges (greatest known distance 134 feet), there is potential for populations to become more isolated. Because of the small home ranges and discontinuity between suitable habitats on the North Slope, there is likely already a lack of intermixing of populations between the North Slope canyons. More potentially suitable habitat would be affected by Alternative 1 than under Alternative 2 because fewer of the drainages on the north edge of the project area would be affected under Alternative 2.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

The mitigation claims may support this species in drainages and near springs. All of the mitigation claims have some blue-line streams mapped on the topographic map, indicating that some suitable habitat may be present. Under the mitigation package, these claims would be withdrawn from mineral entry, providing long-term protection from mining activities.

Cumulative Effects for Large/Yellow-Blotched Ensatina: See **Part II-3.2.13** for a discussion of current and foreseeable future activities. Most of the Forest Service and non-Forest Service fuels reduction activities that are in progress or in the foreseeable future have potential to affect ensatinas. The fuels reduction projects have measures to limit effects to riparian habitats and other areas suitable for ensatina. While the fuels reduction projects have the potential to affect individual ensatinas, the habitat effects are temporary.

While fuels reduction projects on NFS lands attempt to retain important amphibian habitat components and include measures to avoid direct effects, the same is probably not true for activities on non-federal land. Similar vegetation/fuels projects on private lands do not generally carry the same levels of habitat protection as those on the SBNF and have likely resulted in disturbance to these species, in short-term and, potentially, in long-term alterations of habitat. The level of effects and habitat alteration/losses from hazard tree and downed log removal is unknown and likely varies by land ownership.

Omya has a proposed mining expansion for their Butterfield-Sentinel quarries. That project may affect ensatinas and their habitat over the long life of the project (an additional 20-40 years depending on alternative).

These reasonably foreseeable cumulative effects, together with the potential effects of the proposed action, affect a small fraction of the range and habitat of large/yellow-blotched ensatina.

Determination of Effects – Large/Yellow-Blotched Ensatina: It is my determination that implementation of either of the action alternatives may impact individuals and habitat, but is not likely to result in a trend toward Federal listing for large/yellow-blotched ensatina. The project is not expected to interfere with maintaining viable well-distributed populations of large/yellow-blotched ensatina.

IV-2.3.2 – Sensitive Reptiles

The potential effects for Sensitive reptiles are similar and, thus, are discussed together after the life history, baseline, and occurrence information for the Sensitive reptiles.

IV-2.3.2.1 Southern California Legless Lizard (Anniella stebbinsi)

The California legless lizard *Anniella pulchra* is a Forest Service Sensitive species and a CDFW Species of Special Concern. In September 2013, a genetic study of California legless lizard was published (**Papenfuss and Parham 2013**) that broke out *A. pulchra* into five species of *Anneilla,* with four of the species being new. Based on this new description, the southern California species previously considered *Anniella pulchra* is now considered *Anniella stebbinsi* (Southern California legless lizard). The Forest Service Sensitive species list has not been revised to include this new information. For the purposes of this analysis, *A. stebbinsi* is being treated as a Sensitive species until the Regional Forester determines whether a revision of the list is warranted. **Figure 31** (*from* **Papenfuss and Parham 2013)** below displays the recent changes.

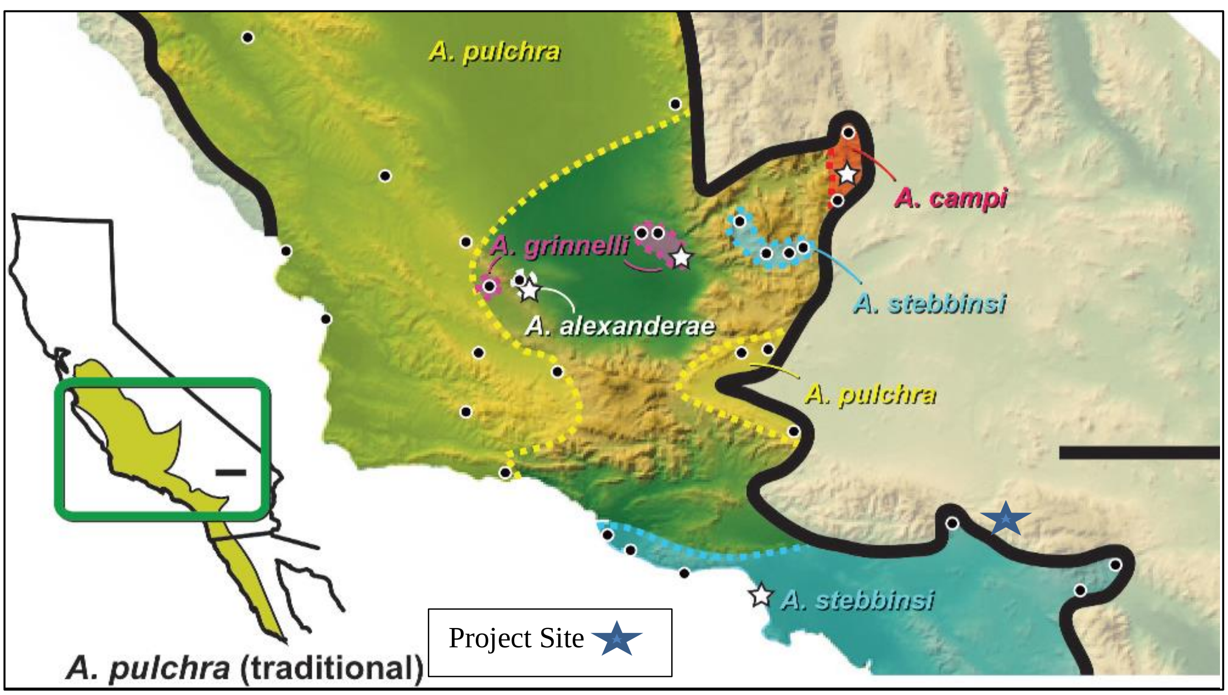


Figure 31. Distribution of California Legless Lizard

Map shows the traditional (inset) distribution of Anniella pulchra and a detail (main) showing the hypothesized distribution of the newly described species. White stars indicate type localities, black dots show referred specimens used in this study. Color-shaded areas are speculated based on the distribution of museum specimens and genetic clades. (Papenfuss and Parham 2013).

<u>Life History and Baseline Information</u>: *A.stebbinsi* occurs in the Coast, Transverse, and Peninsular Ranges. There are also occurrences in the Piute and Tehachapi Mountains at elevations of 1310 – 3000 feet in oak woodlands, mixed conifer forest, and Joshua tree/juniper woodlands (**Papenfuss and Parham 2013)**. It is found on the coastal side of the San Bernardino Mountains and into Cajon Pass. A population of California legless lizards is known to inhabit the alluvial fan at the mouth of Cable Canyon, approximately a mile outside the SBNF boundary.

When queried for *Anniella,* the Berkeley Museum of Vertebrate Zoology database map tool displays the following records in/near the SBNF: east of Silverwood Lake (from a vague record "5-10 miles N of San Bernardino), Cable Canyon (Devore), Live Oak Canyon (Yucaipa), at base of San Jacinto Mountains (Cabazon area south of I-10 and within the SBNF boundary) (http://berkeleymapper.berkeley.edu/?ViewResults=tab&tabfile=http://arctos.database.museum/bnhmMaps/tabfiles/arctos_113.txt&configfile=http://arctos.database.museum/bnhmMaps/tabfiles/arctos_113.xml).

Anniella stebbinsi is found in a broader range of habitats that any of the other species in the genus. Often locally abundant, specimens are found in coastal sand dunes and a variety of interior habitats, including sandy washes and alluvial fans (**Stebbins and McGinnis 2012**). *Anniella stebbinsi* is common at the western margin of the Colorado Desert under trash dumped at the base of Mt. San Jacinto in the vicinity of Cabazon, Riverside County. The only large shrub is Creosote (*Larrea tridentata*). The seasonal Whitewater River provides sufficient moisture near the surface. **(Papenfuss and Parham 2013)**

The legless lizard (genus *Anniella*) is a burrowing species associated with sandy or loose loamy soils under the sparse vegetation of beaches, chaparral, or pine-oak woodland; or under sycamores, cottonwoods, or oaks growing on stream terraces. Legless lizards also occur in desert scrub. Legless lizards are often found under surface objects such as logs, rocks, and leaf litter. Soil moisture is essential for the species; Legless lizards die if they are unable to reach a moist substrate. (**USFS 2006** LMP Species Accounts). Legless lizards are both diurnal and crepuscular, and in warm weather, nocturnal (**Stebbins and McGinnis 2012).** Their prey includes a variety of ground-dwelling insects and their larvae. Feeing takes place on the surface or just below (usually in leaf litter under bushes) (**Stebbins and McGinnis 2012**).

Breeding occurs in early spring through July. Eggs have been observed in the oviducts of females from July to October. Gestation is approximately 4 months. Litters of one to four live young are born September–November. Predictable seasonal movements have not been reported for this species in California. Some long-distance wandering, related to temporarily available food sources, could occur. Legless lizards usually forage at the base of shrubs or other vegetation, either on the surface or in leaf litter or sandy soil just beneath. They feed primarily on insect larvae, small adult insects, and spiders. (**USFS 2006** LMP Species Accounts)

The former *A. pulchra*, a species of special concern (**Jennings and Hayes 1994**), is now divided into five species. This means *A. pulchra* has a smaller distribution than previously recognized, thereby enhancing concern about its conservation status. The remaining four species have even smaller ranges, some of which are degraded or threatened by human activities. Much of the range of *A. stebbinsi* is already compromised by urban development. (**Papenfuss and Parham 2013)**

The conservation status of the legless lizard is not well known due to the difficultly in adequately censuring this fossorial species. Very little is known about this species, its habitat and threats. Their fossorial nature and low thermal preference results in them being able to stay under the duff and litter and emerge at night and not be seen. (Source: **USFS 2006** LMP Species Accounts)

Occurrence in the Analysis Area: While this species is generally more of a coastal species, there is habitat on the North Slope that appears to be suitable in the lower parts of north-facing drainages and legless lizards in the genus *Anniella* have been documented in the Mojave Desert. According to the new distribution map (**Papenfuss and Parham 2013)** displayed above, there are no records for legless lizards in the genus *Anniella* on the north side of the San Bernardino Mountains. The closest documented occurrences are in Cable Canyon on the coastal side of the San Bernardino Mountains (**USFS 2006** LMP Species Accounts; Calherps website) and possibly a record near Lake Silverwood (Berkeley MVZ). The likelihood of occurrence in the analysis area is considered relatively low. However, the species may be present and undetected due to the difficulty in surveying for this species and the low number of surveys along the North Slope due to accessibility and ruggedness.

IV-2.3.2.2 Northern Three-Lined Boa (Lichanura orcutti)

The taxonomy for rosy boas in California has recently changed with two species being currently identified: the northern three-lined boa (*Lichanura orcutti)* and the rosy boa (*Lichanura trivirgata).* Formerly, *Lichanura trivirgata* was divided into two subspecies, *L.t. gracia* (desert rosy boa) and *L.t. roseofusca* (coastal rosy boa) (http://www.californiaherps.com/snakes/). The northern three-lined boa is a Forest Service Sensitive species and a BLM Sensitive species.

Life History and Baseline Information: This snake is a heavy-bodied snake with smooth shiny scales and a blunt, but tapered tail. The head is only a little wider than the neck. This species occurs in southern California from San Diego County north into the Mojave Desert and east into the Sonoran Desert of California, but is absent from the Imperial Valley and in part of extreme southern San Diego county (where boas are a different species - *Lichanura trivirgata*) (Calherps website).

Three-lined boas inhabit arid scrublands, semi-arid shrublands, rocky shrublands, rocky deserts, canyons, and other rocky areas. It appears to be common in riparian areas, but does not require permanent water. These boas are primarily active at dawn, dusk, and at night, rarely in daylight, but may be active in the morning, especially in cool weather. In the hottest and coldest months of the year, remains inactive in burrows or under surface debris. They are good climbers. Boas eat rodents, small birds, lizards, small snakes, and amphibians and they kill prey by constriction. These boas are live-bearing with young born October-November. (Source: **USFS 2006** LMP Species Account)

Its continued survival may be threatened in part by a recent increase in poaching, precipitated by its popularity in the pet trade and evidenced by the amount of websites shown by an Internet search. Three-lined boas are moderately-sized, docile snakes that are relatively easy to care for in captivity.

Additional factors that may be leading to the decline of this subspecies in southern California include habitat loss, roads, increased fire frequency, and urban light pollution. (Source: **USFS 2006** LMP Species Account)

<u>*Occurrence in the Analysis Area:*</u> There is suitable habitat for this species throughout the analysis area and it is likely to occur.

<u>*IV-2.3.2.3 Southern Rubber Boa (Charina bottae umbratica)*</u>
The southern rubber boa is a Forest Service Sensitive species and listed as Threatened by the California Endangered Species Act. The SBNF has a habitat management guide for southern rubber boa on the SBNF (**USFS 1985**). In July 2012, the Center for Biological Diversity petitioned the U.S. Fish and Wildlife Service to list this species under the federal Endangered Species Act (http://www.biologicaldiversity.org/campaigns/amphibian_conservation/pdfs/Mega_herp_petition_7-9-2012.pdf). USFWS has yet to determine whether listing is warranted.

<u>*Life History and Baseline Information:*</u> Southern rubber boas are secretive snakes that occur in a variety of montane forest habitats including chaparral, woodlands, mixed-conifer forest, and riparian areas. They are typically found from sea level to approximately 9,000 feet in elevation. They tend to be associated with vegetatively-productive sites, usually with deep, well-developed soils. Favored cover includes rotting logs, rocky outcrops, and other surface debris. Primary prey includes small mammals, lizards, and amphibians. Southern rubber boas are generally inactive between the end of May and the end of September as between mid-November and March.

The southern rubber boa is known to occur in the San Jacinto Mountains and the San Bernardino Mountains. Most of the records for southern rubber boa in the San Bernardino Mountains are within the mixed conifer belt between Lake Arrowhead, Big Bear, and Barton Flats. This snake is threatened by development and increased recreational use of forested areas where it occurs. The SBNF Habitat Management Guide for rubber boas (**USFS 1985**) contains management direction and species information. This species is rare in the San Bernardino Mountains, and the population trends for this species are unknown.

Rubber boas are vulnerable to habitat loss from development on private land, water diversion or extraction, and land use activities that destroy soil or surface cover. The majority of known rubber boa locations are on private lands. The lush, mesic forests that are prime habitat for this species tend to be highly interspersed with private lands (*e.g.,* around Lake Arrowhead and Idyllwild). Crestline to the Snow Valley Ski Area has long been considered the best southern rubber boa habitat in the San Bernardino Mountains. Currently, 44 percent of this area is private land subject to development.

Roughly 81 percent of the known and potential habitat in the San Bernardino Mountains for southern rubber boas is on public lands managed by the Forest Service. Stewart considered the most pervasive habitat impacts on National Forest System lands to be personal use fuelwood harvesting and off-highway vehicle use. He estimated that 46 percent of the known and potential southern rubber boa habitat received high to moderate impacts from fuelwood harvesting and approximately 35 percent received high to moderate impacts from OHV use. Other habitat impacts cited were fern picking, commercial timber harvesting, fire management, skiing, and land exchanges.

Stewart estimated that most of the suitable southern rubber boa habitat on private lands would be lost in the next 20-40 years, and in a worst case scenario, most of the habitat that is heavily impacted by OHVs and fuelwood harvest could also be lost. In his opinion, if this happened, the resulting loss of 50-60 percent of the suitable habitat would endanger the San Bernardino Mountains southern rubber boa population. (Source: **USFS 2006** LMP Species Accounts)

Occurrence in the Analysis Area: There are records of southern rubber boa on the north side of Big Bear and Baldwin Lakes, with the closest record about 3 ½ miles from the SQ expansion areas. While the SQ expansion areas are outside of the known distribution for this species, the project area, the SQ analysis area, particularly the drainages (including those that would be affected by the SQ and haul road) and Cushenbury Springs, have suitable habitat that could support this species. It is a very difficult species to detect during surveys and those areas have not been well-surveyed due to ruggedness and inaccessibility.

While the analysis area generally lacks heavy downed log component that is often cited as the primary habitat trait needed by this species, several recent SBNF records have been from areas that also lack this component but have an abundance of rock outcrops. The rock features in the project area and the analysis area support suitable habitat for this species. The probability of occurrence and density may be low due to being on the periphery of the known distribution. However, this species may occur within the project and analysis area.

IV-2.3.2.4 San Bernardino Ringneck Snake (Diadophis punctatus modestus)

The San Bernardino ringneck snake is a Forest Service Sensitive species and a Federal Species of Concern (formerly USFWS Candidate species).

Life History and Baseline Information: Ringneck snakes are rarely seen on the surface, but are usually found under rocks, logs, or leaf litter. Ringneck snakes can be found in a variety of open, relatively rocky habitats, including mixed montane chaparral and annual grasslands. They are most often located in somewhat moist microhabitats near intermittent streams. Ringneck snakes are not strongly associated with riparian habitats, but the apparent importance of tree frogs and slender salamanders in their diet suggests they may seek out and require moist microclimates.

Woodpiles, flat rocks, rotting logs, and small holes in the ground are all used for cover. These snakes avoid open or barren areas. Ringneck snakes appear to move seasonally between summer habitats and hibernacula. They may aggregate at dens for winter hibernation. These snakes may exhibit site tenacity, establishing long-term home ranges. In one study, snakes could still be located within 32 feet of their initial capture point even after a number of years, indicating strong site tenacity. A clutch of three eggs is laid from April to July, hatching from August to October.

Populations are believed to be declining as a result of loss of suitable habitat primarily from development on private land. (Source: **USFS 2006** LMP Species Account)

<u>Occurrence in the Analysis Area</u>: San Bernardino ringneck snakes are known to occur around Big Bear Lake. They have the potential to occur in the analysis area; most likely in the drainages, Marble Canyon and at Cushenbury Springs. It is a very difficult species to detect during surveys and those areas have not been well-surveyed due to ruggedness and inaccessibility.

<u>IV-2.3.2.5 San Bernardino Mountain Kingsnake (Lampropeltis zonata parvirubra)</u>
The San Bernardino mountain kingsnake is a Forest Service Sensitive Species and a CDFW Species of Special Concern.

<u>Life History and Baseline Information</u>: The most favored habitats are yellow pine communities, but mountain kingsnakes are found in chaparral, woodland, and riparian habitats as well. The San Bernardino mountain kingsnake is typically found in sunlit canyons with rocky outcrops. Partially-shaded rock outcrops and large downed logs for refugia and basking sites appear to be important microhabitat elements. California mountain kingsnakes consume lizards, snakes, nestling birds, bird eggs, and small mammals.

Mountain kingsnakes exhibit diurnal and crepuscular activity patterns from mid-March through mid-October and nocturnal activity patterns during warmer months. Activity is more restricted at higher elevations.

The biggest threat to San Bernardino mountain kingsnakes is poaching by collectors and the destruction of microhabitat caused by poachers (*e.g.,* dismantling rock outcrops and shredding down logs). A significant illegal commercial trade in this attractive snake continues to fuel a demand for poaching. San Bernardino mountain kingsnake would benefit from control of poaching and protection of known localities on National Forest System lands in southern California. (Source: **USFS 2006** LMP Species Account)

<u>Occurrence in the Analysis Area</u>: There is a 1996 CNDDB record for San Bernardino mountain kingsnake in Furnace Canyon at 6600 feet. There are several Forest Service records at similar elevations within 10-15 miles west of the project area. Due to the similarity in habitat between that site and the analysis area, the likelihood San Bernardino mountain kingsnakes occur in the analysis area is considered high.

<u>IV-2.3.2.6 Two-Striped Garter Snake (Thamnophis hammondii)</u>
The two-striped garter snake is a Forest Service Sensitive Species and a CDFW Species of Special Concern.

Life History and Baseline Information – Two-Striped Garter Snake: Two-striped garter snakes inhabit perennial and intermittent streams and ponds in chaparral, oak woodland, and forest habitats. The species is primarily associated with aquatic habitats that are bordered by riparian vegetation and provide open areas nearby for basking. Two-striped garter snakes also occupy adjacent grassland and coastal sage scrub in upland areas during the winter. Adult snakes feed primarily on tadpoles, toads, frogs, fish, fish eggs, and earthworms. These snakes are highly aquatic. They are found up to 8000' in elevation. Two-striped garter snakes give birth to live young.

Quantity and quality of habitat for two-striped garter snake is declining through much of its range. Over the last century, two-striped garter snake has disappeared from more than 40 percent of its historic range in California. Most of this decline has occurred since 1945. Factors leading to the decline of this species include habitat conversion and degradation resulting from urbanization, construction of reservoirs, and cement-lining of stream channels in southern California. Other threats include habitat modification resulting from livestock grazing, predation by introduced fishes and bullfrogs, and depletion of prey base. (Source: **USFS 2006** LMP Species Account)

Occurrence in the Analysis Area – Two-Striped Garter Snake: Two-striped garter snakes are known from Big Bear and Baldwin Lake areas to the south of the project. Typical habitat for this species is not located at the SQ expansion site or along the proposed haul road. They have potential to occur at Cushenbury Springs, in Marble Canyon, and potentially in some of the unnamed drainages if there are springs present.

IV-2.3.2.7 Potential Effects Common to All Sensitive Reptiles (California Legless Lizard, Southern Rubber Boa, Northern Three-Lined Boa, San Bernardino Mountain Kingsnake, San Bernardino Ringneck Snake, Two-Striped Garter Snake)

Habitat would be permanently lost for any of these species that inhabit the SQ project area. Alternative 1 would result in more acres (~154 acres) of suitable and probably occupied habitat being affected than Alternative 2 (~134 acres). More of the unnamed drainages on the north side of the quarry footprint would be affected under Alternative 1 than under Alternative 2; those drainages may support higher quality habitat for some of these species.

The mitigation package includes 540 acres being withdrawn from mineral entry, providing long-term protection of suitable habitat acres from mining operations; some of the mitigation claims likely support some of the Sensitive reptiles, especially the species that prefer xeric habitats. Relinquishment of these 540 acres of claims would help mitigate for the Sensitive reptile habitat that would be affected by the SQ project.

All of these species burrow in soft dirt, under litter, rocks, and logs. If present, it is likely that individuals would be killed or injured during the development of the quarry and haul road, especially within north-facing drainages. For species with strong site tenacity (San Bernardino ringneck snake) or very small home ranges (southern rubber boa), loss of individuals may be important. Over the life of the project, individuals in the vicinity of active mining operations would continue to be at risk as a result of human activities and vehicles/equipment on the haul road and access roads.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

Some of these species may inhabit Cushenbury Springs. While the proposed project would result in an increase in water extractions from MCC's wells near Cushenbury Springs, the Hydrology study done for this project did not identify a direct connection between the proposed increases in water extraction and water levels at Cushenbury Springs. As such, no changes to baseline conditions for any of these species at Cushenbury Springs would be expected from this project.

Cumulative Effects for California Legless Lizard, Southern Rubber Boa, Northern Three-Lined Boa, San Bernardino Mountain Kingsnake, San Bernardino Ringneck Snake, Two-Striped Garter Snake: See **Part 3.2.13** for a discussion of current and foreseeable future activities.

Most of the Forest Service and non-Forest Service fuels reduction activities that are in progress or in the foreseeable future have potential to affect the same Sensitive reptiles and amphibians that may occur in analysis area. The fuels reduction projects have measures to limit effects to any of the reptiles associated with riparian habitats. While the fuels reduction projects have the potential to affect individual reptiles, the habitat effects are temporary.

While fuels reduction projects on NFS lands attempt to retain important reptile/amphibian habitat components and include measures to avoid direct effects, the same is probably not true for activities on non-federal land. Similar vegetation/fuels projects on private lands do not generally carry the same levels of rare reptile habitat protection as those on the SBNF and have likely resulted in disturbance to these species, in short-term and, potentially, in long-term alterations of habitat. Since the rubber boa is a state-listed species, some of the agencies doing work on non-federal lands have incorportated monitors and avoidance measures for this species. The level of effects and habitat alteration/losses from hazard tree and downed log removal is unknown and likely varies by land ownership.

As part of the baseline conditions for species that occur at Cushenbury Springs, there may be some ongoing effects associated with the maintenance of the monitoring wells and access road that could affect these species and their habitats.

Omya's proposed expansions at Butterfield/Sentinel and at White Knob would result in losses of habitat for some of these species and may result in losses of individuals over the life of those projects. Mitsubishi's approved West Quarry project will also affect habitat and possibly individual Sensitive reptiles during the quarry development and long-term operations.

These reasonably forseeable cumulative effects, together with the potential effects of the proposed action, affect a small fraction of the range and habitat of these species.

Determination of Effects – California Legless Lizard, Southern Rubber Boa, Northern Three-Lined Boa, San Bernardino Mountain Kingsnake, San Bernardino Ringneck Snake, Two-Striped Garter Snake: It is my determination that implementation of either of the action alternatives may impact individuals and habitat, but is not likely to result in a trend toward Federal listing for California legless lizard, southern rubber boa, northern three-lined boa, San Bernardino mountain kingsnake, San Bernardino ringneck snake, two-striped garter snake. The project would not be expected to interfere with maintaining viable well-distributed populations of these Sensitive species.

IV-2.3.3 – California Spotted Owl *(Strix occidentalis occidentalis)*

The California spotted owl is a Forest Service Sensitive species. The California spotted owl was petitioned for listing under the Endangered Species Act in 2000. In February 2003, USFWS determined that listing was not warranted at that time. In May 2004, the California spotted owl was again petitioned for listing. In June 2005, the USFWS released a finding that indicated that there was substantial scientific evidence or information showing that listing may be warranted and they initiated a status review. In May 2006, the USFWS announced a 12-month finding on the petition that found that the petitioned action was not warranted at that time. In 2014, the California spotted owl was again petitioned for listing. USFWS has yet to rule on the petition.

It is a CDFW Species of Special Concern, a USFWS Bird of Conservation Concern, a BLM Sensitive species, and an American Bird Conservancy Watchlist species.

Much of what is known about California spotted owls in southern California is based on a demography study conducted in the San Bernardino Mountains between 1987 and 1998 and subsequent monitoring between 2003 and 2011.

Life History and Baseline Information: The spotted owl (*Strix occidentalis*) occurs as a resident breeder in western North America from British Columbia south through Washington, Oregon, California, Utah, Colorado, Arizona, New Mexico, and southwest Texas to central Mexico. The California spotted owl (*S. o. occidentalis*) occurs on the western side of the Sierra Nevada (and very locally on the eastern slope) from the vicinity of Burney, Shasta County south through the southern Cascade Range and Sierra Nevada to Kern County; in the southern part of the Coast Ranges from Monterey County to Santa Barbara County; and in the Transverse and Peninsular Ranges of southern California south to Baja California. (**USFS 2006** LMP Species Account)

The spotted owl is a forest-dwelling owl that is found throughout most forests and deep canyons of the western United States. In southern California, California spotted owls occur within four general but distinct forest types: riparian/hardwood forest, live oak/bigcone Douglas-fir forest, mixed conifer forest, and redwood/California laurel forest. (**USFS 2006** LMP Species Account)

The California spotted owl is strongly associated with forests that have a complex multi-layered structure, large-diameter trees, and high canopy. Nest stands often have a well-developed hardwood understory (*e.g.,* canyon live oak [*Quercus chrysolepsis*]) and a conifer overstory. However, some high-elevation territories (above 6,500 feet) consist primarily of solely of conifers, and some low-elevation territories (below 3,000 feet) are found in pure hardwood stands. California spotted owl habitats are consistently characterized by greater structural complexity compared to available forest habitat. This is a territorial species with large acreage requirements. (**USFS 2006** LMP Species Account)

California spotted owls are generally solitary except for interactions with their mates. The nest site is usually a natural tree cavity, broken treetop, or abandoned nest of another large bird species, unlined or composed of material already present. Stick nests predominate in southern California. Nests are typically 30 to 180 feet above ground. The breeding season begins in early April and extends through early June. As is true of most owls, there is a strict division of duties: males provide food to the female and young, and females incubate eggs and brood the young. Clutch size ranges from one to three eggs (four-egg clutches are extremely rare), and incubation lasts for approximately 28 to 30 days. The owlets leave the nest at 34 to 36 days and are able to fly about a week later. The fledglings may continue to be fed by the parents for up to 3 months. California spotted owls show strong fidelity to breeding sites and winter home range. (**USFS 2006** LMP Species Account)

A pair may use the same breeding territory for five to ten years, but may not breed every year. In the San Bernardino Mountains study, dusky-footed woodrats and Jerusalem crickets were the most important prey items. (**USFS 2006** LMP Species Account)

In 2004, the Forest Service finalized the "Conservation Strategy for California Spotted Owls in the National Forests on Southern California" that provides guidelines for management of spotted owls and their habitat. The strategy was incorporated into the LMP. In 2009, the SBNF completed an effort to map California spotted owl habitat on the SBNF using digital ortho-photo quarter-quadrangles (DOQQ) from 2002 as a "baseline" for spotted owl habitat. Within each territory, the highest quality habitat was mapped (based on guidelines in the Conservation Strategy). Within each 1.5-mile radius territory circle, Protected Activity Centers (PACs) are mapped based on 300 acres of the highest quality habitat around the nest, and Home Range Cores (HRCs) include the next best 300 acres. The best 60+ acres around the nest tree(s) are mapped as Nest Stand (NS); the NS is a subset of the PAC.

Threats to this population of California spotted owls include losses and degradation of habitat (natural and human-caused) and human disturbance. **Franklin *et al*. (2003**) identified four main risk factors for California spotted owl populations revolve:

- habitat abundance and distribution,
- habitat quality,
- influence of climate, and
- wildfire.

The number of active territories in the San Bernardino Mountains has declined steadily since 1990. In the San Bernardino Mountains between 1990 and 1998, 134 territories were active during at least one of those years. Only 53 (39%) of those territories were still active at least one year during the 2008, 2009, and 2010 breeding seasons. When considered spatially, there are relatively large areas of forested habitat in the San Bernardino Mountains that were occupied by owls in the 1990s but are no longer occupied (*e.g.,* north of Lake Arrowhead, on the south slope of Big Bear Lake, south of Silverwood Lake, the north slope of the San Bernardino Mountains, areas adjoining the pass between the San Bernardino and San Gabriel Mountains). Currently, much of the landscape that is not occupied by owl pairs overlaps areas that have burned or that have high levels of conifer mortality during the drought in the early 2000s. These unoccupied areas may represent isolation of pairs and fragmentation of habitat.

In summary, the low numbers of owls fledging each year combined with typical low survival rates during the first year may indicate that recruitment of nesting owls in the San Bernardino Mountains is in jeopardy. More and more territories appear to be "blinking out" in the San Bernardino Mountains. In 2010, only 15 pairs bred successfully in the San Bernardino Mountains (out of 29 nesting pairs). With the low numbers of reproducing pairs of owls, low recruitment of nesting owls into the population, the increasing distances between occupied territories, and continued effects to habitat quality and quantity from fire and climate change, the long-term viability of this population of California spotted owls is at risk. Based on our understanding of how much the population of breeding pairs has dwindled on the SBNF since the early 1990s, the spotted owls may not be able to afford to lose any more suitable nesting habitat in the mountains of the SBNF.

Occurrence in the Analysis Area: There is one spotted owl territory (Burnt Flat - SB110) that overlaps a portion of the analysis area (**Figure 32**). A territory is considered to be habitat within 1.5 miles of a nest or centroid (assumed nest site) and is meant to represent the typical breeding home range for this species. Not all of the habitat within a territory may be suitable for nesting/roosting and/or foraging. Marble Canyon contains mapped Nest Stand and PAC (**Figure 32**). No mapped spotted owl habitat overlaps with the footprint of the analysis area. While the project area foot print does not support high quality nesting and roosting habitat with dense canopy closure, it may be used for foraging by nearby spotted owls.

The Burnt Flat territory was occupied by a pair or single owl most years between 1989 and 1996. No surveys were conducted between 1999 and 2005. The territory was vacant in all of the annual surveys between 2005 and 2011. Most of the territories in the other North Slope drainages (Silver Creek, Deep Canyon, E. Fork Dry Creek, and Crystal Creek) were also vacant between 2005 and 2011 while having previous occupancy in the 1990s. Silver Creek was occupied by a female in 2005 but not since. No surveys have been conducted since 2011.

The Burnt Flat nest stand has large incense cedars, white fir, and live oak trees. During the period when nesting was detected, both incense cedar (56" DBH) and white fir (16" DBH) were used as nest trees. Spotted owls rarely nest in pinyon pines (**Davis and Gould 2008**) however they may occasionally forage in the pinyon/juniper habitat found in the analysis area.

Potential Effects of the Proposed Action - California Spotted Owl

The effects analyses are based on current population and habitat conditions. There is a degree of uncertainty because it is difficult to address potential changes in conditions and population status over the 40-120 year project life (see **Part II-3.2.14**).

a) Habitat Effects: The habitat within the project area's footprint is not suitable for nesting or roosting. It may be occasionally used for foraging or dispersal. Neither alternative would be expected to result in degradation or loss of habitat suitable for nesting or daytime roosting due to the lack of preferred conditions (dense canopy closure, abundance of snags, etc.).

b) Disturbance Effects: The quarry and haul road are outside of the ¼ mile buffer that the Forest Service uses as a Limited Operating Period (LOP) area around nest sites. The ¼-mile buffer was developed for general activities and uses on NFS lands; it did not consider extremely loud noises and rumbling associated with blasting activities. If nesting were to occur at the historic nest site, it is unlikely that daily operations at the quarry and Alternative 1 haul road would cause abandonment of the nest site due to distance. However, if a nest were built in the Marble Canyon suitable habitat (mapped as PAC and Nest Stand), it could be within ¼ mile of mining activities and disturbance could result.

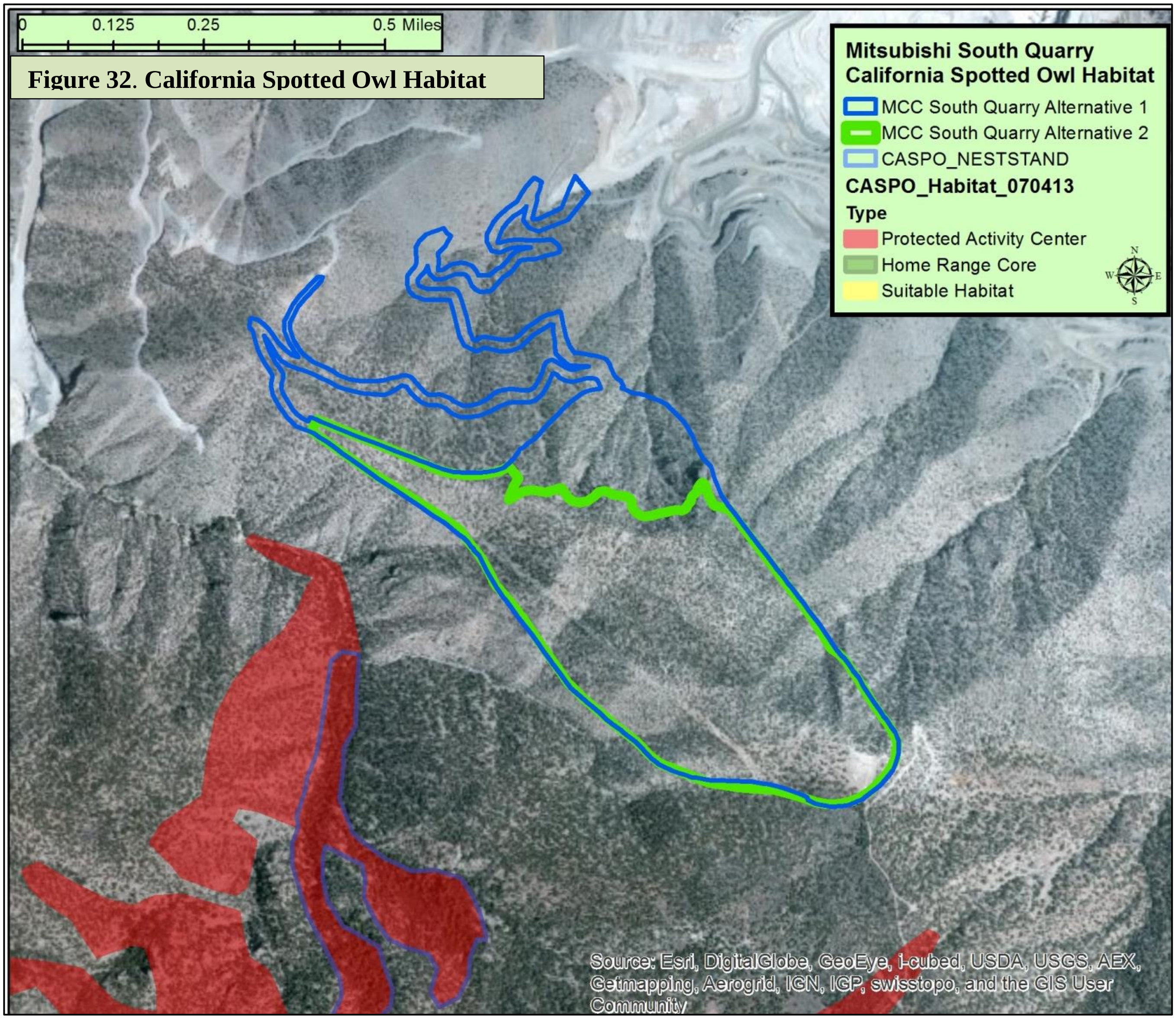


Figure 32. California Spotted Owl Habitat

It is possible that blasting and noise from the operations could disturb daytime roosting California spotted owls using the habitat in Marble Canyon. Noise from night-time mining activities may interfere with communication, courtship, breeding, and foraging success. Since the blasting would not be conducted at night (due to safety reasons) even if operations were to include night-time work, effects to foraging spotted owls may be less likely. If spotted owls reoccupy the North Slope, they might avoid the area for nesting, roosting, and foraging.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

c) Potential for Death or Injury: The likelihood if death or injury to California spotted owls is considered very low and is probably only has potential to occur if a nest were built close enough to the active mining sites that blasting during construction or mining startled nestlings or young owls so that they fell out of the nest.

Cumulative Effects for California Spotted Owls: See **Part II-3.2.13** for a discussion of current and foreseeable future activities. The cumulative effects analysis area for this species is the San Bernardino mountain range. There are 181 known territories on the SBNF; of those, 149 are in the San Bernardino Mountains (plus 10 in the San Gabriel Mountains and 22 in the San Jacinto Mountains).

There are several fuels reduction projects currently being implemented in the San Bernardino Mountains in spotted owl habitat. These include South Big Bear and the Bluff Mesa fuels reduction projects. Both of these projects have Design Features intended to protect spotted owl habitat and improve the stand resiliency to wildfires. There are several fuels reduction projects in the planning phase that overlap spotted owl habitat in the San Bernardino Mountains: North Big Bear, Baldwin, and the Santa Ana Fuels Reduction projects. It is expected that these projects may start implementation in 2015 but it depends on completion of the environmental analysis and funding. Thus, the level of protection of key habitat components and habitat availability, and the effort to minimize disturbance, will be similar.

Over the long life of this project, Omya's proposed expansions at Butterfield/Sentinel and at White Knob would also affect foraging habitat and may result in disturbance to nesting/roosting owls in adjacent draingages.

Over the 40-120 year life of the project, this project may add to the reasonably foreseeable effects to this species in the San Bernardino Mountains.

Determination of Effects – California Spotted Owl: It is my determination that implementation of either of the action alternatives may impact individuals and habitat, but would not lead toward a trend in federal listing for California spotted owl. The project would not be expected to interfere with maintaining viable well-distributed populations of California spotted owls.

IV-2.3.4 –Willow Flycatcher *(Empidonax traillii)*
There are five subspecies of the willow flycatcher currently recognized with three of these subspecies occurring in California.

E. t. brewsteri (little willow flycatcher) breeds in California from Tulare County north, along the western side of the Sierra Nevada and Cascades, extending to the coast in northern California. The little willow flycatcher is a Forest Service Sensitive species (**Craig and Williams 1998**).

*E. t. adastus b*reeds in California east of the Sierra/Cascade axis, from the Oregon border into Modoc County and possibly into northern Inyo County. There is a lack of information for this subspecies in California (**Craig and Williams 1998**). These two subspecies are CDFW Endangered species and USFWS Bird of Conservation Concern.

E. t. extimus (southwestern willow flycatcher) is federally-listed as Endangered. It breeds in California from the Mexican border north to Independence in the Owens Valley, the South Fork Kern River, and the Santa Ynez River in Santa Barbara County. The southwestern willow flycatcher subspecies is a federally-listed species and addressed in **Part III** of this document.

Life History and Baseline Information: The willow flycatcher is a riparian-obligate species. This species occurs primarily in densely vegetated riparian habitats, preferring streamside associations of cottonwood (*Populus* spp.), willow (*Salix* spp.), alder (*Alnus* spp.), and other riparian vegetation. Willow flycatchers also occur in woodland edges, meadows, and brushy fields.

Willow flycatchers are insectivores that forage on aerial insects by sallying out from exposed perches and capturing them on the wing; they also glean insects from riparian vegetation. All subspecies of willow flycatcher are Neotropical migrants that winter in Mexico, Central America, and South America.

Habitat for migrant willow flycatchers is being affected by development and encroachment throughout southern California. Throughout southern California, another ongoing effect to this species is from encroachment into the riparian zones by recreationists using the area for off-road vehicle use, enjoying nature, cooling off in the water, mountain biking, dog walking, etc. This type of encroachment can be expected to disturb migrant birds, possibly causing displacement, degraded habitat, and individual mortality. It is also likely that desert-influence springs and riparian zones that once supported important stop-over habitat for migrant willow flycatcher habitat has been degraded or lost through water diversions and development. (Source: **USFS 2006** LMP Species Account)

Occurrence in the Analysis Area – Migrant Willow Flycatcher: Migrant willow flycatchers are known to occur in near the analysis area during spring and fall. They have been observed at Holcomb Creek, Grout Bay, Jacoby Canyon, Caribou Creek (SBCM records, USFS records), and Cushenbury Springs (**Kielhold 1993**). There is suitable habitat for this species at Cushenbury Springs and possibly in Marble Canyon.

The habitats used during migration are less specific than during breeding. During migration, they have been known to use narrow, linear riparian strips, shrubs and trees in parks and gardens, and agricultural areas (**Craig and Williams 1998**).

Potential Effects to Migrant Willow Flycatcher: If migrant willow flycatchers use Marble Canyon or Burnt Flats, there may be some disturbance as a result of mining activities (*i.e.,* blasting). Due to the distance to suitable habitat, those disturbance effects would likely be relatively low but may cause startling or movement away from the site. Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

There are no effects to willow flycatcher habitat expected at the proposed haul road or quarry sites. None of the proposed mitigation parcels appear to support habitat that is likely to be used by migrant willow flycatchers.

The hydrology analysis determined that the increase water extraction would not result in changes to surface water or habitat conditions at Cushenbury Springs. The Design Features include a monitoring measure to ensure detection of changes and provide for adaptive management over the long life of the project. The activities at Cushenbury Springs would occur regardless of the proposed project; therefore, they are considered baseline and part of cumulative effects but not part of the direct or indirect effects of the proposed project.   See **Part II-3.2.7** for a discussion of potential effects to riparian habitat. See **Part III-3.3.2** for the endangered southwestern willow flycatcher for a complete discussion.

Because of the small amount of suitable habitat, the likelihood of negative effects to migrant willow flycatchers is considered very low.

Cumulative Effects for Migrant Willow Flycatcher: See **Part III-3.3.22** for the endangered southwestern willow flycatcher for a complete discussion. See the cumulative effects discussion in **Part II-3.2.13.** This proposed project, over the 40-120 year life of the project, has a low likelihood of effects by may add incrementally to the reasonably foreseeable effects to this species in the San Bernardino Mountains.

Determination of Effects – Migrant Willow Flycatcher: It is my determination that implementation of either of the action alternatives may impact individuals and habitat but would not lead toward a trend in federal listing. This determination is based on current population status and conditions. There is a degree of uncertainty for this determination because it is impossible to predict changes in conditions and population status over the 40-120 year project life (see **Part II-3.2.14**). The project would not be expected to interfere with maintaining viable well-distributed populations of migrant willow flycatchers.

IV-2.3.5 Gray Vireo *(Vireo vicinior)*

The gray vireo is a Forest Service Sensitive species and a CDFW Species of Special Concern.

Life History and Baseline Information: Within California, gray vireo is currently known as a summer resident in the mountains of the eastern Mojave Desert, on the northeastern slope of the San Bernardino Mountains. They are known to nest in Cactus Flats/Lone Valley area, Round Valley and Rose Mine and likely breed locally in similar habitat elsewhere in those mountains. In 1988, territorial males were located in the upper Crystal Creek drainage, west of Cushenbury Canyon.

In southern California, gray vireos breed in two general habitat types: montane chaparral dominated by chamise (*Adenostoma fasciculatum*), redshank (*A. sparsifolium*), ceanothus (*Ceanothus spp.);* and pinyon-juniper woodland. Canopy cover at nest sites varies from nearly complete closure in chaparral to more open habitat in pinyon/juniper woodland where canopy closure may be quite low. Throughout the breeding range, a common feature is the presence of patches of continuous shrub cover ranging from 0.5 meters–2 meters in height.

The breeding season for gray vireo generally begins in May and lasts until August. Gray vireos build open-cup, pensile nest constructed of bark, plant fibers and grasses, lined with fine fibers or down. Nests are not reused, but some nest materials may be recycled to construct new nests.

Gray vireos migrate annually between their breeding and wintering grounds. During fall, they migrate short distances south to their wintering grounds in southern Baja California, southern Arizona, Big Bend in Texas, and Sonora, Mexico. Fall migration begins in early August and lasts to early October. The spring migration period in California is March through May.

The gray vireo diet consists of arthropods, including stinkbugs, tree hoppers and cicadas, tree crickets, short-horned grasshoppers, flies, beetles, moths, and damselflies. Gray vireos forage in dense foliage on insects gleaned from leaves, twigs, branches, and trunks of bushes and small trees; they spend most of their foraging time 3–12 feet above the ground and within the inner two-thirds of the plant. Gray vireos forage within a shrub or tree, catching prey primarily through gleaning, stalking, and hawk-capture.

It is thought that the entire California gray vireo population may consist of only a few dozen pairs. However, there remains a substantial amount of chaparral habitat that has not been surveyed for this species. Early work by Grinnell and associates indicates that gray vireo was historically more widespread, particularly in the San Gabriel and San Jacinto Mountains. Little is known about the extent or cause of the species' decline. By 1999, gray vireos had apparently disappeared from numerous parts of its southern California range, including the western section of Joshua Tree National Park; the Grapevine, Kingston, and San Gabriel Mountains; the Phelan/Cajon Pass/Hesperia region; and portions of Riverside and San Diego Counties.

Habitat loss and brood parasitism by brown-headed cowbird (*Molothrus ater*) are likely causes of gray vireo population decline and range contraction since the 1940s. Like most vireos, gray vireos are considered highly susceptible to cowbird nest parasitism, which has been implicated as a possible reason for the species' decline. Cowbird parasitism of gray vireo nests has been documented in the San Bernardino Mountains. Habitat fragmentation may make areas more accessible to brown-headed cowbirds, which may adversely affect gray vireos through brood-parasitism. Human activities, including residential development, golf courses and agriculture, attract cowbirds thereby increasing this potential threat to gray vireos.

Stand-replacing fires in pinyon are also a major threat. Nonnative grasses that may be introduced after removal of pinyon/juniper habitat could contribute to type conversion of the habitat to grassland. Livestock grazing and fires of unnatural frequency or intensity have modified and may continue to modify the extent and composition of shrub cover to the detriment of gray vireos. Human recreation pressures in the form of off-road motorized vehicles and recreational shooting has the potential to cause disturbance to nesting vireos. (Source: **USFS 2006** LMP Species Accounts)

Occurrence in the Analysis Area – Gray Vireo: There is suitable nesting and foraging habitat for gray vireos in and near the proposed quarry and haul road areas. They have been recorded in the area at Furnace Spring (**USFS GIS layer -1993**), at Omya's Butterfield 3 site (**USFS records – 6/2011)**; at Mitsubishi's West Quarry (**White 2000**), and at Cushenbury Spring (**Kielhold 1993**).

Potential Effects to Gray Vireo: Under Alternative 1, approximately 154 acres of vegetated landscape, currently suitable gray vireo habitat, would essentially become unusable for 120 years of the operation and longer because the landscape will be changed in such a way and restoration is so difficult that the habitat quality will be degraded for many decades after the end of mining operations on the site. Under Alternative 2, the acreage would be smaller (134 acres) and the duration of mining would be shorter (40 years).

For Alternative 1, approximately 120 acres of pinyon/juniper woodlands and 34 acres of desert and desert transition habitat would be developed into quarry and haul road and would become unsuitable for many species of wildlife during and after the life of the project. Alternative 2 would reduce the loss of pinyon/juniper woodland by approximately 20 acres.

The proposed project includes mitigation for the habitat losses. Mitsubishi would transfer ownership of private land (Claim 7P) to the U.S. and it would become part of the SBNF. Other unpatented claim lands (Claims 9, 15, and 16a) held by Mitsubishi would be relinquished following mineral withdrawal. All of those mitigation parcels would be unavailable for future mining. As a result, approximately 540 acres would become unavailable for future mining in order to mitigate for the development of 154 acres (under the Proposed Action) or 134 acres (under Alternative 2). The mitigation parcels support pinyon/juniper woodland and desert transition habitats that are suitable for gray vireos.

The Design Features have measures to locate and avoid active nests during the initial ground clearance. As such, the likelihood of direct losses of gray vireos is considered low.

If gray vireos forage or nest near the quarry or haul road during mining operations, they would experience disturbance. The effects of that disturbance may be low because individual vireos that choose to nest close to active mining operations would likely be habituated to those disturbance levels. As such, displacement may be unlikely.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

Cumulative Effects for Gray Vireo: See the cumulative effects discussion in **Part II-3.2.13.** Pinyon woodland habitat within the range of the gray vireo, on and off-NFS lands, has been dramatically affected in California due to development, fire, and grazing. Those pressures on pinyon woodland habitat are likely to continue and the the effects may be magnified over the 40-120 year project life due to climate change.

Omya's proposed expansions at Butterfield/Sentinel and at White Knob would result in losses of habitat for this species. Mitsubishi's approved West Quarry project will also affect habitat during the quarry development and long-term operations. These mining activities may result in disturbance to this species over the life of the operations. All of these projects include mitigation through relinquishment of claims; this would result in protection of suitable habitat for gray vireos from future mining on those parcels.

This proposed project, over the 40-120 year life of the project, may add to the reasonably foreseeable effects to this species in the San Bernardino Mountains.

Determination of Effects – Gray Vireo: It is my determination that implementation of either of the action alternatives may impact individuals and habitat, but would not likely result in a trend toward Federal listing of the gray vireo. This determination is based on current population status and conditions. There is a degree of uncertainty for this determination because it is impossible to predict changes in conditions and population status over the 40-120 year project life (see **Part II-3.2.14**). The project would not be expected to interfere with maintaining viable well-distributed populations of this species.

IV-2.3.6 Fringed Myotis (*Myotis thysanodes)*

Fringed myotis is a Forest Service Sensitive species, a BLM Sensitive species, a Western Bat Working Group "high priority" species (indicating that it is imperiled or at high risk of imperilment).

Life History and Baseline Information - Fringed Myotis: The fringed myotis occupies a wide variety of habitats from low desert scrub to high-elevation coniferous forests. In California, the species occurs in mixed deciduous/coniferous forests, redwood and giant sequoia groves, and Joshua tree woodlands. Roost sites are essential for metabolic economy, for juvenile growth and as night roosts to consume prey. The fringed myotis roosts in crevices in a variety of situations such as caves, buildings, mineshafts, cliff faces, trees, and bridges for maternity and night roosts. Hibernation has only been documented in buildings and mines.

In the Laguna Mountains of San Diego County, a radio-telemetry study provided a means to locate hidden roosting bats. Five roosting fringed myotis were discovered along the eastern escarpment in separate rock crevices on inaccessible cliff faces. One post-lactating female roosted in a south-facing cliff face in chaparral and was located 7.9 miles away from the capture site.

Mating occurs during autumn, but ovulation, fertilization, and implantation take place from April to May. Females give birth to one young per year in May, June, or early July. Maternity colonies are typically small (fewer than 40 females), but may contain up to several hundred individuals. Due to thermoregulatory requirements, maternity colonies may shift locations within a roost.

Fringed myotis are year-round residents of California, where they hibernate but are also capable of periodic winter activity. Excluding periods of hibernation, individual bats emerge from the roost to forage approximately 1-2 hours after sunset. There may be some level of activity throughout the night. Fringed myotis feeds on a variety of insect prey, including small beetles and moths. The species may forage in and among vegetation along forest edges and over the forest canopy.

Very few records exist in California and the limited data available suggest serious population declines. Not only have historic maternity colonies disappeared, but those remaining appear to contain significantly fewer animals. In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment. Roost sites are lost as abandoned mines collapse or are destroyed to provide for human safety.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance. Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation. Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced. Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death. Fringed myotis are very sensitive to human disturbance at roost sites. (Source: **USFS 2006** LMP Species Account)

Occurrence in the Analysis Area – Fringed Myotis: On and near the North Slope, fringed myotis have been detected at Cactus Flats and Jacoby Canyon (SBCM surveys 2006) in similar pinyon/juniper habitat and at Cushenbury Springs (**Kielhold 1993**) and in Holcomb Valley

(SBNF records). They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.*, 2014)**. They are likely to occur in the analysis area.

<u>*Potential Effects to Fringed Myotis*</u>: Mortality/injury of bats may occur for those species using in rock outcrops, cliffs, and crevices or that roost in trees during vegetation removal and mining operations. Blasting, activities, and noise from the operations could disturb roosting bats during the day causing them to flush, possibly increasing the risk of predation. Bats and other organisms may also be attracted to any water-like surfaces (*e.g*., open sumps of process waters potentially) associated with operations of the project and be exposed to potentially injurious chemicals (**Brown and Rainey 2014)**.

Blasting would not be conducted at night (due to safety reasons) but night-time mining activities do occur. Noise from night-time mining activities may interfere with important vocalizations (including echolocation) that are used for communicating between colony members and territorial disputes. Night-time noise could also interfere with courtship, breeding, and foraging success.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

The project would result in more clearing of vegetation, affecting foraging opportunities by reducing the localized insect population. All of the alternatives may result in long-term loss of roosting, foraging, breeding, and hibernating habitat for this species.

When mining and reclamation has ceased on each quarry bench, some of the rock faces of the quarry may again provide suitable sheltering habitat, depending on the proximity to ongoing mining activities and disturbance. When all mining and reclamation has ceased, then crevices and fractures throughout the quarry would be available for bat species that use that type of habitat for roosting. In and near areas of active mining operations, it is unlikely that bats would use the rock outcrops and cliff faces due to the disturbance.

The mitigation package includes 540 acres being withdrawn from mineral entry, providing long-term protection of more suitable habitat acres than would be lost for the mining operations. As a result, those areas would be protected from future mining, providing foraging, roosting, hibernating, and breeding habitat for bats into the future.

<u>*Cumulative Effects for Fringed Myotis*</u>*:* The analysis area for cumulative effects is the San Bernardino Mountains. See **Part II-3.2.13** for a discussion of ongoing and foreseeable future projects and cumulative effects. Riparian habitat, on and off-NFS lands, has been dramatically affected in California due to development, water extractions/diversions/ impoundment, drought, grazing, and recreational use.

Omya's proposed expansions at Butterfield/Sentinel and at White Knob would result in losses of habitat and may result in losses of individuals over the life of those projects. Mitsubishi's approved West Quarry project wills also affect habitat and possibly individuals during the quarry development and long-term operations. The effects from those projects would be similar to those described above for this project.

The continued development of the North Slope for mining can be expected to affect roosting habitat for this bat species. Those pressures on riparian and foraging habitat are likely to continue and the effects may be magnified over the 40-120 year project life due to climate change.

This proposed project, over the 40-120 year life of the project, may add to the reasonably foreseeable effects to this species in the San Bernardino Mountains.

Determination of Effects – Fringed Myotis: It is my determination that implementation of either of the action alternatives may impact individuals and habitat, but would not likely result in a trend toward federal listing of the fringed myotis. This determination is based on current population status and conditions. There is a degree of uncertainty for this determination because it is impossible to predict changes in conditions and population status over the 40-120 year project life (see **Part II-3.2.14**). The project would not be expected to interfere with maintaining viable well-distributed populations of this species.

IV-2.3.7 Townsend's Big-Eared Bat *(Corynorhinus townsendii)*

Townsend's big-eared bat is a Forest Service Sensitive species, a CDFW Candidate species, a BLM Sensitive species, and a Western Bat Working Group "high priority" species (indicating that it is imperiled or at high risk of imperilment). In June 2013, CDFW passed a motion to designate this species as a Candidate for Threatened/Endangered species status but a formal Notice of Finding has yet to be posted (http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEAnimals.pdf; pg. 12; Henderson, pers. comm. 2014). It was formerly a CDFW Species of Special Concern.

Life History and Baseline Information: The distribution of this species is strongly correlated with the availability of suitable caves and cave analogs (mines, rock shelters, tunnels, building) for roosting. Population centers occur in areas dominated by exposed, cavity forming rock and/or historic mining areas. Abandoned mine adits and shafts are particularly important as roost sites in areas where there are not suitable caves. A high degree of site fidelity has been noted for this species.

Townsend's big-eared bat can be found in a variety of habitats throughout California, from the moist coastal redwoods to the mid-elevation mixed conifers to the dry deserts, but are most commonly associated with desert scrub, mixed conifer, pinyon-juniper, and pine forest. Within these communities, these bats are most commonly associated with limestone caves, mine adits/shafts, lava tubes, buildings and tunnels. During hibernation, Townsend's big-eared bats typically prefer habitats with relatively cold (but above freezing) temperatures in quiet, undisturbed places. These areas are often in the more interior, thermally stable portions of caves and mine adits/shafts. During spring and summer, females establish maternity colonies in the warm parts of caves, mine adits/shafts, and buildings.

Female Townsend's big-eared bats form maternity colonies in early spring, usually returning to the same site every year. They give birth to a single offspring in late spring or early summer. Townsend's big-eared bat is a year-round resident in California and does not migrate. Townsend's big-eared bats emerge from the roost approximately 45 minutes after sunset and are thought to have two peak activity periods during the night. Townsend's big-eared bat feeds primarily on small moths, but also takes other insects including flies, lacewings, dung beetles, and sawflies. This bat flies slowly and is highly maneuverable, foraging both above and within forest canopies.

Drastic population declines have occurred in Townsend's big-eared bat in California throughout the last 40–60 years. These declines include a 52% loss in the number of maternity colonies, a 44% decline in the number of roosts, a 55% decline in the number of bats, and a 32% decline in the average size of remaining colonies. The status of particular populations is correlated with amount of disturbance to or loss of suitable roosting sites. In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment. Roost sites are lost as abandoned mine adits/shafts collapse or are destroyed to provide for human safety.

Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Local extirpation may possibly occur as a result of roost disturbance. Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation.

Loss of roost sites reduces the distribution and often the number of bats to fewer sites. This makes remaining populations even more susceptible to potential impacts and greater loss of individuals or populations at the local or regional level. The availability of roost sites provided by tree and shrub bark or foliage has been reduced by timber harvest and urbanization. Dam construction and water impoundments for water storage and flood control have resulted in losses of roosting habitat in rocky canyons.

Bats often utilize a variety of habitats for foraging but tend to prefer those that are more open or are along edges. These conditions allow for more flight mobility and a broader prey base. Foraging habitat has been lost to urbanization and agriculture. This is particularly pronounced in riparian areas, valleys, oak woodland foothills, and coastal basins where there are concentrated areas of homes, businesses and agriculture. Livestock grazing may also eliminate forage and cover for insects. As a result, insect productivity may be reduced. Pesticide use may pose a threat to bats. Bats that primarily consume insects may be exposed to home and agricultural pesticides. Pesticides and other chemicals may accumulate within predators and lead to sickness or death. Activities on NFS lands that could have effects on bats include rock climbing, livestock grazing, vegetation treatments and water extraction that would lead to the loss of a water source or riparian habitat (Source: **USFS 2006** LMP Species Account)

<u>Occurrence in the Analysis Area - Townsend's Big-Eared Bat</u>: This species is known from the North Slope(6800'), Arrastre Creek (6400'), Wright Mine (7600'), Vaughn Spring and the Rose Mine area (6800-7200') in similar pinyon/juniper and desert transition habitats to the analysis area. Townsend's big-eared bats have also been detected at Cushenbury Springs (**Kielhold 1993**). They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.,* 2014)**.

Due to the proximity to known roost sites and presence of suitable foraging habitat, this species likely uses the analysis area for foraging.

The majority of hibernation sites for Townsend's big-eared bats are caves or mine shafts/adits, with buildings used occasionally (**Barbour and Davis 1969, Pearson *et al.* 1952).** Maternity roosts are typically in caves, mines, hollow trees, and buildings (**Pierson and Rainey 1998**). This species rarely uses cracks or crevices when roosting in caves and mines (**Pierson and Rainey 1998**). No caves or mine shafts occur within the area proposed for expansion. All of the known roost sites for this species on the SBNF are in abandoned mine shafts. This species is unlikely to use rock crevices in cliff or quarry faces for roosting/hibernating. Townsend's big-eared bats are known to sometimes roost in large hollow trees. As such, the analysis area may have on a very limited amount of suitable roost, hibernating, and maternity sites.

<u>Potential Effects to Townsend's Big-Eared Bat</u>: This species prefers caves and cave analogs (mine adits/shafts) for roost, maternity, and hibernating sites. Caves are not present on the North Slope. The Mohawk Mine shaft is very close (~500') to the southern edge of the proposed quarry (both alternatives). If blasting activities during the quarry development and subsequent mining affect the stability of the mine shaft, there could be some loss of roost, maternity, and hibernation sites. No other mine shafts are known within close proximity to the proposed project. It is possible that a few potential roost trees would be lost during vegetation removal for the proposal.

There may be some effects to foraging habitat, including effects to prey species availability, as a result of vegetation clearing within the project area footprint (134 or 154 acres depending on alternative).

The mitigation package includes 540 acres being withdrawn from mineral entry, providing long-term protection of suitable habitat from future mining operations. The claims support habitat that would be suitable for foraging. In additions, examination of USGS topographic maps suggest that some of the mitigation parcels appear to have old mine activities and may have shafts/adits that would be suitable for roost, maternity, and hibernation sites.

If mining occurs at night, the noise may interfere with important vocalizations that are used for communicating between colony members and territorial disputes. This might interfere with courtship, breeding, and foraging success.

If bats are roosting in tree cavities during tree felling, death or injury could occur; however, it is more likely that they would be flushed during initial tree cutting activities. Tree density in the project area is low and it is likely that there are a relatively low number of trees that would be suitable for roosting. As such, the likelihood of death or injury of Townsend's big-eared bats, including "take" under the California Endangered Species Act, is considered very low.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

Cumulative Effects for Townsend's Big-Eared Bat: The potential cumulative effects are similar to those described above for fringed myotis.

Determination of Effects – Townsend's Big-Eared Bat: It is my determination that implementation of either of the action alternatives may impact individuals and habitat, but would not likely result in a trend toward federal listing of the Townsend's big-eared bat. This determination is based on current population status and conditions. There is a degree of uncertainty for this determination because it is impossible to predict changes in conditions and population status over the 40-120 year project life (see **Part II-3.2.14**). The project would not be expected to interfere with maintaining viable well-distributed populations of this species.

IV-2.3.8 Pallid Bat (*Antrozous pallidus*)

The pallid bat is a Forest Service Sensitive species, a CDFW Species of Special Concern, a BLM Sensitive species, and a Western Bat Working Group "high priority" species (indicating that it is imperiled or at high risk of imperilment).

Life History and Baseline Information: Pallid bats are found in a variety of habitats, including rocky canyons, open farmland, scattered desert scrub, grassland, shrubland, woodland, and mixed conifer forest. Pallid bats appear to be more prevalent within edges, open stands, particularly hardwoods, and open areas without trees. Pallid bats roost in rock crevices, mines, caves, tree hollows, and a variety of anthropogenic structures. Pallid bats frequently use buildings, bridges and culverts in California.

Pallid bats mate late October-February, but fertilization is delayed until April–June. Maternity colonies form in early April and may contain from 12 to 100 individuals. Maternity colonies form in rock crevices, buildings and in other man-made structures such as mine tunnels. In the southwestern United States, young are born May–June.

In the western United States, this species is thought to overwinter in the general vicinity of its summer range. The pallid bat is a year-round resident in California. Time of emergence from roost sites varies seasonally but typically occurs 30–60 minutes after sunset. Foraging is concentrated in two periods: 90-190 minutes after sunset and shortly before dawn.

Pallid bats primarily glean prey from the ground or surfaces of vegetation, but have also been observed to take prey in flight. Prey items include large insects such as scorpions, crickets, praying mantids, and moths. Pallid bat may hover or glide momentarily while foraging.

Declines were observed in the 1970s in Los Angeles, Orange, and San Diego Counties. At that time, only one of 12 roost sites documented in the 1940s were still occupied. These declines were attributed to 1) destruction of buildings, 2) eradication of bats roosting in public buildings in response to public health concerns, and 3) urban expansion (**USFS 2006** LMP Species Account). The threats to pallid bats are similar to those discussed above for Townsend's big-eared bats.

Occurrence in the Analysis Area - Pallid Bat: Pallid bats have been detected at Cushenbury Springs (**Kielhold 1993**) and in Cactus Flats (SBNF records 2013). With sufficient moonlight, pallid bats can navigate visually, use prey-produced sounds to hunt, and may not emit echolocation signals. Therefore, the activity of this species may be under-estimated based solely on acoustic detections. Some of the calls recorded in the 2014 survey at Omya's Butterfield/Sentinel quarries (a few miles to the west of SQ) could have been high slope non-diagnostic pallid bat signals (**Brown and Rainey 2014**). They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.*, 2014)**. It is likely to occur in the analysis area.

Potential Effects for Pallid Bat: The potential effects are similar to those described above for fringed myotis.

Cumulative Effects for Pallid Bat: The potential cumulative effects are similar to those described above for fringed myotis.

Determination of Effects –Pallid Bat: It is my determination that implementation of either of the action alternatives may impact individuals and habitat, but would not likely result in a trend toward federal listing of the pallid bat. This determination is based on current population status and conditions. There is a degree of uncertainty for this determination because it is impossible to predict changes in conditions and population status over the 40-120 year project life (see **Part II-3.2.14**). The project would not be expected to interfere with maintaining viable well-distributed populations of this species.

IV-2.4 – Sensitive Animals – Potential Effects of No Action

See the **Part II-** for a discussion of the potential effects of the No Action Alternative. Under the No Action Alternative, there would be no immediate change in habitat conditions until a disturbance, such as wildfire, drought, etc., affected the habitat.

IV-3.0 – SUMMARY OF DETERMINATION OF EFFECTS FOR SENSITIVE SPECIES

Table 16. Summary of Determinations of Effects for Sensitive Species in the Analysis Area

Species	Determination of Effects [1]	Viability Statement
Plants		
Abronia nana var. *covillei*	MIIH	No threat to viability from this project
Astragalus bernardinus	NI	No threat to viability from this project
Astragalus tidestromii	NI	No threat to viability from this project
Atriplex parishii	NI	No threat to viability from this project
Calochortus striatus	NI	No threat to viability from this project
Boechera shockleyi	MIIH	No threat to viability from this project
Dudleya abramsii subsp. *affinis*	MIIH	No threat to viability from this project
Linanthus killipii	NI	No threat to viability from this project
Saltugilia lattimeri	NI	No threat to viability from this project
Symphyotrichum defoliatum	NI	No threat to viability from this project
Wildlife		
large-blotched ensatina	MIIH	No threat to viability from this project
yellow-blotched ensatina	MIIH	No threat to viability from this project
California legless lizard	MIIH	No threat to viability from this project
southern rubber boa	MIIH	No threat to viability from this project
three-lined boa	MIIH	No threat to viability from this project
San Bernardino ringneck snake	MIIH	No threat to viability from this project
San Bernardino mountain kingsnake	MIIH	No threat to viability from this project
Two-striped garter snake	MIIH	No threat to viability from this project
California spotted owl	MIIH	No threat to viability from this project
Willow flycatcher (migrant)	MIIH	No threat to viability from this project
Gray vireo	MIIH	No threat to viability from this project
Fringed myotis	MIIH	No threat to viability from this project
Townsend's big-eared bat	MIIH	No threat to viability from this project
fringed myotis	MIIH	No threat to viability from this project
pallid bat	MIIH	No threat to viability from this project

[1] NI=No Impact;
MIIH= May Impact Individuals or Habitat, But Not Likely to Lead Toward a Trend in Federal Listing;
MLTFL=May Lead Toward a Trend in Federal Listing

PART V: WILDLIFE AND BOTANY REPORT

V-1.0 – INTRODUCTION

Part I of this document contains descriptions of the methods/evaluation process, Proposed Action, and habitat for this project. **Part II** addresses effects that are common many species addressed in this document.

This part, **Part V**, provides documentation about other species that have been identified as having viability concerns by the Forest Service or other entities (CDFW, USFWS, CNPS, Western Bat Working Group, Xerces Society, etc.).

V-2.0 SBNF WATCHLIST SPECIES AND OTHER SPECIES OF CONCERN

The LMP contains strategies for achieving the desired conditions and goals. Strategy WL-2 for management of species of concern provides guidance to "maintain and improve habitat for fish, wildlife, and plants, including those with the following designations: game species, harvest species, and Watchlist species" (**USFS 2006** LMP, pg. 129)

SBNF Watchlist species are those that the local biologists and botanists have expressed concern about viability either because of apparent downward trends, apparent changes in habitat availability, vulnerability of associated habitats, or very narrow or localized distributions. Because of limited knowledge and/or understanding of some species, it may not yet be known whether listing as Sensitive is warranted (the effort to gather such information is one of the purposes of the Watchlist).

Species accounts from the LMP are incorporated by reference; species account information is summarized in the species-specific discussions. For complete species accounts with citations see the LMP (**USFS 2006** LMP Species Accounts; **USFS 2013**). The LMP species accounts and updated species accounts (in Project Record) are incorporated by reference. New information regarding Watchlist species is discussed, as appropriate.

V-2.1 –Viability of SBNF Watchlist Plants and Other Rare Plants – Potential Effects from Alternatives 1 and 2

There are six SBNF Watchlist plant species known or likely to occur within the reach of direct and indirect effects of the proposed action and alternatives. In addition, there are four plant taxa with very limited distributions and potential vulnerabilities that are reported from in or near the analysis area. For species not known to occur in the SQ project area, the likelihood of occurrence is based on survey data, available habitat, and proximity to known occurrences. All species listed in **Table 17** were considered in this analysis and those that are known or likely to occur in the analysis area are indicated. It is possible that Watchlist and other limited/vulnerable plant occurrences are present but undetected/unmapped in the SQ analysis area.

Direct and indirect effects to Watchlist plants from the Proposed Action are described below. The earlier discussions in **Part II-3.2** also applies to Watchlist plants known to occur as well as any that were undetected during surveys.

Table 17. San Bernardino National Forest Watch Plant Species and Other Rare Plants in/near the Analysis Area			
Species Name	**Common Name**	**Mountaintop District Record***	**Occurs In/Near Analysis Area***
Allium parishii	**Parish's onion**	**Y**	**Y**
Androsace elongata subsp. *acuta*	California androsace	P	N
Astragalus leucolobus	**Bear Valley woollypod**	**Y**	**Y**
Berberis fremontii	**Fremont barberry**		**P**
Boechera dispar	pinyon rock-cress	Y	N
Boechera lincolnensis	**Lincoln rockcress**		**P**
Boykenia rotundifolia	round-leaved boykenia	Y	N
Calochortus plummerae	Plummer's mariposa lily	X	N
Castilleja montigena	Heckard's paintbrush	Y	N
Chaenactis parishii	Parish's chaenactis		N
Chorizanthe polygonoides var. *longispina*	long-spined spineflower		N
Corydylanthyus eremicus* subsp. *eremicus	**desert bird's beak**	**Y**	**Y**
Cymopterus multinervatus	**purple-nerve cymopterus**	**P**	**Y**
Erigeron breweri var. *jacinteus*	San Jacinto Mts. daisy		N
Eriogonum microthecum* var. *corymbosoides	**San Bernardino Mountains buckwheat**	**Y**	**Y**
Eriogonum umbellatum var. *minus*	alpine sulphur-flowered buckwheat	Y	N
Eriophyllum lanatum var. *obovatum*	southern Sierra woolly sunflower	Y	N
Frasera neglecta	pine-green gentian	Y	N
Galium angustifolium subsp. gabrielense	San Antonio Canyon bedstraw		N
Galium jepsonii	Jepson's bedstraw		N
Galium johnstonii	Johnston's bedstraw	Y	N
Hulsea vestita subsp. *callicarpha*	beautiful hulsea		N
Hulsea vestita* subsp. *parryi	**Parry's sunflower**	**Y**	**Y**
Juglans californica	southern California black walnut		N
Juncus duranii	Duran's rush	Y	N
Layia ziegleri	Ziegler's aster		N
Lepidium virginicum var. robinsonii	Robinson's peppergrass		N
Linanthus maculatus	Little San Bernardino Mountains gilia	P	N
Lilium humboldtii var. *ocellatum*	ocellated Humboldt lily	Y	N
Meesia triquetra	three-ranked humpmoss	P	N
Monardella australis subsp. *cinerea*	Gray monardella		N

Table 17. San Bernardino National Forest Watch Plant Species and Other Rare Plants in/near the Analysis Area			
Species Name	**Common Name**	**Mountaintop District Record***	**Occurs In/Near Analysis Area***
Muhlenbergia californica	California muhly grass		N
Muilla coronata	**Crowned muilla**	**P**	**Y**
Packera ionophylla	Tehachapi ragwort	Y	N
Perideridida parishii subsp. *parishii*	Parish's yampah	Y	N
Phacelia exilis	Transverse Range phacelia	X	N
Phacelia mohavensis	Mojave phacelia	Y	N
Piperia leptopetala	Narrow-petaled rein orchid	Y	N
Podistera nevadensis	Sierra podistera	Y	N
Poliomintha incana	**frosted mint**		**P**
Rupertia rigida	Parish's California tea	Y	N
Syntrichopappus lemmonii	Lemmon's syntrichopappus	Y	N
Streptanthus bernardinus	Laguna mountains jewel-flower	Y	N
Viola pinetorum subsp. *grisea*	Grey-leaved violet	H	N
Viola aurea	golden violet	P	N

*Occurrence Information:

Y = Species is known to occur.

P = Occurrence of the species is possible; suitable habitat exists, and the species is known from nearby locations.

U = Occurrence of the species is unlikely based on habitat present.

H = Part of the historical range but the species has likely been extirpated.

N = Outside known distribution/range of the species.

V-2.1.1 Parish's Onion (*Allium parishii*)
This wild onion is nearly-endemic to the Mojave Desert, and is limited to very widely-scattered populations on rocky slopes from the northern slope of the San Bernardino Mountains to western Arizona. Of the total 51 records of this species, at least 40 are from the north slopes of the San Bernardino Mountains and Little San Bernardino Mountains. The occurrences on the north slope of the San Bernardino Mountains range from near Grapevine Canyon (northwest of White Mountain) to the northern slopes of Blackhawk Mountain. Even within known populations, individual plants are typically described as scarce.

NatureServe ranks the species as G3 (globally vulnerable), the California State Rank is S3 (vulnerable within the State), and the Arizona State Rank is S1 (critically imperiled within the State). The California Native Plant Society (CNPS) lists this species as 4.3 (a watch list for rare plants with a low degree and immediacy of threats). This species is on the SBNF watch list.

Samuel Parish collected this species in 1882 at the "Mountains near Cushenbury Springs". Nearby collections since then include a 1979 record from near Whiskey Springs**,** Marble Canyon, Cushenbury Canyon, Arctic Canyon, and near Monarch Flat (**Consortium of California Herberia 2013**). While these rocky desert-facing slopes of the San Bernardino Mountains are rugged and largely-remote, the whole area is subject to past, current and future open-pit mining and other mining-related activities, and potential future wind energy development.

SQ project surveys and related surveys related to Mitsubishi's Cushenbury West Quarry, associated haul roads, and exploratory drilling projects, resulted in the discovery of two occurrences within the SQ analysis area. One occurrence is immediately north of the "scoop" where the proposed quarry transitions to the northwest into the haul road (**Consortium of California Herberia 2013**). Impacts to this occurrence should be avoided to the extent practical. The other occurrence is well within the perimeter of the proposed SQ (**Consortium of California Herberia 2013**).

While the plants are perennial from an underground bulb, only a small and variable fraction of individuals typically rise to flower in any given year. This makes detection and assessment of population numbers and extent problematic. As a result, based on contiguous suitable habitat between these two occurrences, it is possible that the population is sparsely contiguous between these two occurrences, and most of the intervening area would be lost to the development of the SQ project. According to Design Feature PLANT-3, an effort will be made to salvage rare plants from the quarry and haul road footprints prior to removal of the land surface with subsequent transplantation to suitable sites outside the SQ disturbance footprint. This measure may help reduce the number of plants of this species affected.

Surveys of mitigation lands at Cushenbury 7P, Cushenbury 9, Cushenbury 16a, and Cushenbury 15 did not detect this species, and there are no previously recorded occurrences within these areas. However, all of these areas support good habitat for the species and it may occur undetected. These lands may also provide good transplantation opportunities for salvaged bulbs. One occurrence has been reported within Cushenbury 8P, on lands protected as mitigation for the Mitsubishi West Quarry project (**Consortium of California Herberia 2013**). There is also one reported occurrence near Whiskey Springs, just south of Cushenbury 8P and less than ¼ mile west of Cushenbury 9 (**Consortium of California Herberia 2013**).

V-2.1.2 Bear Valley Woollypod (*Astragalus leucolobus*)
This native perennial milkvetch is limited to the mountain regions of San Bernardino, Riverside, and Los Angeles counties. The species is common throughout Bear Valley and surrounding areas of the San Bernardino Mountains. It is typically found on or adjacent to pebble plains, in openings of yellow pine forest and pinyon-juniper woodland, and in dry, rocky areas with sagebrush. It also occurs in areas with disturbed soils, on fuelbreaks, in residential tracts, and adjacent to roads and trails, indicating a tolerance of an intermediate level of chronic disturbance and resilience from more severe disturbances.

NatureServe ranks the species as G2 (Globally Imperiled) and S2 (California State Imperiled), and the CNPS ranks it as 1B.2 (threatened, with a moderate degree and immediacy of threat), although over the years a number of botanists familiar with this species have recommended that reclassification to list 4.2 (a watch list for rare plants with a moderate degree and immediacy of threats) is warranted. This species is on the SBNF watch list.

Project surveys did not detect this species within the SQ project footprint. There are records of this species at Burnt Flat just to the south of the SQ project, and suitable habitat through the upper elevations of the proposed quarry.

V-2.1.3 Fremont Barberry (*Berberis fremontii*)
This cane shrub occurs in many localities across the Southwest from the Mojave Desert in California to Colorado and New Mexico, and south into Baja California and Sonora, Mexico. In California the species is very infrequently reported and limited to a few mountain ranges of the Mojave Desert, the north foot of the San Bernardino Mountains, and the eastern foot of the peninsular range. The only California records from the past 30 years are three records from the New York Mountains, and one from near Pioneertown. It is ranked by NatureServe as G5 (secure globally), and S2 (imperiled in California). It is not ranked in the other southwestern states, where it is more common. This species is on CNPS's List 3, a review list for species about which more information is needed. It is not on the SBNF watch list.

The only record near the SQ project area is an October 1, 1925 collection by Marcus Jones from "Cushenbury Springs". This locality should be interpreted as meaning within the general vicinity of Cushenbury Springs (Jones' locality records were typically generalized). Based on other collections from the same date, Jones travelled up Cushenbury Grade from Lucerne Valley to Bear Valley that day. This species was not observed during project surveys, but there is suitable habitat within the SQ analysis area and associated mitigation lands.

V-2.1.4 Lincoln Rockcress (*Boechera lincolnensis*)
This rock cress, formerly treated as *Arabis pulchera* var. *munciensis*, is rare in California, limited to mountains of the northern Mojave Desert and the Mojave Desert slopes of the San Bernardino and Little San Bernardino Mountains (Inyo and San Bernardino Counties). There are fewer than 20 records of the species from California, and only one from the last 25 years. The species is more common and widespread in southern Nevada and extends into southwestern Utah.

NatureServe ranks the species as G4 (apparently secure globally), and S1 (critically imperiled in California). The species is on CNPS list 2.3, rare but not very endangered in California, and more common elsewhere. It is not on the SBNF watch list.

This species was not observed during SQ project surveys. The only record from near the project area is an April 7, 1928 collection by Milo S. Baker from 2 miles south of Box S Springs. Based on other collections, Baker collected in the San Bernardino Mountains and down the "Baldwin Lake to Victorville Highway" on the same day this collection was made. Suitable habitat is present throughout the analysis area and associated mitigation lands.

V-2.1.5 Desert Bird's-Beak (*Cordylanthus eremicus* subsp. *eremicus*)
This native annual hemi-parasitic herb is endemic to the Mojave Desert of California. Its distribution is limited to the mountains of the northern Mojave Desert in Inyo and Kern Counties (*e.g*., Panamint Mountains, Cottonwood Mountains, Argus Range, Mount Jenkins), and the Mojave Desert slopes of the San Bernardino Mountains. The San Bernardino Mountains records include Box S Springs (north of the SBNF), above Parton Mine, Monarch Flat, Rattlesnake Canyon, and Pipes Canyon.

NatureServe ranks this species as G3/T3 (globally vulnerable) and as S3 (vulnerable in California). It is on the California Native Plant Society list 4.3, a watch list for plants of limited distribution but not very endangered in California. It is on the SBNF watch list.

This species was not observed during project surveys. Suitable habitat exists throughout the project area and mitigation lands. This species is small and highly variable in numbers from year to year. It is possible based on habitat suitability and proximity to reported occurrences that it occurs undiscovered within the analysis area.

V-2.1.6 Purple-Nerve Cymopterus (*Cymopterus multinervatus)*
This native perennial member of the carrot family is occurs in the Mojave Desert and east to Utah, New Mexico, and Texas. In California the species is known from only 19 records, ranging from the Pahrump Valley of southeastern Inyo County, to the Mojave National Preserve, and south to Lucerne and Johnson Valley. Eleven of these 19 records are over 25 years old.

NatureServe ranks this species as G5 (globally secure), and S2 (imperiled in California). It is also ranked as imperiled in Utah and critically-imperiled in Texas. It is on the California Native Plant Society list 2.2, rare in California but more common elsewhere. It is not on the SBNF watch list.

This species was not observed during project surveys. Suitable habitat exists within the analysis area and mitigation lands. One record of this species is from near the analysis area, on the alluvial fan at the base of Marble Canyon (White 1995). This occurrence is about one mile northwest of the SQ.

V-2.1.7 San Bernardino Mountains Wild Buckwheat (*Eriogonum microthecum* var. *corymbosoides*)

This taxon is endemic to the Transverse Ranges (San Bernardino Mountains and eastern San Gabriel Mountains), and is strongly associated with carbonate soils. Populations are widely scattered across the range, but individual plants can be abundant with these populations. Occurrences are generally found on dry, open slopes and are sometimes associated with localized ground disturbance such as road and trail margins, mining claims assessment work, historic diggings, etc. This indicates a low to moderate tolerance to light to moderate chronic ground disturbance and a moderate resilience following more severe disturbance.

NatureServe ranks this taxon as G5T3 (a vulnerable infra-specific taxon within an otherwise secure species). The California Native Plant Society considers the taxon too common to list. It is on the SBNF watch list.

This taxon was documented during project surveys, and is common on carbonate slopes throughout the SQ analysis area. The SQ project is likely to result in the permanent loss of thousands of individual plants of this taxon and associated carbonate habitat. This loss is offset through the dedication of the project mitigation lands to the carbonate habitat reserve. This taxon should be incorporated to the extent practical into seed mixes for revegetation.

V-2.1.8 Parry's Sunflower (*Hulsea vestita* subsp. *parryi*)

This native perennial herb is endemic to the San Bernardino Mountains and Little San Bernardino Mountains. The San Bernardino Mountains records range from the San Gorgonio Wilderness north to the desert slopes above Lucerne Valley.

NatureServe ranks this taxon as G5/T3 (a vulnerable infra-specific taxon within an otherwise secure species) and as S3 (vulnerable in California). It is on the California Native Plant Society list 4.3, a watch list for plants of limited distribution but not very endangered in California. It is on the SBNF watch list.

This plant was observed during project surveys and occurs within the proposed SQ project area and within the associated mitigation lands. It also occurs within the Cushenbury West Quarry expansion area. In the project area, plants of this taxon are widely scattered.

V-2.1.9 Crowned Muilla (*Muilla coronata*)

This wild onion is endemic to the Mojave Desert and associated mountain slopes, and is limited to very widely-scattered populations from the Mojave Desert slopes of the San Bernardino Mountains and southern Sierra Nevada and east to southern Nevada.

NatureServe ranks the species as G3 (globally vulnerable), the California State Rank is S3 (vulnerable within the State), and the Nevada State Rank is S1 (critically imperiled within the State). The California Native Plant Society (CNPS) lists this species as 4.2 (a watch list for rare plants with a moderate degree and immediacy of threats). It is on the SBNF watch list.

SQ project surveys did not detect this species. There is one recorded occurrence nearby, from Marble Canyon, just north of the SMI Marble Canyon Quarry. This occurrence is about 0.8

miles northwest of the proposed SQ. Suitable habitat exists within the project area and within the associated mitigation lands.

V-2.1.10 Frosted Mint (*Poliomintha incana*)
This low-growing native shrub in the mint family is only known in California from a single specimen collected in 1938. The record was from boggy soil at Cushenbury Springs. The species is not rare through its primary range, from Arizona and Utah to Texas, though it is rare in Colorado.

NatureServe ranks the species as G5 (globally secure), and the California State Rank is SH (historic, possibly extirpated). The California Native Plant Society lists this species as 1A (presumed extinct in California). The Jepson Manual of California Plants presumes that the California population has been extirpated by mining. Based on the 1938 record being from boggy soil, and the extant habitat at Cushenbury Springs, it seems premature to presume extirpation. This species is not on the SBNF watch list.

SQ project surveys did not detect this species, but surveys did not include Cushenbury Springs. There is no 'boggy' habitat within the project area or mitigation lands, however this species commonly occurs on drier sandy soils in the main part of its range, so suitable habitat does exist in the SQ analysis area and mitigation lands. This species, if extant at Cushenbury Springs, would only be affected by the project if associated future well water extraction results in changes to the hydrology of Cushenbury Springs.

V-2.1.11 Summary of Effects to Watchlist Plants and Other Vegetation
The primary effect to affected Watchlist plant species, other rare plants, and general vegetation is large-scale habitat loss through removal of the land surface. Habitat loss through burial of the land surface would also occur, mainly associated with the haul road and the berm. Habitat loss would be offset by establishment of protected lands into as part of the Carbonate Habitat Reserve. Indirect effects would include the effects of dust, weeds, and hydrology, and would be expected to be localized and minimized through application of Design Features.

V-2.2 – SBNF Watchlist Plants – Potential Effects of No Action
Under the No Action Alternative, no effects to Watchlist Plants are expected to occur relative to the baseline condition. The discussion in **Part II-** is applicable for all Watchlist plant species that occur in the analysis area.

V-2.3 – Viability of SBNF Watchlist Animals and Other Species of Concern - Potential Effects from Alternatives 1 and 2
There are a number of Watchlist animals known or expected to occur in the analysis area. **Table 18** contains the current Watchlist animals for the SBNF and occurrence probability in the analysis area. The potential effects to Watchlist species that are known to occur and those that have a high probability of occurring in the analysis area are discussed in detail. In addition to Watchlist animals, several other species of concern for the area are addressed in this section.

Table 18. San Bernardino National Forest Watchlist Animals and the Likelihood of Occurrence in Areas Expected to be Affected by the MCC Project				
Common	**Latin**	**District Record [1]**	**Habitat [2]**	**OCCURS IN/ NEAR ANALYSIS AREA [1]**
Springsnails	*Pyrgulopsis sp.*	Y	aq – seeps and springs	P @ Cushenbury Springs
simple hydroporus diving beetle	*Hydroporus simplex*	Y	aq	P @ Cushenbury Springs
greenest tiger beetle	*Cicindela tranquebarica viridissima*	P	r, w	U
Dorhn's elegant eucnemid beetle	*Palaeoxenus dorhni*	Y	mc	N – no suitable habitat
bicolored rainbeetle	*Pleocoma bicolor*	Y	mc, wo (oaks)	N - no suitable habitat
California diplectronan caddisfly	*Diplectrona californica*	N	Aq (rapid portions of small, cool streams)	N
desert monkey grasshopper	*Psychomastax deserticola*	Y	d, wo (pj)	Y
San Bernardino Mountains silk moth	*Coloradia velda*	Y	wo (pj), mc	P
August checkerspot butterfly	*Euphydryas editha augustina*	Y	mc	N – no suitable habitat
Andrew's marble butterfly	*Euchloe hyantis andrewsi*	Y	m, r; Host plants are in mustard family (*Thelypodium stenopetalum; Arabis holboelii* var. *pinetorum; Streptanthus bernardinus)*	P – host plants are present
partially armored threespine stickleback	*Gasterosteus aculeatus microcephalus*	Y	aq	N
Monterey ensatina salamander	*Ensatina eschscholtzii*	Y	wo (oaks), mc, r	P @ Cushenbury Spring and Marble Canyon
arboreal salamander	*Aneides lugubris*	N	wo (oaks), c, r; foothills	N – out of known distribution
garden slender salamander	*Batrachoseps major*	N	r, wo, g, meadow, c	N – out of known distribution
western spadefoot toad	*Spea hamondii*	N	w, r	N
Red spotted toad	*Anaxyrus punctatus*	Y	d, r (streams, pools, cattle tanks, springs), rk	P @ Cushenbury Springs and Marble Canyon
common chuckwalla	*Sauromalus obesus*	Y	d, wo (pj)	Y
Zebra-tail lizard	*Callisaurus draconiodes rhodostictus*	Y	d, sandy washes	P
Mojave black-collared lizard	*Crotaphytus bicinctores*	Y	d	Y
granite night lizard	*Xantusia henshawi*	N	rk	N
Desert night lizard	*Xantusia vigilis*	Y	d	Y @ Cushenbury Springs; P @ project
Coronado skink	*Plestiodon skiltonianus interparietalis*	Y	c, wo, r, mc – sea level to 1675 meters	N – out of known distribution
coast patch-nosed snake	*Salvadora hexalepis virgultea*	L	c, d, w, rk, coastal sage, alluvial fan scrub	P

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Common	**Latin**	**District Record** [1]	**Habitat** [2]	**OCCURS IN/ NEAR ANALYSIS AREA** [1]
mountain garter snake	*Thamnophis elegans*	Y	m, r	P
southwestern speckled rattlesnake	*Crotalus mitchellii pyrrhus*	Y	c, wo, d, rk	Y
western least bittern	*Ixobrychus exilis hesperis*	L	aq	U
turkey vulture (breeding)	*Cathartes aura*	Y	a, g, c, wo, d, rk	P
osprey	*Pandion haliaetus*	Y	aq, r	U
white-tailed kite	*Elanus leucurus*	Y	r, wo	U
northern harrier	*Circus cyaneus*	Y	g, m	P
sharp-shinned hawk (breeding)	*Accipiter striatus*	Y	r, mc	Y @ Cushenbury Springs (migrant); P @ project
Cooper's hawk (breeding)	*Accipiter cooperii*	Y	r, mc	Y @ Cushenbury Springs; P @ project
zone-tailed hawk	*Buteo albonotatus*	Y	mc, wo (pj)	U
ferruginous hawk	*Buteo regalis*	Y	g, d	P (migration; not nesting)
golden eagle	*Aquila chrysaetos*	Y	g, d, wo (pj, oak)	Y for foraging; Nesting known on North Slope
merlin	*Falco columbarius*	Y	g, mc	U
American peregrine falcon	*Falco peregrinus anatum*	Y	cliffs for nests; aq for hunting	P
prairie falcon	*Falco mexicanus*	Y	g, d	Y (Records from Cushenbury Springs; Burnt Flat, Deep Canyon, Dry Canyon, Crystal Creek)
Wilson's snipe (Lake Hemet population only)	*Gallinago delicata*	n/a	m, aq	n/a
flammulated owl	*Otus flammeolus*	Y	mc	U
western screech owl	*Otus kennicottii*	Y	r, mc, wo	P @ analysis area; Y@ Cushenbury Springs
northern pygmy owl	*Glaucidium gnoma*	Y	r, mc, wo	P
burrowing owl	*Athene cunicularia hypogaeae*	P	d	U
long-eared owl	*Asio otus*	Y	r, mc	Y @ Cushenbury Springs; P @ project
northern saw-whet owl	*Aegolius acadicus*	Y	wo, mc, pine	P
common nighthawk	*Chordeiles minor*	Y	a, pine, mc	P
Mexican whip-poor-will	*Caprimulgus arizonae*	Y	wo, mc	P
black swift	*Cypseloides niger*	Y	a, r (waterfalls)	U
calliope hummingbird	*Stellula calliope*	Y	r	P @ Cushenbury Springs; P @ project

Table 18. San Bernardino National Forest Watchlist Animals and the Likelihood of Occurrence in Areas Expected to be Affected by the MCC Project				
Common	**Latin**	**District Record [1]**	**Habitat [2]**	**OCCURS IN/ NEAR ANALYSIS AREA [1]**
Lewis' woodpecker	*Melanerpes lewis*	Y	wo (oak), r	U
Williamson's sapsucker	*Sphyrapicus thyroideus*	Y	mc	U
Nuttall's woodpecker	*Picoides nuttallii*	Y	r, c, wo, mc	P @ analysis area; Y @ Cushenbury Springs (breeding)
white-headed woodpecker	*Picoides albolarvatus*	Y	mc	U
gray flycatcher	*Empidonax wrightii*	Y	wo (pj), c	Y @ Cushenbury Springs (migrant); P @ project
loggerhead shrike	*Lanius ludovicianus*	Y	c, wo, r, d, mc	P @ analysis area; Y @ Cushenbury Springs
plumbeous vireo	*Vireo plumbeus*	Y	wo (pj), mc	P
Cassin's vireo	*Vireo cassinii*	Y	mc, wo (oak), r	P
warbling vireo	*Vireo gilvus*	Y	r, wo, mc	Y @ Cushenbury Springs; P @ project
pinyon jay	*Gymnorhinus cyanocephalus*	Y	wo (pj), mc	Y @ Cushenbury Springs (migrant); P @ project
California horned lark (breeding)	*Eremophila alpestris actia*	Y	g, d	Y @ Cushenbury Springs (breeding); U @ project
purple martin	*Progne subis*	Y	a, r, mc, wo	U – no suitable habitat
tree swallow	*Tachycineta bicolor*	Y	a, r, wo, mc	Y @ Cushenbury Springs (migrant); P @ project
American dipper	*Cinclus mexicanus*	Y	streams	U
Swainson's thrush	*Catharus ustulatus*	Y	r, mc	Y @ Cushenbury Springs; P @Marble Canyon
hermit thrush (breeding)	*Catharus guttatus*	Y	pine, mc	Y @ Cushenbury Springs (migrant) ; P @ project
Bendire's thrasher	*Toxostoma bendirei*	Y	c, wo, r, d	P
LeConte's thrasher	*Toxostoma lecontei*	Y	d	Y @ Cushenbury Springs (breeding); P @ project
American pipit (breeding)	*Anthus rubescens*	Y	alpine, talus & sand slopes	U
Virginia's warbler (breeding)	*Vermivora virginiae*	Y	wo (pj), c	P @ Cushenbury Springs; P @ project
yellow warbler	*Dendroica petechia brewsteri*	Y	mc, wo, r	Y @ Cushenbury Springs (breeding) ; P @ project
MacGillivray's warbler	*Oporornis tolmiei*	Y	r. m	P @ Cushenbury Springs; P @ project

Table 18. San Bernardino National Forest Watchlist Animals and the Likelihood of Occurrence in Areas Expected to be Affected by the MCC Project				
Common	**Latin**	**District Record [1]**	**Habitat [2]**	**OCCURS IN/ NEAR ANALYSIS AREA [1]**
common yellowthroat	*Geothlypis trichas*	Y	r	Y @ Cushenbury Springs; U @ project
Wilson's warbler	*Wilsonia pusilla*	Y	r	Y @ Cushenbury Springs; P @ project
yellow-breasted chat	*Icteria virens*	P	r	Y @ Cushenbury Springs; U @ project
hepatic tanager	*Piranga flava*	Y	wo	P
summer tanager	*Piranga rubra*	Y	r	Y @ Cushenbury Springs; U @ project
southern California rufous-crowned sparrow	*Aimophila ruficeps canescens*	Y	c	U
Black-chinned sparrow	*Spizella atrogularis*	Y	c, wo, d	Y
Bell's sparrow	*Artemisiospiza belli*	Y	c	N
Lincoln's sparrow	*Melospiza lincolnii*	Y	r, mc, wo	P @ Cushenbury Springs; P @ project
tri-colored blackbird	*Agelaius tricolor*	Y	r, m	Y @ Cushenbury Springs; U @ project
Lawrence's goldfinch	*Carduelis lawrencei*	Y	r, c	P
western small-footed myotis	*Myotis ciliolabrum*	Y	wo, r, mc; roosts in cliffs, talus, rocks, mines, burrows, cavities, under bark, bridges, buildings	P; Y @ North Slope
long-eared myotis	*Myotis evotis*	Y	c, wo, mc; roosts in buildings, tree cavities, under bark, bridges, caves, mines, cliffs	P; Y@ North Slope
little brown myotis	*Myotis lucifugus*	Y	c, m, g, wo; roosts in buildings, trees, under rocks/wood, caves, mines	Y @ Cushenbury Springs; P @ project; Y @ North Slope
long-legged myotis	*Myotis volans*	Y	wo, mc, c; roosts in rock crevices, buildings, under bark, snags, mines, caves.	Y @ Cushenbury Springs; P @ project; Y @ North Slope
Yuma myotis	*Myotis yumanensis*	Y	d, wo; roosts in buildings, mines, caves, crevices, under bridges	Y @ Cushenbury Springs; P @ project; Y@ North Slope
spotted bat	*Euderma maculatum*	Y	d, rk; preferred roost is cliffs/rock crevices, caves, buildings.	P; Y@ North Slope
pocketed free-tailed bat	*Nyctinomops femorosaccus*	L	wo (pj), d; roost in cliffs/rock crevices	Y @ Cushenbury Springs; P @ project

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Common	**Latin**	**District Record [1]**	**Habitat [2]**	**OCCURS IN/ NEAR ANALYSIS AREA [1]**
western bonneted bat	*Eumops perotis californicus*	Y	mc, wo, c, g, d, u; roosts in cliff faces, tall buildings, trees, tunnels	Y @ Cushenbury Springs; P @ project
San Diego black-tailed jackrabbit	*Lepus californicus bennettii*	N	c, wo	N – outside known distribution
lodgepole chipmunk	*Tamias speciosus*	Y	mc	P
golden-mantled ground squirrel	*Spermophilus lateralis bernardinus*	Y	mc, rk	P
San Diego pocket mouse	*Chaetodipus fallax*	Y	d, c	Y @ Cushenbury Springs; P @ analysis area
southern grasshopper mouse	*Onychomys torridus ramona*	Y	d, c	Y @ Cushenbury Springs; P @ analysis area
San Diego desert woodrat	*Neotoma lepida intermedia*	Y	d, c, rk	Y
porcupine	*Erethizon dorsatum*	Y	mc, wo	P
ringtail	*Bassariscus astutus*	Y	mc, wo, rk, r	Y
American badger	*Taxidea taxus*	Y	wo, mc, c, d, g	P
western spotted skunk	*Spilogale gracilis*	Y	mc, wo, r, c	P
mountain lion	*Felis concolor*	Y	mc, wo, c, d	Y
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	Y	c, d, rk, wo (pj), mc	Y

[1] *Occurrence Information:*
Y = Species is known to occur.
P = Occurrence of the species is possible; suitable habitat exists, and/or the species is known from nearby locations.
B = Species is known or likely to nest in the area.
M = The species uses the area during migration as a stopover.
H = Part of the historical range but the species has been extirpated.
U = Occurrence of the species is unlikely based on habitat present.
N = Outside known distribution/range of the species.

[2] *HABITAT TYPES/HABITAT COMPONENTS*
a = aerial; usually seen in flight, often over several habitat types
r = riparian (streamside thickets and woodlands)
g = grasslands, fields, and agricultural areas
m = marshes, meadows; both freshwater areas and moist meadows
c = chaparral and coastal sage scrub
wo = woodlands; pinyon-juniper, oaks
mc = mixed conifer forests; Jeffrey pine, ponderosa pine, bigcone Douglas fir, coulter pine, sugar pine, white fir overstory
d = desert; Joshua tree woodlands, creosote bush scrub, blackbrush scrub
aq = aquatic; lakes, reservoirs, ponds, vernal pools/puddles
u = urbanized areas
w = washes and alluvial fans
rk = cliffs and rocky outcrops
s = snags and cavities

The species shown as "Unlikely" are considered unlikely to occur in the analysis area for a variety of factors including: 1) the analysis area is outside the currently-known distribution or range of the species; 2) the analysis area does not support suitable habitat in general terms (*e.g.,* vegetation types) or specifically (*e.g.,* host plant, nesting substrate, etc.); 3) the nearest occurrences of the species are not connected by suitable habitat and the species is not likely to be able to move into the project area; and/or, 4) the species is so rare and in such low densities that occurrence is very unlikely.

Complete species accounts for the Watchlist species discussed below are contained in the LMP (**USFS 2006**) or project file and are incorporated by reference. The species accounts are summarized below. See the complete species accounts for more details and literature citations.

See the existing environment described in **Part II-2.0** and the effects analyses common to wildlife species/habitats in **Part II-3.0**. The following species and site-specific evaluations tier to those discussions.

<u>V-2.3.1 –Invertebrate SBNF Watchlist Species</u>

There are five Watchlist invertebrates that are known from or have potential to occur in the analysis area: springsnails, simple hydroporus diving beetle, San Bernardino Mountains silk moth, Andrew's marble butterfly, and desert monkey grasshopper.

<u>V-2.3.1.1 - Springsnails (Pyrgulopsis sp.)</u>

Springsnails are a SBNF Watchlist species. Springsnails are a diverse group of freshwater gastropods. Many of the species in this genus are at risk of extinction. There is a very high rate of endemism with many of the ~120 species occurring in isolated springs and seeps (**Hurt 2004**).

No surveys for springsnails have been conducted on the SBNF. There is a high probability that there are endemic springsnails in many of the springs and seeps in the San Bernardino Mountains. Suitable habitat for springsnails (*Pyrgulopsis* sp.) likely exists at Cushenbury Springs and parts of Marble Canyon. See **Part II-3.2.7** for a discussion of the potential effects to riparian zones, including suitable habitat for this species, as a result of the proposed project.

<u>V-2.3.1.2 Simple Hydroporus Diving Beetle (Hydroporus simplex)</u>

The simple hydroporus diving beetle is a SBNF Watchlist species. NatureServe lists this species as G1-Critically Imperiled. Little is known about this species. Occurrences are from shallow water but habitat type is not known. It may be found in creeks, lakes, or ponds. It is probably adapted to use microhabitat in shallow edge areas (Natureserve.org). There is a 1983 record for this species in the Holcomb Valley area south of the analysis area (CNDDB). This species may occur at Cushenbury Springs. See **Part II-3.2.7** for a discussion of the potential effects to Cushenbury Springs as a result of the proposed project.

<u>V-2.3.1.3 Desert Monkey Grasshopper (Psychomastax deserticola)</u>

The desert monkey grasshopper is a Federal Species of Concern (formerly known as USFWS Candidate species), a SBNF Watchlist species, and a State Special Status Animal (S1.2: Threatened). Desert monkey grasshopper is known only from Cushenbury Canyon on the northern edge of the San Bernardino Mountains. The type locality for desert monkey grasshopper is Cushenbury Ranch, which is about one mile north of National Forest System lands boundary. The area is now known as Cushenbury Springs. The species is also reported from Cactus Flat on the SBNF. The elevation range appears to be between 4,000 feet (Cushenbury Springs) and 6,000 feet (Cactus Flat).

The desert monkey grasshopper is described as occurring in arid environments, and chamise (*Adenostoma fasciculatum*) has been identified as a possible food plant. The vegetation at Cactus Flat and Cushenbury Canyon is primarily pinyon/juniper woodland with Joshua tree subdominants transitioning down into blackbrush scrub. Common plant species include antelope bush (*Purshia tridentata*), Mormon tea (*Ephedra nevedensis*), desert apricot (*Prunus fremontii*), Mohave yucca (*Yucca schidigera), Coleogyne ramosissima*, *Nolina biglovii*, and Tucker's oak (*Quercus john-tuckeri*). No chamise is present anywhere on the desert side of the mountains. The closest chamise is found in the cismontane chaparral on the south slopes of the San Bernardino Mountains. There is either a misidentification of the host or the location is incorrect; misidentification is most likely.

Adults have been reportedly collected from only one plant, chamise, which is its suspected food plant. Further investigation is required to resolve this discrepancy. Most likely, the correct host plant was antelope bush (*Purshia tridentata*) or blackbrush (*Coleogyne ramosissimsa)*.

There is no information on the early life stages or typical periods of activity of desert monkey grasshopper or on typical periods of activity. Adults have been collected between August 22 and 31. (Source: **USFS 2006** LMP species accounts)

Desert monkey grasshoppers are known from the Cushenbury Springs and Cactus Flats areas and are likely to occur throughout the analysis area. All of the suitable habitat for desert monkey grasshoppers that occurs in the quarry and haul road footprints would be lost completely. If this species occurs on the mitigation parcels (the mitigation claims in Cushenbury Canyon have a high potential), the habitat would be protected into the future. The loss of suitable (presumed occupied) habitat at the quarry and haul road sites may fragment habitat and occurrences of this species. The maintenance and use of the haul road may also result in death or injury of grasshoppers.

V-2.3.1.4 San Bernardino Mountains Silk Moth (Coloradia velda)

San Bernardino Mountains silk moth has been identified by the Forest Service as a species with a local viability concern (**Stephenson and Calcarone 1999**) and is a SBNF Watchlist species. The type locality for San Bernardino Mountains silk moth, also known as the velda pinemoth, is at Coxey Meadow at elevations of 5,600 feet on the north side of the San Bernardino Mountains. The species has also been collected at elevations of 5,600–6,400 feet at Horse Springs, Crab Flat, Cactus Flat, and Barton Flats.

San Bernardino Mountains silk moth is most commonly found in stands of pinyon pine (*Pinus monophylla*), the larval host plant, above elevations of 4,593 feet. It has also been collected in Jeffrey pine (*Pinus jeffreyi*), although in much smaller numbers. Larvae feed primarily on the leaves of the pinyon pine, although larvae above the first instar have also been collected on, and presumably eat, Jeffrey pine. Adults do not feed.

Adult moths emerge from the pupal case between 9:30 a.m. and 11 a.m. The remainder of the day is spent inflating their wings in preparation for flight that night. Females attract males through the use of pheromones that they emit when it becomes dark. Like many species in the family *Saturniidae*, females remain in one place while the male homes in on her pheromone signal. The flight period lasts from June to the end of July.

This species is known from Cactus Flat in pinyon/juniper habitat and may occur in similar habitat in the project area. It has a high likelihood of occurring in the project area. It likely occurs in the Cushenbury Canyon mitigation claim that would be protected from future mining. There would be some habitat losses in the newly-cleared areas and the operations may result in death or injury of individual moths.

V-2.3.1.5 Andrew's Marble Butterfly (Euchloe hyanitis andrewsi)

Andrew's marble butterfly is a subspecies of the widely-distributed California marble butterfly. It is a SBNF Watchlist species and a State Special Status Animal (S1: Fewer than six occurrences, 1000 individuals, or 2000 acres). It is a federal species of concern (previously USFWS Candidate species). Andrew's marble butterfly is endemic to the San Bernardino Mountains. It is found at elevations of 5,000 to 7,000 feet near Lake Arrowhead and Big Bear Lake and in other locations across the crest and the North Slope. Records include Baldwin Lake, Sugarloaf Mountain, and Wild Horse Meadow. Forty to eighty percent of known occurrences are estimated to be located on the SBNF.

Andrew's marble butterfly is found primarily in pine and mixed conifer forests. All of the larval host plants for this species are members of the mustard family. The hosts are found in different habitat types: *Thelypodium stenopetalum* is found in wet meadows; *Boechera reflexa (*formerly treated as *Arabis holboelii* var. *pinetorum)* is found in dry openings in conifer and mixed conifer forests; and *Streptanthus bernardinus* is found in openings in chaparral and various conifer forest types, often in disturbed areas, as well as in shaded or mesic sites near springs and seeps. Because of this, it appears that this butterfly species focuses on plant type (mustard family) rather than habitat type. *Streptanthus bernardinus* and *Thelypodium stenopetalum* are the main larval food plants. *Boechera reflexa* is used, but probably to a lesser extent. The larvae also eat seedpods of the mountain tansy mustard (*Descurainia richardsonii*). (Source: **USFS 2006** LMP species accounts)

While *Streptanthus bernardinus* does not occur in the project or mitigation parcel area, other members of the mustard family that may be host plants occur at the project area and mitigation parcels. *Boechera reflexa*, in addition to other *Boechera* species, is present in the analysis area and the mitigation parcels. Plant species closely related to *Streptanthus bernardinus* (including *Caulanthus major*) occur in the project and mitigation areas.

Andrew's marble butterfly may occur in the project and analysis area. It is expected that any host plants growing in the quarry or haul road footprints would be lost completely for the long-term. As such, some habitat for this species would be eliminated. Additionally, host plants along the haul road could be affected by through use and maintenance over the life of the project. Host plants in the mitigation parcels would be protected from future losses if the parcels are withdrawn from future mineral entry. Individual Andrew's marble butterflies may also be killed or injured as a result of the operations.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

V-2.3.2 – SBNF Watchlist Amphibians

Two Watchlist amphibians have the potential to occur in the vicinity of the SQ project area: Monterey ensatina and red-spotted toad.

V-2.3.2.1 Monterey Ensatina (Ensatina eschscholtzii eschscholtzii)

Monterey ensatina has been identified by the Forest Service as a species of local viability concern (**Stephenson and Calcarone 1999**) and is a SBNF Watchlist species.

Ensatina is a geographically and genetically variable taxon that has traditionally been treated as a single species with seven recognized subspecies, including both blotched and unblotched color forms. Three subspecies of *Ensatina* occur in the mountains of southern California, and their evolutionary relationships and taxonomic status have received considerable scientific attention.

There is a "hybrid swarm" for *Ensatina* in the San Bernardino Mountains where Monterey, yellow-blotched, and large-blotched ensatina hybridize. The genetics for these three species is yet to be resolved (**Stebbins and McGinnis 2012**).

Monterey salamanders are most common in oak woodlands with extensive leaf litter and downed wood; however, they occupy a wide variety of other habitats as well. They have been found at elevations above 6,100 feet.

Colonies of *Ensatina* salamanders seem best developed in marginal belts between dense and sparse vegetation-that is, in "edge" situations. Downed logs, leaf litter, and woody debris appear to be important habitat elements. Populations of *Ensatinas* in drier regions of southern California primarily occur on north-facing slopes of deep canyons and in other microhabitats that provide cool, moist conditions. *Ensatinas* are frequently found near streams where soils are relatively moist, or in shaded, moist habitats where there is good canopy cover.

The species is nocturnal and difficult to see near the surface, so it could be more widespread than current data suggest. Juveniles and adults are most active when the ground is wet and temperatures are moderate. *Ensatina* remain underground throughout the dry summer in most areas of their range and can tolerate substantial dehydration. During dry weather, they tend to frequent holes in the ground such as rodent burrows, rotted-out root channels, and openings among rocks. Except in areas where severe winter weather occurs, *Ensatina* emerge with the first rains of autumn and are active on the ground through spring. Surface activity is highest immediately following rains and continues while temperature and moisture conditions are favorable. *Ensatina* are commonly found in areas with considerable leaf litter. This litter serves as an insulating blanket to help conserve moisture and to buffer temperature fluctuations.

Insects, spiders, crustaceans, and earthworms that occur in and beneath the leaf litter serve as food for these salamanders. Most feeding occurs above ground when the surface is damp and temperatures are not too high. (Source: **USFS 2006** LMP)

Monterey ensatinas are known from the North Slope north near Lake Silverwood (**Goodward pers. comm. 2013)**. While not known from the project vicinity, the North Slope is within the known distribution (http://www.californiaherps.com/salamanders/pages/e.e.eschscholtzii. html) and the large/yellow blotched subspecies of ensatina is known from the North Slope (suggesting that suitable habitat exists for Monterey salamander).

They are unlikely to occur within the footprint of the expansion area but may occur in Marble Canyon and Cushenbury Springs. See the large/yellow-blotched ensatinas in the Sensitive species section in **Part IV-2.3.1** of this document for a discussion of potential effects.

V-2.3.2.2 Red-Spotted Toad (Anaxyrus punctatus)

The red-spotted toad is a SBNF Watchlist species. Red-spotted toads are found in arid and semi-arid regions. Their habitats include desert succulent shrub, desert scrub, alkali scrub, desert wash, juniper woodlands, desert riparian, and Joshua tree and palm tree oases. They are found near rocky areas, associated with spring seeps, intermittent streams, and cattle tanks. Red-spotted toads prefer rocky areas where they can hide in crevices and under rocks. Red-spotted toads eat a variety of invertebrates.

In southern California deserts, they breed April to June. The duration of the breeding period depends on water availability. Males move to a breeding site and call from various locations (shallow water, dry land, exposed rocks, from under rocks, or in burrows). They lay eggs singly in the water with clutches containing a few to as many as 5000 eggs. Tadpoles metamorphose after about eight weeks. Red-spotted toads are primarily nocturnal, but may be diurnal during breeding. They become dormant in burrows when temperatures are below 65^{o} F. (Sources: http://www.californiaherps.com/frogs/pages/b.punctatus.html; https://nrm.dfg.ca.gov/FileHandlerashx?DocumentID=1486&inline=1).

Red-spotted toads are known from the northeastern slopes of the San Bernardino Mountains and from the northern slopes of the San Gabriel Mountains. It may occur in between.

They are unlikely to occur within the footprint of the quarry and haul road but may occur in Marble Canyon and Cushenbury Springs. It may also occur in artificial water sources at the Mitsubishi operations that have been created for wildlife. The study done for this project did not predict a change in surface water at Cushenbury Springs due to the increased extraction of water. As such, no effects to this species or habitat quality/quantity would be expected from water extraction. There may be some other effects to habitat conditions in Marble Canyon (*e.g.,* rock deposition from roll down, etc.) and ongoing baseline effects at Cushenbury Springs (*e.g.,* road, well, and pipeline maintenance).

V-2.3.3 – SBNF Watchlist Reptiles

There are seven Watchlist reptiles that are known to occur in the analysis area or have the potential due to suitable habitat being present: common chuckwalla, western zebra-tail lizard, desert night lizard, collared lizard, coast patch-nosed snake, mountain garter snake, and southwestern speckled rattlesnake. The effects for Watchlist reptiles are similar and discussed together after the life history and occurrence information for each species.

V-2.3.3.1 Common Chuckwalla (Sauromalus ater)

The common chuckwalla is a SBNF Watchlist species. The common chuckwalla is a large, flat-bodied lizard with a rounded belly and wide blunt-tipped tail. Chuckwallas are found from sea level to 4600 feet. Creosote bush is the primary vegetation associated with their rock piles. They are found in a variety of desert woodland and scrub habitats but are most frequently associated with, and reach their highest densities, in creosote communities. It is restricted to areas with large rocks, boulder piles, or large rock outcrops on slopes. It is diurnal and lives in in rock crevices and under rocks. Chuckwallas also use rock outcrops and boulders for basking.

Chuckwallas are most active spring through fall. They retreat to deep rock crevices and become inactive during extreme cold and hot periods. When disturbed, a chuckwalla will retreat into a rock crevice, inflating its body with air and using its strong claws and rough skin to tightly wedge itself into the crevice to make extraction difficult. The chuckwalla is herbivorous, feeding on flowers, fruits and leaves of creosote and, to a lesser extent, on other perennials and annuals. They do not require water. They breed between April and June, laying 6-13 eggs in sandy, friable well-drained soil. (Sources: http://www.californiaherps.com/; http://www.dfg.ca.gov/biogeodata/cwhr).

Chuckwallas are known from the Mitsubishi area; the analysis area is considered occupied by this species.

V-2.3.3.2 Western Zebra-Tailed Lizard (Callisaurus draconoides rhodostictusis)

The western zebra-tailed lizard is a SBNF Watchlist species. The western zebra-tailed lizard is a pale thin lizard with long legs and a long flat tail and can run extremely fast. It is found in the Mojave and Colorado deserts up to the desert slopes of the Transverse and Peninsular mountain ranges up to 5000 feet. They frequent sandy and gravelly desert flats, washes and alluvial plains in a variety of desert woodland and scrub habitats. They occasionally occur in rocky areas, but seem to prefer flats dominated by scrub vegetation. They are opportunistic carnivores that wait for prey to get close. These lizards eat insects, insect larvae, spiders, lizards, shed lizard skin, and leaves and flowers. Zebra-tailed lizards lay eggs in sandy soils in June and may have as many as five clutches/year in years with greater than average rainfall. They burrow into sand for the night and usually seek daytime shelter in the shade of bushes.

This lizard is diurnal, rising early, usually before other species and remaining active throughout the day in all but the hottest weather. During the hottest times of day, lizards may stand alternately on two legs in the shade of bushes or climb into the bushes to avoid the heat of the substrate. This species is one of the first to emerge in the spring and remains active through the summer. They are active from February through October but spend most of their waking hours sedentary. (Sources: http://www.californiaherps.com; http://www.dfg.ca.gov/biogeodata/cwhr; **Jones and Lovich 2009**).

Zebra-tailed lizards are known from the North Slope north of Deep Creek (**NRIS record**), at Omya's White Knob project area (**Lilburn 2013**), and from other sites on the North Slope (**G. Braden, pers. comm. 2013**). This species is likely to occur in the analysis area.

V-2.3.3.3 Mojave Black-Collared Lizard (Crotaphytus bicinctores)

The black-collared lizard is a SBNF Watchlist species. The Mojave black-collared lizard is a large lizard with a broad head and narrow neck marked by a pair of distinctive black bands. It is generally restricted to areas with rocky substrates, slopes, gullies, washes, canyons, and sometimes rock piles, although occasionally can be found up to a mile from extensive rocky habitat. It is most common in desert succulent shrub, desert scrub, and desert wash habitats. The Mojave black-collared lizard occupies slopes, rock outcrops, gullies, washes and other areas with small vertical perches. It often sits on rock perches and watches for prey, predators, or perhaps conspecifics. This lizard is active in the spring and summer and to a lesser extent in the early fall. It hibernates in winter.

Collared lizards retreat to holes, burrows, and rocky crevices for shelter. They forage on the ground, usually near rock piles, eating insects, spiders, small lizards and snakes, and leaves and flowers. This species prefers rocky areas and seeks cover under rocks and in cracks and crevices and rodent holes, occasionally bounding bi-pedally from stone to stone when disturbed. This diurnal collared lizard is very tolerant of extreme heat. The species lays eggs and presumably constructs its own nest but there are no reports. Friable, well-drained soil is probably required for nesting. (Sources: http://www.californiaherps.com; http://www.dfg.ca.gov/biogeodata/cwhr).

Collared lizards are known in and near the analysis area (**White 2000, MacKay and Thomas 2008, White 2012**) and in the mitigation parcels (SBNF records).

V-2.3.3.4 Desert Night Lizard (Xantusia vigilis)

The desert night lizard is a SBNF Watchlist species. The desert night lizard is a small thin lizard with soft skin and fine scales. It is found throughout the Mojave Desert. Desert night lizards are most common in Joshua tree and desert scrub habitats. They are secretive and spend most of their time under yucca logs and other cover. They are found between 990 and 6800 feet in elevation. They eat small invertebrates (ants, termites, beetles, caterpillars, crickets, spiders, etc.) inhabiting decaying vegetation. These lizards probably do not require water. These diurnal lizards breed in late spring. The young are borne live in August to October with 1-3 young/brood. (Sources: http://www.californiaherps.com; http://www.dfg.ca.gov/biogeodata/cwhr).

This species is known from Cushenbury Springs (**Kielhold 1993**) and Cactus Flats (**SBNF records**). The proposed quarry and haul road locations have suitable habitat for this species and it likely occurs.

V-2.3.3.5 Coast Patch-Nosed Snake (Salvadora hexalepis virgultea)

Coast patch-nosed snakes are a CDFW Species of Special Concern, a Federal Species of Concern (formerly known as USFWS Candidate species), and a SBNF Watchlist species. The coast patch-nosed snake prefers coastal sage scrub and chaparral habitats. Habitat selection is closely related to the presence of the species' primary prey, whiptail lizards (*Cnemidophorus spp*.), and the presence of refuge and overwinter sites provided by ground squirrels or other burrowing mammals. Coast patch-nosed snakes seem to require at least a low shrub structure of minimum density; it is not found in habitats lacking this habitat characteristic. Patch-nosed snakes are found up to 7000 feet in elevation.

Western patch-nosed snakes mate between April and June, and gravid females have been observed in the field May–August. This species typically lays one clutch of four to ten eggs, with an average clutch size of five to six. Incubation of eggs requires approximately 85 days. The hatchlings emerge in late summer. Adult coast patch-nosed snakes have been observed emerging from overwintering sites in March and returning to overwintering sites in October. Western patch-nosed snake is normally active in spring and early summer with the greatest activity occurring May–June. However, this species may be active all year in southern California during mild to warm years.

This snake is diurnal and has been observed throughout the day during the milder months of spring. In summer, this activity pattern becomes bimodal (a primary peak in late morning and a secondary peak in late afternoon), and it is suggested that this behavior corresponds roughly to the emergence interval of whiptail lizards, the major prey item. Coast patch-nosed snakes apparently remain immobile on the surface during the inactive period of the day.

Coast patch-nosed snake seems to be a broad generalist in its diet and an opportunistic feeder. It probably eats anything it can overpower, including small mammals (*e.g.*, kangaroo rats [*Dipodomys spp.]),* lizards (*Cnemidophorus spp., Coleonyx spp.),* and the eggs of lizards and snakes. (Sources: http://www.dfg.ca.gov/biogeodata/cwhr; **USFS 2006** LMP species accounts).

Patch-nosed snakes are known from the San Bernardino Mountains – the closest known record is about 9 miles to the west at approximately 5600 feet. It is not known if that record was the coast subspecies. The project area is at the margin of the known distribution for this subspecies. This subspecies may occur in the analysis area.

V-2.3.3.6 Mountain Garter Snake (*Thamnophis elegans elegans*)

The mountain garter snake has been identified by the Forest Service as a species of local viability concern (**Stephenson and Calcarone 1999**), and is a SBNF Watchlist species. The mountain garter snake occurs across the northern third of California and throughout the Sierra Nevada. An isolated population occurs in the high elevations of the San Bernardino Mountains. The isolated southern California population of mountain garter snake occurs in the San Bernardino Mountains at elevations above 4,900 feet. There is little information on the distribution and abundance of this snake in the San Bernardino Mountains.

There are records from the vicinity of Big Bear Lake and Lake Arrowhead, and the Berkeley Museum of Vertebrate Zoology lists several historic records from the vicinity of the Santa Ana

River, Fish Creek, Bear Lake, Bluff Lake, and Seven Oaks. Forest Service records and observations include: Skyforest (1971), Fawnskin, and Arrastre Creek.

Mountain garter snakes in the San Bernardino Mountains enter streams only occasionally and to occur more commonly in meadow-type vegetation and in very dry locations several miles from water.

Courtship and mating in *T. elegans* normally occur soon after spring emergence. Young are born alive, usually in secluded sites such as under the loose bark of rotting logs or in dense vegetation near pond or stream margins. A large female captured near Big Bear Lake on June 20, 1954, contained 11 eggs. A gravid female was captured going down a gopher burrow near Lake Arrowhead on July 30, 1921; this snake gave birth to four young the following October 11.

On the basis of documented behavior of red-sided garter snakes (*Thamnophis sirtalis parietalis*), this species at inland montane locations, might migrate to and from hibernacula where individuals spend the fall, winter, and early spring. *T. elegans* is an active diurnal snake. Peak activity occurs during the morning and late afternoon in mid-summer. Garter snakes have been observed to emerge from hibernacula and bask in the sun during winter. A varied diet, including beetles, toads, Pacific chorus frog, and sagebrush lizard, has been reported for this species in the San Bernardino Mountains. (Source: **USFS 2006** LMP species accounts)

Mountain garter snakes are likely to occur in the analysis area, at Cushenbury Springs, and in Marble Canyon.

V-2.3.3.7 Southwestern Speckled Rattlesnake (Crotalus mitchellii pyrrhus)

The southwestern speckled rattlesnake is a SBNF Watchlist species. The southwestern speckled rattlesnake is a heavy-bodied venomous pit viper. It is found in rocks as well as sandy areas and desert flats. It occurs in sagebrush, creosote, chaparral, cactus, and pinyon-juniper woodlands at elevations between 1000 to 7300 feet. These snakes are primarily nocturnal and crepuscular during hot periods and diurnal during moderate temperatures. They are not active during cold periods. They eat small mammals, lizards, and birds. Speckled rattlesnakes are live-bearing with 2-11 young born from July to August. They are active from mid-spring to mid-fall (Sources: http://www.californiaherps.com; http://www.dfg.ca.gov/biogeodata/cwhr; **Brown 1997**).

Speckled rattlesnakes have been documented from several locations on the North Slope, including in and near the analysis area (**R. McKernan, pers. comm. 2013**, **MacKay and Thomas 2008, White 2000, White 2012**). The analysis area has suitable habitat for this species and considered occupied.

V-2.3.3.8 Potential Effects to Watchlist Reptiles

There is a high likelihood for mortality of young and adults during initial ground clearing and construction as well as during the life of the mining operations. Death or injury of denned or hibernating individuals may occur as a result of dens and rock crevices being compacted or shifted during construction and mining activities. Additionally, these slow-moving reptiles are susceptible to being run over by mine equipment and vehicles during construction and mining operations. See **Part II-3.2.8** for a discussion of the effects of disturbance.

Any currently suitable or occupied habitat that would become haul road or quarry would become unsuitable for these species; over time, approximately 134 acres (Alternative 2) to 154 acres (Alternative 1) of habitat would become unsuitable for reptiles. During the life of the mining operation (40-120 years), Watchlist reptiles inhabiting the areas around the quarry and haul road would experience high levels of disturbance. This may cause temporary displacement, behavioral changes, or displacement.

After mining has been completed at each quarry bench, and where vegetation becomes re-established, special status reptiles may recolonize. The mitigation package for all alternatives includes relinquishment of 540 acres of claims, including areas that are suitable for the Watchlist species discussed above. As a result, those areas would be protected from future mining, providing habitat for Watchlist reptiles into the future.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

V-2.3.4 – SBNF Watchlist Birds

Table 19 lists the SBNF Watchlist bird species that were observed in the analysis area or have high likelihood of occurrence based on habitat (Forest Service records and survey observations, SBNF "All Species" GIS layer; SBCM records, CNDDB).

California Partners in Flight "Bird Conservation Plans" were also used to assess potential for species and effects (**CALPif 2002 and 2004**). Species accounts from the LMP (**USFS 2006**) contain detailed information about life history, habitat needs, status, and threats. Those full species accounts are incorporated by reference**.** For the potential effects discussions below, most of the species are grouped by primary habitat associations. Golden eagle is discussed separately due to higher levels of protection and management efforts.

Table 19. Summary of Breeding for SBNF Watchlist Birds in MCC's Proposed South Quarry

Common Name	**Occurs In/ Near Analysis area [1]**	**Regular Breeder [2]**
turkey vulture (breeding)	P	N
northern harrier	P	Y
sharp-shinned hawk (breeding)	Y@ Cushenbury Springs (migrant)	Y
Cooper's hawk (breeding)	Y @ Cushenbury Springs	Y
ferruginous hawk	P (migration; not nesting)	N
golden eagle	Y	Y
American peregrine falcon	P	Y
prairie falcon	Y (Records from Cushenbury Springs; Burnt Flat, Breeding @Deep Canyon, Dry Canyon, Crystal Creek)	Y

Table 19. Summary of Breeding for SBNF Watchlist Birds in MCC's Proposed South Quarry		
Common Name	**Occurs In/ Near Analysis area [1]**	**Regular Breeder [2]**
western screech owl	P in analysis area; Y@ Cushenbury Springs	Y
northern pygmy owl	P	Y
long-eared owl	Y @ Cushenbury Springs; P in analysis area	Y
northern saw-whet owl	P	Y
common nighthawk	P	Y
Mexican whip-poor-will	P	Y
calliope hummingbird	P @ Cushenbury Springs	Y
Nuttall's woodpecker	P @ analysis area; Y @ Cushenbury Springs (breeding)	Y
gray flycatcher	Y@ Cushenbury Springs (migrant)	Y
loggerhead shrike	P@ analysis area; Y@ Cushenbury Springs	Y
plumbeous vireo	P	Y
Cassin's vireo	P	Y
warbling vireo	Y@ Cushenbury Springs	Y
pinyon jay	Y@ Cushenbury Springs (migrant)	Y
California horned lark (breeding)	Y@ Cushenbury Springs (breeding)	Y
tree swallow	Y@ Cushenbury Springs (migrant)	Y
Swainson's thrush	Y@ Cushenbury Springs	N
hermit thrush (breeding)	Y @ Cushenbury Springs (migrant)	Y
Bendire's thrasher	P	N
LeConte's thrasher	Y@ Cushenbury Springs (breeding)	N
Virginia's warbler (breeding)	P@ Cushenbury Springs	N
yellow warbler	Y@ Cushenbury Springs (breeding)	Y
MacGillivray's warbler	P@ Cushenbury Springs	Y
common yellowthroat	Y@ Cushenbury Springs	Y
Wilson's warbler	Y@ Cushenbury Springs	Y
yellow-breasted chat	Y@ Cushenbury Springs	Y
hepatic tanager	P	Y
summer tanager	Y @ Cushenbury Springs	Y
Black-chinned sparrow	Y	Y
Lincoln's sparrow	P @ Cushenbury Springs	Y
tri-colored blackbird	Y @ Cushenbury Springs	N
Lawrence's goldfinch	P @ Cushenbury Springs	Y

[1] *Occurrence Information:*
Y = Species is known to occur.
P = Occurrence of the species is probable; suitable habitat exists, and the species is known from nearby locations.
U = Occurrence of the species is unlikely based on habitat present.
H = Part of the historical range but the species has been extirpated.
N = Outside known distribution/range of the species.

[2] *Breeding records for San Bernardino Mountains from the San Bernardino County Museum (Field Checklist – Sept 1995) were used to evaluate breeding potential.* See **Appendix A** for sighting records.

V-2.3.4.1 Turkey Vulture (Cathartes aura)

Breeding turkey vultures are a SBNF Watchlist species due to lack of breeding in southern California. In southern California, turkey vultures breed very locally in lowland, foothill, and mid-elevation habitats away from suburban/urban areas. In the west, they primarily nest in caves, protected rocky outcrops, or hollow logs, and sometimes in dense scrub. Large trees or cliff faces are required for roost sites because vultures need sufficient room for takeoff and sufficient protection from nocturnal predators. Turkey vultures exhibit strong fidelity to nest sites, returning year after year.

They migrate annually to the neotropics. Turkey vultures primarily feed on carrion but sometimes will kill and eat injured or weak animals. Turkey vultures are highly social and often roost together in large flocks. They form large communal night roosts during migration and on their wintering grounds. They often forage together and use visual cues to detect other vultures' discovery of prey. Flocks are commonly observed riding thermals. They primarily forage individually on carcasses, with others waiting nearby for their turn.

More information is needed to assess the current population status and distribution of breeding turkey vultures in southern California to confirm suspected declines. The decline of the turkey vulture breeding population in coastal San Diego County may have been caused by "loss of habitat from urban and agricultural development". Turkey vultures are susceptible to poisoning campaigns to control predators on livestock and have often been shot or trapped by ranchers throughout the west. They are also vulnerable to toxins, such as pesticides, that they ingest with their prey. They are highly sensitive at their nest sites and may abandon nests if disturbed. (Source: **USFS 2006** LMP Species Accounts)

Turkey vultures are known to forage in the analysis area during the summer and migration (**Kielhold 1993, White 2000**). While there are no records for nesting turkey vultures on the North Slope, suitable nesting habitat exists and nesting may be occurring. There is the potential that over the life of the project (40-120 years), turkey vultures could nest on the North Slope, including in the vicinity of the SQ. Both foraging habitat and suitable nest sites would be affected by either alternative. The mitigation parcels have suitable foraging habitat and some suitable nesting sites that would be protected from future mining.

V-2.3.4.2 Northern Harrier (Circus cyaneus)

The northern harrier is a SBNF Watchlist species and a CDFW Species of Special Concern. Northern harriers occur from annual grassland up to lodgepole pine and alpine meadow habitats, as high as 10,000 ft. They breed from sea level 5700 feet in the Central Valley and Sierra Nevada, and up to 3600 feet in northeastern California. This species frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas.

Harriers feed mostly on voles and other small mammals, birds, frogs, small reptiles, crustaceans, insects, and, rarely on fish. They make low, quartering flights 3-30 feet above open ground. They dive from flight or hover; rarely perches and pounces on prey.

Northern harriers typically roost on the ground. They also nest on the ground in shrubby vegetation, usually in wetlands or along rivers and lakes. They may occasionally nest in grasslands, grain fields, or on sagebrush flats several miles from water.

Harriers breed April to September, with peak activity June through July. They are single-brooded with clutches averaging 5 eggs (range 3-12). The female incubates while male provides food. The nestling period lasts about 53 days. Breeding pairs and juveniles may roost communally in late autumn and winter.

The California population of northern harriers has decreased in recent decades, but can be locally abundant where suitable habitat remains free of disturbance, especially from intensive agriculture. Destruction of wetland habitat, native grassland, and moist meadows, and burning and plowing of nesting areas during early stages of breeding cycle are major reasons for the decline. (Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx)

Northern harriers are known from the North Slope area. Northern harriers are not known to nest in the San Bernardino Mountains but foraging may occasionally occur in the analysis area.

V-2.3.4.3 Sharp-Shinned Hawk (Accipiter striatus)

The sharp-shinned hawk is a SBNF Watchlist species and a CDFW Watch species. In California, sharp-shinned hawks breed throughout the state, including the mountains of southern California, but the majority probably breed in the northern half of the state.

Sharp-shinned hawks in California typically nest in coniferous forests, often within riparian areas or on north-facing slopes. Nest stands are typically dense patches of small-diameter trees; these patches are cool, moist, and well-shaded with little groundcover. Nest stands often occur near water and are typically in close proximity to open areas. Sharp-shinned hawks are presumed to be serially monogamous. The breeding season is mid-April to mid-July, with a single clutch of four-five eggs. The nest is a large, well-built structure of twigs, typically located in a tree crotch 10–60 feet high.

Sharp-shinned hawks are partial migrants over much of their North American range. Small birds are the main food taken, followed by small mammals and, occasionally, large insects. Sharp-shinned hawks chase and attack perched or flying prey with short bursts of speed. Typically, sharp-shinned hawks remain motionless on perches, from where they can dart out to surprise prey. Sharp-shinned hawks forage in a wide variety of habitats, including forest canopy and subcanopy, shorelines, urban and suburban settings, smaller forest patches, and transitional habitats.

Sharp-shinned hawks occur regularly in winter and as a migrant throughout the mountains of southern California, but nesting has been recorded only in the northern Santa Lucia, San Gabriel, San Bernardino, and San Jacinto Mountains. It is not known if nesting occurs regularly in these mountains, although records of birds sighted during summer in the San Bernardino and San Jacinto Mountains are common enough to suggest that it does. (Source: **USFS 2006** LMP Species Account)

Sharp-shinned hawks are known from Big Bear (Forest Service records), the North Slope area, and Cushenbury Springs (**Kielhold 1993**). This species has potential to breed and forage in or near the analysis area.

V-2.3.4.4 Cooper's Hawk (Accipiter cooperii)
The Cooper's hawk is a SBNF Watchlist species and a CDFW Watchlist species. Cooper's hawks breed in a wide variety of habitat types, including deciduous, coniferous, and mixed forests; oak woodlands; deciduous riparian habitats; woodlots; and suburban and urban areas. In southern California, Cooper's hawks typically nest in riparian forests, mountain canyons, and oak woodlands. Populations in southern California are likely to be permanent, non-migratory residents, although individuals may wander widely during winter. Cooper's hawks are strictly diurnal. Breeding begins in April or May, young fledge from mid-May to late June, and dispersal begins in late July to August.

Cooper's hawks catch small birds, especially young during nesting season, and small mammals; they also take reptiles and amphibians. They hunt in broken woodland and habitat edges, catching prey in air, on ground, and in vegetation. Cooper's hawks often dashes suddenly from perch in dense cover and pursues prey in air through branches. They sometimes run prey down in dense thickets. They use cover to hide, attack, and approach prey; also soaring and making low, gliding search flights.

Breeding Bird Survey data for the last 20 years (1980 to 2000) suggest that Cooper's hawk populations in California may be declining. Habitat in the lower elevation woodlands on private land is developing rapidly. (Sources: **USFS 2006** LMP Species Accounts; http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx)

Cooper's hawks are known from the North Slope and have bred at Cushenbury Springs (**Kielhold 1993**) and in Crystal Creek in a canyon live oak tree (**Myers 1988,** CNDDB and SBNF records – 1988 at about 5400'). The analysis area supports suitable breeding and foraging habitat.

V-2.3.4.5 Ferruginous Hawk (Buteo regalis)
The ferruginous hawk is a SBNF Watchlist species and a CDFW Watchlist species. Ferruginous hawks are migratory, arriving in California in September and departing by mid-April. They breed in Oregon into Canada. There are no breeding records from California.

Ferruginous hawks frequent open grasslands, sagebrush flats, desert scrub, low foothills surrounding valleys, and fringes of pinyon-juniper habitats. This species nests in foothills or prairies; on low cliffs, buttes, cut banks, shrubs, trees, or in other elevated structures, natural or human-made. They roost in open areas, usually a lone tree or utility pole. They are tolerant of heat and sun.

When foraging, ferruginous hawks search for prey from low flights over open, treeless areas, and glides to intercept prey on the ground. They also hover and hunt from high mound perches. These hawks mostly eat lagomorphs, ground squirrels, and mice; also takes birds, reptiles, and amphibians. Ferruginous hawks require large, open tracts of grasslands, sparse shrub, or desert habitats with elevated structures for nesting. They are diurnal and active year-round. (Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx)

The analysis area supports suitable habitat for foraging by migratory ferruginous hawks. Breeding would not be expected; this species does not regularly breed in the San Bernardino Mountains.

V-2.3.4.6 American Peregrine Falcon (Falco peregrinus anatum)

The peregrine falcon is a Forest Service Sensitive species and a CDFW "fully protected" species. It is a USFWS Bird of Conservation Concern. It has been removed from the Federal and State of California's Endangered Species lists.

Peregrine falcons nest almost exclusively on protected ledges of high cliffs, primarily in woodland, forest, and coastal habitats. A very small number of nests have been found on small outcrops and in trees, and a number of reintroduced pairs nest on tall buildings. Cliffs that provide ledges, potholes, or small caves (usually with an overhang), and that are relatively inaccessible to mammalian predators, are required components of nesting habitat. Nest sites usually provide a panoramic view of open country, are near water, and are associated with a local abundance of passerine, waterfowl, or shorebird prey.

The breeding season of peregrine falcon generally begins after the winter solstice and can last until August. Courtship typically involves the male provisioning the female with food. Females normally lay two-four eggs; egg-laying in California typically occurs in March-May. Both male and female incubate the eggs for 29–33 days. In California, fledging occurs in May to July when the young are 35–54 days old. Juvenile peregrine falcons begin hunting on their own and become independent 6–15 weeks after fledging.

Peregrine falcons feed almost exclusively on birds; ranging in size from hummingbirds to Aleutian Canada geese. They typically feed on highly mobile, flocking, and colonial nesting birds, such as shorebirds, waterfowl, doves, and pigeons. Peregrine falcons chase and grab their prey, or dive down on them at speeds up to 100–200 miles per hour (*i.e.*, stooping). During the stoop, a peregrine falcon grasps its prey or strikes it with its talons and subsequently retrieves it on the ground. Peregrine falcons hunt during the day or at dusk. During the breeding season, adult peregrine falcons attack and chase other raptors away from the nest, especially golden eagles and other peregrine falcons that move through their territory. Adults hunt over a large area around the nest site; foraging may occur up to 12 miles from the nest.

Bans on the use of DDT in the 1970s and a major reintroduction program led by the CDFW and Santa Cruz Predatory Bird Research Group (SCPBRG) in California resulted in an impressive increase in the distribution and abundance of this species. The population increase was substantial enough to warrant the taxon's delisting in August 1999 from federal endangered status. (Source: **USFS 2006** LMP Species Accounts, **Pagel 2014 pers. comm.**)

The widespread use of DDT was a primary cause of the decline in peregrine falcon populations. High levels of these pesticides and their metabolites (*i.e.*, byproducts of organic decompositions) were found in the tissues of peregrine falcons, leading to thin eggshells and reproductive failure. Environmental toxins continue to be a threat. Other threats include illegal shooting, illegal falconry activities, and habitat destruction. National Forest System lands in southern California do not support a large amount of high-quality habitat for American peregrine falcon. Protecting cliff-nesting sites from human disturbance has been identified as an important conservation measure for peregrine falcons on NFS lands. (Source: **USFS 2006** LMP Species Accounts, **Pagel and Jarman 1991**)

Peregrine falcons are not currently known to nest on the North Slope. However, the number of peregrine falcon nesting territories and distribution of them in the areas in and near the San Bernardino Mountains have increased over the past decade. After decades of no nesting in the San Bernardino Mountains or eastern San Gabriel Mountains, now at least one nest is known in each area.

The North Slope, including areas that would be lost developed as the SQ and haul road, has an abundance of rocky outcrops and cliffs that are suitable peregrine falcon nest sites. With successful nesting efforts in the mountain range and increasing populations of peregrine falcons in the western U.S., it is possible that over the life of the project, this species could nest on the North Slope of the San Bernardino Mountains, including in and near the analysis area.

The proposed project would result in losses of some suitable nest sites in the quarry development, with Alternative 2 affecting fewer acres of suitable nesting sites. See discussions later in this section about golden eagles. The discussions of habitat, nest sites, and disturbance apply to peregrine falcons.

V-2.3.4.7 Prairie Falcon (Falco mexicanus)

Prairie falcons are a SBNF Watchlist species and a CDFW Watchlist species. Prairie falcons inhabit shrub-steppe desert, open desert scrub, grassland, mixed shrub-grasslands, and alpine tundra. Prairie falcon habitat typically consists of dry open terrain, either hilly or level. Nests are located on cliffs, generally in arid open areas. Desert scrub and grasslands are preferred foraging habitats in southern California. This species has declined in the coastal foothills of southern California as development has affected foraging habitat availability.

The breeding season of prairie falcons generally begins after the winter solstice and can last until August. Egg-laying typically occurs in March – May with fledging between May and July. Nests are located on cliff ledges or rock outcrops in open regions. Nests are typically scrapes located 30-40 feet high on a cliff or rock outcrop; they are occasionally found as high as 400 feet. Abandoned nests built by other birds are rarely used by prairie falcons. The female incubates a single clutch; clutches usually contain four-five eggs. Incubation lasts for approximately 29-31 days.

Prairie falcons are described as more of a wanderer than a true migrant. They move seasonally, probably in response to food availability. Most of the species' southward movements occur between late August and late October, with the main return flight taking place in early March to late April.

Primary foods taken by prairie falcons include horned larks (*Eremophila alpestris*) and other small passerines, lizards, ground squirrels (*Spermophilus* spp.), and small rodents. Prairie falcons employ two main hunting strategies: one is to flush a prey item and fly along a route meant to conceal the prairie falcon until the last moment; the other is to patrol long distances close to the ground until it may surprise its quarry. Prairie falcons defend a small area around the nest site from conspecific and other intruders. However, prairie falcons forage over large, undefended areas. (Source: **USFS 2006** LMP Species Account, **Pagel 2014 pers. comm.**)

The species is legally harvested in 19 states. Falconers legally take an estimated 0.2 percent of the prairie falcon population each year, making it the second most commonly harvested raptor in the United States. Because of prairie falcons' strong association with cliffs as nesting sites, they are especially susceptible to habitat loss adjacent to suitable nest structures. Prairie falcons can be adversely affected by large-scale agricultural development, especially in foraging areas with high densities of ground squirrels. Much of the prime foraging area for prairie falcons has been lost to in southern California and those losses are likely to continue with human population growth. (Source: **USFS 2006** LMP Species Account)

Prairie falcons are known to occur on the North Slope and adjacent SBNF lands. There is a migrant prairie falcon record at Cushenbury Spring (**Kielhold 1993**). There are several records on the North Slope (SBNF records). Two of the records are of single birds between March and July. It is not known if they were migratory or breeding birds. This species was also detected at the Mitsubishi mining area in May 2008 (**MacKay and Thomas 2008**). Nesting is suspected but has not been confirmed on the North Slope. Both suitable nesting sites and foraging habitat would be affected by the proposed project; fewer suitable nesting sites would be affected under Alternative 2 than under Alternative 1.

See discussions later in this section about golden eagles. The discussions of habitat, nest sites, and disturbance apply to prairie falcons.

V-2.3.4.8 Western Screech Owl (Otus kennicottii)

The western screech owl has been identified by the Forest Service as a local viability concern (**Stephenson and Calcarone 1999**) and a SBNF Watchlist species. Western screech owls are uncommon to common, yearlong resident of open oak, pinyon-juniper, riparian, redwood, and mixed conifer habitats. They are tolerant of humans; found in small towns, suburbs, farms, ranches, and meadows. This species occurs between sea level and 8000 feet. They perch, pounce, and stoop for mice and other small mammals, birds, fish, reptiles, amphibians, and arthropods in meadows and other openings in trees. Small birds are frequently taken in nesting season. Insects are an important food source in summer and fall. They roost and nest in abandoned woodpecker holes or other tree cavities. Western screech owls are nocturnal. They are non-migratory. (Source: **USFS 2006** LMP Species Accounts)

On the North Slope, western screech owls are known to breed at Cushenbury Springs (**Kielhold 1993**). This species is a regular breeder in the San Bernardino Mountains and could nest in or near the proposed expansion area. Suitable habitat for nesting, roosting, and foraging exists for western screech owls in the analysis area. The mitigation claims also support some suitable habitat that would be protected from future mining.

V-2.3.4.9 Northern Pygmy Owl (Glaucidium gnoma)

The northern pygmy owl has been identified by the Forest Service as a species of local viability concern (**Stephenson and Calcarone 1999**) and a SBNF Watchlist species. It is an uncommon to fairly common, yearlong resident of most forest habitats in California, especially valley foothill hardwood, mixed conifer, valley foothill riparian, and montane riparian. They are often found in canyons. It is most commonly found along edges near meadows, streams, lakes, and other openings. Northern pygmy owls are found between sea level and 0-12,000 feet.

They roost and nest in abandoned woodpecker holes or other tree cavities. They are non-migratory but may move up and down slope in winter. In contrast to other owl species, northern pygmy owls are at least partly diurnal. The main food items of northern pygmy-owl are insects, small rodents, and reptiles. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains and could nest in or near the project area. Suitable habitat for nesting, roosting, and foraging habitat for northern pygmy owls occurs in the analysis area in Jeffrey pine forest or pinyon/juniper woodlands. It is unlikely to occur in the lower portions in desert and desert transition habitats.

V-2.3.4.10 Long-Eared Owl (Asio otus)

The long-eared owl is a CDFW Species of Special Concern and a SBNF Watchlist species. Long-eared owls breed in mature live oak and riparian woodlands in coastal and foothill areas, but also occur in desert riparian, woodland, and oasis habitats. Long-eared owls may begin laying eggs in March, and most young fledge by mid-May. They tend to nest in old corvid and raptor nests and occasionally in dwarf-mistletoe brooms. Long-eared owls are active primarily during the night. Long-eared owls prey primarily on voles and mice, but will also take birds on occasion. They most often hunt at night over open grasslands and meadows.

Substantial declines in the numbers and range of long-eared owls in California have been documented. This species is known to occur in the San Bernardino Mountains. (Source: **USFS 2006** LMP Species Accounts)

Long-eared owls are a notoriously irruptive species and use a variety of nest substrates, including old raptor nests, rock caves, and outcrops (**G. Braden, pers. comm. 2013**). This species is a regular breeder in the San Bernardino Mountains and could nest in or near the proposed expansion area. On the North Slope, long-eared owls are known to breed at Cushenbury Springs (**Kielhold 1993**). Suitable habitat for nesting, roosting, and foraging habitat for long-eared owls occurs in the analysis area in Jeffrey pine forest or pinyon/juniper woodlands. It is less likely to occur in the lower portions in desert and desert transition habitats, but may occur in the drainages.

V-2.3.4.11 Northern Saw-Whet Owl (Aegolius acadicus)

The northern saw-whet owl has been identified by the Forest Service as a species of local viability concern (**Stephenson and Calcarone 1999**) and a SBNF Watchlist species. Northern saw-whet owls most commonly breed in dense oaks intermixed with conifers and in pine and fir forests that have an oak understory, although open conifer forests are occupied at higher elevations. Northern saw-whet owls are secondary cavity nesters that primarily utilize cavities excavated by woodpeckers, although they will use natural cavities or artificial nest boxes. Northern saw-whet owls are known to persist year-round on the breeding grounds, although many move south in autumn. Northern saw-whet owls exhibit yearlong nocturnal activity. The diet of northern saw-whet owl consists mainly of small rodents and occasionally small birds, frogs, and insects. Northern saw-whet owls are territorial; they proclaim territories through the exchange of vocalizations. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains and could nest in or near the project area. Suitable habitat for nesting, roosting, and foraging habitat for this species occurs in the analysis area in Jeffrey pine forest or pinyon/juniper woodlands. It is unlikely to occur in the lower portions of the analysis area in desert and desert transition habitats.

V-2.3.4.12 Common Nighthawk (Chordeiles minor)
The common nighthawk has been identified by the Forest Service as a species of local viability concern (**Stephenson and Calcarone 1999**) and a SBNF Watchlist species. Common nighthawk is a local species of concern because it is a rare breeder in southern California and there are few known nesting localities on NFS lands. In the San Bernardino Mountains, it is found near Big Bear Lake, Bluff Lake, Sugarloaf and the San Gorgonio Wilderness. It is found between 3,000 and 9,000 feet in elevation.

Common nighthawks forage over a variety of habitats, from open coniferous forest to sagebrush plains, and are frequently seen foraging over open bodies of water. In forested areas of California, common nighthawks are generally associated with white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), and lodgepole pine (*P. contorta*). Some open, gravelly substrate is required for nesting. Nesting habitat includes woodland clearings, flat gravel rooftops, clearcuts, open forest, rural fields, sagebrush and grassland habitat, beaches and coastal sand dunes, prairies and plains, and rocky outcrops. Common nighthawks typically nest on bare ground, using no gathered material. The breeding season begins late May to early April.

Common nighthawks forage by hawking flying insects. They are opportunistic feeders, taking those insects that are most abundant and most easily captured. Preferred foraging habitats include broad, open fly-ways over wet meadow, emergent wetland, lacustrine, and riverine habitats and shrub-covered valleys and plains. In addition, they often forage at lights, and over most habitats, including forests. More than fifty species of insects have been reported as common nighthawk prey.

Common nighthawks are crepuscular, with dusk flights beginning about 30 minutes before sunset and ending about 70 minutes after sunset. Dawn flights begin about an hour before sunrise and last until about 15 minutes after sunrise. The remaining hours of the day are spent roosting. Common nighthawks migrate great distances; in fact, the species follows one of the longest migration routes traveled by any North American bird. (Sources: **USFS 2006** LMP Species Accounts; http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx)

This species is a regular breeder in the San Bernardino Mountains and could nest in or near the project area. Suitable habitat for nesting, roosting, and foraging habitat for common nighthawk occurs in the analysis area and vicinity.

V-2.3.4.13 Mexican Whip-Poor-Will (Caprimulgus arizonae)
The whip-poor-will is a SBNF Watchlist species. The whip-poor-will is a rare and local summer resident in mountains of southern California. It is found in a small area of the San Bernardino Mountains around Big Bear, Heart Bar, and the Santa Ana River. In California, has been found on steep slopes in montane hardwood, montane hardwood-conifer, and mixed conifer habitats, as well as in montane riparian and pinyon-juniper habitats.

Whip-poor-wills feed on flying insects, especially moths. Insects are caught in short sallies made from the ground, or from a perch in a tree. They nest in a scrape on the ground in the litter of woodlands. They are found in sparse and dense woodlands, often on steep slopes.

Whip-poor-wills are crepuscular and nocturnal in habits. They arrive in California from Mexico and Central America by early May, and are mostly gone by mid-August. (Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx) While there are no definite nesting records for California, nesting is suspected in the Big Bear Area based on Rare Bird Alert records.

Suitable habitat for nesting, roosting, and foraging habitat for whip-poor-will occurs in the project area, analysis area, and vicinity.

V-2.3.4.14 Calliope Hummingbird (Stellula calliope)
The calliope hummingbird is a SBNF Watchlist species and has been identified by the Forest Service as a local viability concern (**Stephenson and Calcarone 1999**). Calliope hummingbirds occur primarily in montane habitats. Calliope hummingbirds generally breed along meadow borders and in streamside thickets (especially willows) within arid mixed-conifer forests.

Calliope hummingbirds are Neotropical migrants. The breeding season of the calliope hummingbird generally begins in April and lasts to August. Males arrive on the breeding grounds before females, typically in late April. Nests are usually built 10-30 feet above ground in forests adjacent to meadows and riparian zones used for foraging.

Foraging occurs in montane chaparral and wet meadow habitats where herbaceous plants are used for nectar. Calliope hummingbird eats floral nectar and small insects. Nectar sources include the typical red tubular flowers as well as a variety of plant species with white, blue, and purple flowers. Calliope hummingbird forages aerially for insects. Heavy recreation use, facilities development, and overgrazing by livestock can degrade montane riparian habitat condition. Surface water diversions, excessive erosion by roads and/or trails, and/or groundwater extraction or other hydrological changes can reduce or eliminate these habitats. (Source: **USFS 2006** LMP Species Account)

This species is a regular breeder in the San Bernardino Mountains and could nest and forage in or near the project or analysis area.

V-2.3.4.15 Nuttall's Woodpecker (Picoides nuttallii)

The Nuttall's woodpecker is a SBNF Watchlist species and a USFWS Bird of Conservation Concern. Nuttall's woodpeckers are a common, permanent resident of low-elevation riparian deciduous and oak habitats. They forage mostly in oak and riparian deciduous habitats by pecking, probing, drilling for sap, and gleaning from trunks, branches, twigs and foliage. Adult and larval insects, mostly beetles, may make up 80% of the diet. They also eat berries, poison-oak seeds, nuts, other fruits, and sap.

Nuttall's woodpeckers typically excavate a nesting cavity 2-60 feet above ground. Nests are located mostly in riparian habitat in dead (occasionally live) trunk or limb of willow, sycamore, cottonwood, or alder; rarely in oaks. They breed from late March to early July; peak activity April to early June. They are diurnal and may migrate upslope after breeding. (Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, Nuttall's woodpeckers known from Dry Canyon (**Myers 1988)**, Crystal Creek (**Myers 1988)**, Jacoby Canyon (SBNF records), and is known to breed at Cushenbury Springs (**Myers 2005, Kielhold 1993**). There is suitable foraging and breeding habitat at and near the project and analysis areas.

V-2.3.4.16 Gray Flycatcher (Empidonax wrightii)

The gray flycatcher has been identified by the Forest Service as a species of local viability concern (**Stephenson and Calcarone 1999**) and a SBNF Watchlist species. In the San Bernardino Mountains, it is found along the northern slope in areas east of Baldwin Lake and Arrastre Creek during the summer. They migrate out of the area for the winter.

In southern California, breeding gray flycatchers are primarily found in a matrix of pinyon pine (*Pinus monophylla*) and interior scrub oak (*Quercus john-tuckeri*) woodland with grassland understory, and in chaparral that includes buckbrush (*Ceanothus cuneatus*), chamise (*Adenostoma fasciculatum*), mountain mahogany (*Cercocarpus ledifolius*) and other shrubs. During the winter, gray flycatchers may be found in a variety of xeric habitats throughout southern California and, infrequently, in urban/suburban parks on the coastal plain.

Gray flycatchers take insects in flight or from the ground, foliage, tree bark, and branches. In forested habitats, they are sit-and-wait predators, perching primarily on the lowest branches of large conifers or on top of large shrubs. In open shrub habitats, they often perch on exposed dead branches and twigs of shrubs, sometimes close to ground, and often take prey from the ground.

The type conversion of some areas of pinyon and sagebrush may be affecting this species. Because of small population sizes and the relatively few numbers of breeding locations, gray flycatcher is a species of concern locally in southern California. Local increases in cattle that enhance brown-headed cowbird populations may adversely affect nesting success of gray flycatchers. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, gray flycatchers have been recorded at Cushenbury Springs (**Kielhold 1993**) and in Omya's Butterfield-Sentinel quarry area (**Myers 1988)**. The project and analysis areas and vicinity provide suitable nesting and foraging habitat for this species.

V-2.3.4.17 Loggerhead Shrike (Lanius ludovicianus)

The loggerhead shrike is a CDFW Species of Special Concern and a SBNF Watchlist species. The loggerhead shrike prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. The highest densities of loggerhead shrikes occur in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon/juniper, juniper, desert riparian, and Joshua tree habitats. This species commonly use posts, fences, and utility lines as perches. Loggerhead shrikes nest in trees and shrubs, and breeding shrikes typically use isolated trees or large shrubs.

The breeding season of loggerhead shrike generally begins in late January or early February and lasts to July. In non-migratory populations, loggerhead shrikes remain paired during the winter. Loggerhead shrike populations in southern California are non-migratory.

Loggerhead shrikes eat small- to medium-sized animals, including arthropods, birds, amphibians, reptiles, and small mammals; they also eat road-kills and carrion. Loggerhead shrikes hunt from perches such as fences, shrubs, and trees, and kill their vertebrate prey by attacking the nape and tearing the cerebral vertebrae. They often impale their prey on barbed wire and other sharp objects. Loggerhead shrikes forage primarily in the morning. Loggerhead shrikes are strongly territorial and aggressive during the breeding season. (Sources: **USFS 2006** LMP Species Accounts; http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, this species is a year-round inhabit and breeder at Cushenbury Springs (**Myers 2005; Kielhold 1993**); it is also known from Crystal Creek, Dry Canyon, and Blackhawk Mountain (**Myers 1988**), and Rose Valley (**SBNF records**). The project area, analysis area, and vicinity provide suitable nesting and foraging habitat for this species.

V-2.3.4.18 Plumbeous Vireo (Vireo plumbeus)

The plumbeous vireo has been identified by the Forest Service as a species of local viability concern (**Stephenson and Calcarone 1999**) and is a SBNF Watchlist species. Plumbeous vireos have been observed in upper Arrastre Creek on the north side of the San Bernardino Mountains. In southern California, plumbeous vireo breeds in arid woodlands of mature pinyon pine (*Pinus quadrifolia*), white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), and Jeffrey pine (*Pinus jeffreyi*), often extending into adjacent riparian growth. The plumbeous vireo apparently prefers warmer, drier forest to cool moist forest. The primary elevational range of plumbeous vireo is 3,750–8,200 feet.

Nests are generally constructed 6–15 feet high in a pine, pinyon, or juniper tree or tall shrub. Breeding season of plumbeous vireo generally begins in late May or early June and lasts through July. The plumbeous vireo takes arthropods almost exclusively during spring and fall, turning to more fruit and plant material in winter. This species is mainly a foliage- and branch-gleaning species, capturing prey items by fly-catching, hover-gleaning, and probing, mostly the outer twigs and foliage of trees and shrubs.

The plumbeous vireo is considered a partial, medium-distance migrant. Spring migration runs from mid-April to early June, peaking in May. Fall migration runs early August to mid-October, peaking in September. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, there is a record for solitary vireo (since split out into Cassin's vireo, plumbeous vireo, and blue-headed vireo) at Cushenbury Springs (**Kielhold 1993**). It may be Cassin's vireo or plumbeous vireo. Plumbeous vireos are known from Jacoby Canyon in similar pinyon/juniper habitat. There is suitable nesting and foraging habitat (pinyon woodlands) for the plumbeous vireo in and near the project and analysis areas.

V-2.3.4.19 Cassin's Vireo (Vireo cassinii)
The Cassin's vireo has been identified by the Forest Service as a species of local viability concern (**Stephenson and Calcarone 1999**) and is a SBNF Watchlist species. Cassin's vireos breed in dry, warm, forested habitats, especially in montane hardwood-conifer, montane hardwood, ponderosa pine (*Pinus ponderosa*), and Jeffrey pine (*Pinus jeffreyi*) forests. They also occur in riparian and other habitat types.

The Cassin's vireo breeding season begins in mid-May. The nest is a rounded cup built 6–15 feet off the ground. The Cassin's vireo diet comprises approximately 98% animal matter (primarily insects) and 2% plant matter. This species is mainly a foliage- and branch-gleaning species, capturing prey items by flycatching, hover-gleaning, and probing; it forages primarily on the outer twigs and foliage of trees and shrubs. Cassin's vireos take arthropods during spring and fall, and they eat mostly fruit and plant material in winter.

Cassin's vireos are migratory and only present in southern California during the breeding season. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, there is a record for solitary vireo (since split out into Cassin's vireo, plumbeous vireo, and blue-headed vireo) at Cushenbury Springs (**Kielhold 1993**). It may be Cassin's vireo or plumbeous vireo. Plumbeous vireos are known from Jacoby Canyon in similar pinyon/juniper habitat. There is suitable nesting and foraging habitat (pinyon woodlands) for the plumbeous vireo in and near the project and analysis areas.

V-2.3.4.20 Warbling Vireo (Vireo gilvus)
The Forest Service identified the warbling vireo as a riparian obligate species of concern (as defined by Partners in Flight) (**Stephenson and Calcarone 1999**) and is a SBNF Watchlist species. Warbling vireos are primarily associated with mixed deciduous woodlands along streams, lakeshores, ponds, and marshes, but also occasionally in uplands away from water or in mixed hardwood or rarely, pure conifer forests. Suitable habitat usually comprises large trees with a semi-open canopy. Warbling vireos do not appear to be area-sensitive; they often occur in habitat edges and small, isolated patches of habitat.

The breeding season of the warbling vireo is April to August. Warbling vireos are territorial on the breeding grounds. Warbling vireos migrate annually between its breeding and wintering grounds. Spring migration to the breeding grounds begins in mid-March and lasts until early June; fall migration to the wintering grounds begins in mid-August and lasts until late September. During the breeding season, warbling vireos are active primarily during the day; however, they migrate at night.

Warbling vireos forage primarily on arthropods; they also eat fruit during winter. During the breeding season, most foraging occurs within individuals' territories. Warbling vireos glean insects off twigs and leaves, most frequently in the canopy. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. The project area, analysis area and vicinity provide suitable nesting and foraging habitat for this species.

V-2.3.4.21 Pinyon Jay (Gymnorhinus cyanocephalus)

The pinyon jay has been identified by the Forest Service as a species of local viability concern (**Stephenson and Calcarone 1999**) and a SBNF Watchlist species. The pinyon jay is known to breed in the northeastern San Bernardino Mountains. In southern California, pinyon jays are found primarily in mature pinyon pine-juniper-yucca woodland on arid mountain slopes and in open montane valleys of sagebrush or grasslands bordered by pinyon pines, junipers, or yellow pines. The breeding season of the pinyon jay varies annually depending on the pine nut crop; it begins as early as February and as late as May. Pinyon jays are primarily monogamous and nest in loose colonies. Nests are often widely scattered, but two to three nests sometimes occur in the same tree.

Flocks apparently exist as separate units, with little exchange between them. They are primarily active during the day. Pine nuts, primarily from pinyon pine, make up the bulk of the pinyon jay diet. Nuts are cached in crevices or in holes dug in the ground. Pinyon jays also eat other seeds, nuts, berries, arthropods, snails, and the eggs and young of other birds. Pinyon jays are not territorial but nest in loose colonies and travel in flocks throughout the year. Pinyon jays do not migrate, but are inclined to nomadic wandering when pine nut crops fail. During cold months, they may descend to lower elevations. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains and are known from the North Slope and Cushenbury Springs (**Kielhold 1993**; **White 2010**). The project area, analysis area and vicinity provide suitable nesting and foraging habitat for this species.

V-2.3.4.22 California Horned Lark (Eremophila alpestris actia)

The California horned lark is a SBNF Watchlist species and a CDFW Watchlist species. The California horned lark is a common to abundant resident in a variety of open habitats, usually where trees and large shrubs are absent. It frequents grasslands and other open habitats with low, sparse vegetation. It mostly eats insects, snails, and spiders during breeding season; adds grass and forb seeds and other plant matter to diet at other seasons. They hunt by walking on the ground searching for food. Horned larks build grass-lined nests in cup-shaped depressions on the ground in the open. They breed from March through July. (**Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx**)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, horned larks are known from Dry Canyon (**Myers 1988**), and from Cushenbury Springs during the winter (**Myers 2005**) and breeding season (**Kielhold 1993**). The project area, analysis area and vicinity provide suitable nesting and foraging habitat for this species.

V-2.3.4.23 Tree Swallow (Tachycineta bicolor)

The tree swallow is a SBNF Watchlist species and was identified by the Forest Service as having a local viability concern (**Stephenson and Calcarone 1999**). Tree swallows are now a local and increasingly uncommon-to-rare summer resident in southern California. In southern California, tree swallows breed in lowland and foothill riparian habitats near slow moving or standing water. Tree swallows require cavities for nesting; therefore, snags with old woodpecker cavities and artificial nest boxes are important habitat components.

Tree swallows migrate annually between their breeding and wintering grounds. They migrate during the fall to the wintering grounds in Mexico, Cuba, and Central America. The breeding season of tree swallow generally begins in May and lasts to July. Males arrive on the breeding grounds and begin defending a nest cavity shortly before females arrive; pair formation occurs soon after females arrive at the breeding grounds. Nest construction typically occurs in late April–early May.

Tree swallows feed aerially, primarily on flying insects. They often forage over open water, grasslands, or behind windbreaks where concentrations of prey accumulate. Tree swallows forage up to 165 feet in the air, but often swoop down to pick up prey off water and vegetation. Their diet is approximately 80% insects (including flies, beetles, ants, damselflies, and grasshoppers) and 20% berries and seeds.

Historically, tree swallows were common breeders throughout southwestern California. However, the southern California breeding population has declined. The decline of the tree swallow breeding population in southern California is attributed to the loss of riparian habitat; selective removal of snags with cavities that serve as nesting sites; and the rapid increase in the European starling population, which has increased competition for these nesting sites. Tree swallows are also susceptible to pollutants such as PCBs and DDE. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains and it is known from the North Slope (Cushenbury Springs – **Kielhold 1993**). The quarry expansion site does not support nesting habitat but Cushenbury Springs and portions of Marble Canyon may. Foraging habitat is present in the project and analysis areas.

V-2.3.4.24 Swainson's Thrush (Catharus ustulatus oedicus)

The Swainson's thrush has been identified as a Riparian Obligate Species of Concern (as defined by Partners in Flight) (**Stephenson and Calcarone 1999**) and a SBNF Watchlist species. In southern California, breeding Swainson's thrushes are restricted to low-elevation deciduous riparian woodlands, especially with dense thickets of willow (*Salix* spp.), alder (*Alnus* spp.), and other hardwoods. The breeding season of Swainson's thrush generally begins in April and can last to August. Swainson's thrushes migrate annually between North America (breeding grounds) and the neotropics (wintering grounds). For populations that breed in southern California, spring migration from the wintering grounds begins in mid-April and lasts to late May; fall migration from the breeding grounds begins in early September and lasts to early October. Males are highly territorial during the breeding season.

The diet of the Swainson's thrush consists of berries, including elderberries (*Sambucus* spp.), blackberries (*Rubus* spp.), huckleberries (*Vaccinium* spp.), wild grape and other fruits; and insects, including beetles, caterpillars, ants, flies, grasshoppers, and true bugs. They glean insects off leaves, probe the leaf litter, hover-glean, and lunge and sally for insects. Swainson's thrushes often perch on low branches of trees and attack their prey in the leaf litter.

Riparian habitat has been affected throughout California by development, recreational use, water diversion, grazing, wildland fire, and unauthorized vehicles. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, Swainson's thrushes have been recorded at Cushenbury Springs (**Kielhold 1993**) and Jacoby Canyon (SBNF records). Nesting and foraging in the project area (haul road and quarry) is unlikely but may occur in Marble Canyon and Cushenbury Springs.

V-2.3.4.25 Hermit Thrush (Catharus guttatus)

The hermit thrush is a SBNF Watchlist species and was identified by the Forest Service as a species with a local viability concern (**Stephenson and Calcarone 1999**). Throughout the species' breeding range, hermit thrushes occupy a broad spectrum of forested and edge habitats. In southern California, hermit thrushes breed primarily in forests dominated by white fir (*Abies concolor*) and other high-elevation conifers, and are usually found on steep, north-facing slopes.

Hermit thrushes nest on the ground, usually in a small depression, or occasionally a few feet up in low conifer branches. Nests are typically constructed on or within 8 feet of the ground in small conifers or shrubs with ground cover. The nest is a compact cup of course grasses, ferns, bark strips, moss, weeds, or plant fibers, and is lined with mud and plant material. Breeding begins in early to mid-May.

The hermit thrush is considered a terrestrial or bush-gleaning omnivore. During the breeding season, hermit thrushes take mostly animal matter, especially insects and other small invertebrates. In migration and on the wintering grounds, the diet is supplemented with a wide range of small fruits. Invertebrate food items are mostly ants, beetles, caterpillars, wasps, bees, bugs, grasshoppers, flies, and spiders; fruit is mostly berries, including holly, wild cherry, mistletoe, blueberry, pokeberry, elderberry, blackberry, dogwood, grape, and poison ivy.

The hermit thrush is a local species of concern because its breeding population in southern California is small, disjunct, and primarily restricted to high-elevation conifer forests. Stand-replacing wildland fire in dense montane conifer forests is probably the biggest threat to hermit thrushes. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, this species has been detected at Cushenbury Springs (**Myers 2005** – Christmas bird count; **Kielhold 1993** – summer or fall). Nesting and foraging at the quarry expansion site is unlikely but may occur in Marble Canyon and Cushenbury Springs.

V-2.3.4.26 Bendire's Thrasher (Toxostoma bendirei)

The Bendire's thrasher is a CDFW Species of Special Concern and is a SBNF Watchlist species. Southern California is the northern extent of its breeding distribution. During 1986-87 surveys, new, small populations of Bendire's thrasher were discovered in several areas of the western Mojave Desert. These were primarily in Joshua tree woodlands along the northern and eastern base of the San Bernardino Mountains in areas adjacent to NFS lands, including the Lucerne Valley, Apple Valley, and Pipes Canyon.

In the Mojave Desert, nearly all of the Bendire's thrasher population breeds in desert scrub habitat dominated by Joshua tree (*Yucca brevifola*), Spanish bayonet (*Y. baccata*), or Mojave yucca (*Y. schidigera*). In other parts of its range it can be found in relatively open grassland, shrub land, or woodland with scattered trees or shrubs, avoiding more densely vegetated areas such as riparian or desert wash. Occupied sites at higher elevation contain sagebrush (*Artemesia* sp.) and scattered junipers (*Juniperus* sp.). Bendire's thrashers are not typically found in areas with steep slopes and rocky terrain. Elevations range from near sea level to approximately 5,900 feet.

The breeding season of Bendire's thrasher generally begins in late March and lasts through July. Bendire's thrashers primarily take insects and arthropods, but they also consume berries and seeds. They forage mostly on the ground and occasionally glean leaves for arthropods or to pluck fruit. Bendire's thrashers from southern California migrate annually to winter in southern Arizona, southwestern New Mexico, and Sonora, Mexico. In southern California, the spring migration begins in late March, and fall migration begins in late July and extends to late August. Bendire's thrashers are often observed in pairs or in family groups. (Source: **USFS 2006** LMP Species Accounts)

This species is not a regular breeder in the San Bernardino Mountains. There is suitable nesting and foraging habitat for Bendire's thrashers in and near the proposed quarry and haul road areas. The proposed mitigation claims also support suitable habitat that would be protected from future mining.

V-2.3.4.27 LeConte's Thrasher (Toxostoma lecontei)

The LeConte's thrasher is a CDFW Species of Special Concern and a SBNF Watchlist species. LeConte's thrasher is known to occur in Joshua tree (*Yucca brevifolia*) woodlands in the Mojave Desert. LeConte's thrashers require less vegetation than other thrashers; they inhabit very sparse desert scrub (*e.g.,* creosote bush), especially around small washes. They also occupy Joshua tree woodlands in the Mojave Desert, although the Joshua trees themselves seem an unimportant element. In the southwestern San Joaquin Valley, stands of saltbush (*Atriplex*) are preferred, and nesting usually takes place around the edges of washes.

LeConte's thrashers breed in areas with scattered, low shrubby growth. A nest of loosely placed twigs and grass stems is built by both sexes in a small thorny bush or cholla cactus. The breeding season begins in January–February and ends in late June. LeConte's thrashers are essentially monogamous, and are known to double-, triple-, or even quadruple-brood. This species does not migrate. LeConte's thrashers exhibit yearlong diurnal activity. They avoid prolonged activity during the hottest part of the day.

The diet of LeConte's thrasher is more than 90% arthropods, with seeds and fruits making up the rest. LeConte's thrashers are also known to take small snakes and lizards and, occasionally, eggs, including those of its own species. Nearly all food items taken originate from under litter of desert vegetation or from the ground. (Source: **USFS 2006** LMP Species Accounts)

This species is not a regular breeder in the San Bernardino. On the North Slope, this species is known to breed at Cushenbury Springs (**Kielhold 1993**) and two other sites east of the proposed project area (**SBNF GIS – McKernan records from 1993**). There is suitable nesting and foraging habitat for LeConte's thrashers in and near the proposed quarry and haul road areas.

V-2.3.4.28 Virginia's Warbler (Vermivora virginiae)

The Virginia's warbler is a SBNF Watchlist species and a CDFW Watchlist species. Breeding has been documented in the San Bernardino Mountains on Arrastre Creek (6,900 feet) and the South Fork of the Santa Ana River (6,000 feet). Virginia's warblers typically breed in dense brush on relatively steep mountain slopes where there is intermixed or adjacent taller growth such as pinyon pine (*Pinus monophylla*), yellow pines, Douglas-fir (*Pseudotsuga menziesii*), Gambel oak (*Quercus gambelli*), or aspen (*Populus tremuloides*). In southern California, Virginia's warblers occupy understory scrub or open brushfields (*e.g.,* mountain mahogany, manzanita, and serviceberry) within arid coniferous forest.

The breeding season of the Virginia's warbler generally begins in May and lasts to July. Nests are built on the ground on steep slopes in a hollow or under a clump of vegetation. Males are highly territorial during the breeding season. Virginia's warbler territories often border natural boundaries such as coniferous forest edges or canyon walls.

Virginia's warblers forage exclusively on arthropods; they glean or hover-glean prey from leaves and sallies for flying insects. On its wintering grounds, Virginia's warblers often probe into flowers and buds.

Virginia's warblers migrate annually between breeding and wintering grounds. Spring migration to the breeding grounds begins in late March and lasts to late May. Fall migration to the wintering grounds begins in mid-August and lasts to mid-October. (Source: **USFS 2006** LMP Species Accounts)

This species is not a regular breeder in the San Bernardino Mountains. On the North Slope, Virginia warblers have been detected in Jacoby Canyon (SBNF records). There is suitable nesting and foraging habitat for Virginia's warblers at the project and analysis areas.

V-2.3.4.29 Yellow Warbler (Dendroica petechia brewsteri)
The yellow warbler is a CDFW Species of Special Concern and is a SBNF Watchlist species. In southern California, yellow warblers breed in riparian woodlands in the lowlands and foothill canyons. They typically occur in riparian forests that contain cottonwoods, sycamores, willows, or alders. The breeding season of yellow warbler generally begins in May and can last to August. Yellow warblers are highly territorial on both the breeding and wintering grounds.

Yellow warblers feed primarily on arthropods, and rarely on wild fruit. Much of the diet consists of bees, wasps, caterpillars, flies, midges, beetles, and true bugs. Yellow warblers actively glean insects from leaves and occasionally sally to capture flying insects. During winter in southern California, some individuals feed on nectar and pollen.

Yellow warblers migrate annually between North America (breeding grounds) and the neotropics (wintering grounds). For populations that breed in southern California, spring migration from the wintering grounds occurs late March–late May; fall migration from the breeding grounds begins in August and lasts until mid-October. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, yellow warblers are known to nest at Cushenbury Springs (**SBCM records; Kielhold 1993**). There is suitable nesting and foraging habitat for yellow warblers in Marble Canyon and Cushenbury Springs. They are unlikely to occur in the project area.

V-2.3.54.30 MacGillivray's Warbler (Oporornis tolmiei)
The MacGillivray's warbler has been identified by the Forest Service as a local viability concern (**Stephenson and Calcarone 1999**) and is a SBNF Watchlist species. In the San Bernardino Mountains, they are known to nest at Bluff Lake and Metcalf Meadows. In the southern portion of its breeding range, including southern California, MacGillivray's warblers occur in willow thickets and other brushy, montane riparian areas in conifer forests at elevations above 6,000 feet. This species requires moderate cover and thick understory vegetation for nesting.

The breeding season of MacGillivray's warbler generally begins in May and lasts to August. MacGillivray's warblers are strongly territorial and aggressive during the breeding season. MacGillivray's warblers eat insects during the breeding season in California; food items include true bugs, leaf hoppers, beetles, bees, wasps, and ants. MacGillivray's warblers glean insects on the ground or from leaves near the ground. MacGillivray's warblers migrate annually between their breeding and wintering grounds. The spring migration to the breeding grounds begins in March and lasts to June, peaking April–May. Fall migration to the wintering grounds generally begins in July and lasts to November, peaking August–October. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, MacGillivray's warblers are known from Jacoby Canyon not too far from the project area. There is suitable nesting and foraging habitat for MacGillivray's warbler in the Marble Creek drainage and at Cushenbury Springs. They are unlikely to nest at the quarry expansion site or along the proposed haul road.

V-2.3.4.31 Common Yellowthroat (Geothlypis trichas)

The common yellowthroat has been identified by the Forest Service as a local viability concern (**Stephenson and Calcarone 1999**), a high priority riparian obligate by California Partners in Flight, and is a SBNF Watchlist species. In southern California, common yellowthroats breed in freshwater and brackish marshes with cattails, bulrushes, and other emergent vegetation, as well as in dense brush in riparian woodland and other wetlands. Although typically associated with marshes, streamside thickets, wet meadows and other wetlands, common yellowthroats are also found in drier upland habitats as long as there is abundant and dense undergrowth for foraging and nesting. The common yellowthroat is a diurnal songbird with both resident and migratory populations.

In California, eggs are laid between April 4 and July 10. Males aggressively defend breeding territories against other males, and females may defend against other females. The common yellowthroat diet consists primarily of arthropods. Common yellowthroats forage primarily by gleaning arthropods off leaves and stems from ground level to higher than 20 feet in trees. They also pursue prey by sallying, hovering, and flushing. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, common yellowthroats are known to nest (SBCM records) and winter (**Myers 2005)** at Cushenbury Springs. There is suitable nesting and foraging habitat for the common yellowthroat in Cushenbury Springs and possibly in parts of Marble Canyon. They are unlikely to occur in the quarry or haul road areas.

V-2.3.4.32 Wilson's Warbler (Wilsonia pusilla)

The Wilson's warbler is a SBNF Watchlist species. In the San Gabriel and San Bernardino Mountains, Wilson's warblers breed in dense willow thickets in high-elevation meadows and riparian areas. In California, nest construction typically begins in early June in the Sierra Nevada and in early to late April in inner-coastal areas. Males aggressively defend breeding territories. Wilson's warblers are generally active during the day; however, they migrate at night. For populations that breed in southern California, spring migration begins in mid-March and lasts to late May; fall migration begins in mid-August and lasts to mid-October.

Wilson's warblers forage primarily on arthropods, including bees, flies, mayflies, spiders, beetles, and caterpillars; they occasionally eat berries. Wilson's warblers forage mostly in shrubs and trees at heights from ground- to canopy-level. Their foraging behavior consists mostly of leaping vertically to glean insects from the bottoms of leaves; they also sally, hover-glean, and glean while perched on twigs. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, Wilson's warblers have been recorded at Cushenbury Springs (**Kielhold 1993**) and Crystal Creek (**Myers 1988)**. There is suitable nesting and foraging habitat for the Wilson's warblers in Cushenbury

Springs and Marble Canyon. They may forage at the proposed quarry site but would be unlikely to nest there or along the proposed haul road.

V-2.3.4.33 Yellow-Breasted Chat (Icteria virens)

The yellow-breasted chat is a CDFW Species of Special Concern and is a SBNF Watchlist species. In southern California, yellow-breasted chats breed in dense riparian thickets and brushy tangles in the vicinity of watercourses, primarily in the coastal lowlands. The species appears to be closely tied to streamside thickets of willows, mesquite, and mulefat with tangles of grapevines and other riparian species. Some taller trees (*i.e.,* alders and cottonwoods) are required for song perches. During migration, yellow-breasted chats use habitat similar to its breeding habitat. Yellow-breasted chats migrate annually between breeding and wintering grounds. Chats winter primarily in Mexico to western Panama. For populations that breed in southern California, spring migration from the wintering grounds occurs in mid-April to late May, and fall migration from the breeding grounds occurs from mid-July to mid-September.

The breeding season of the yellow-breasted chat generally begins in April or May and can last to August. The yellow-breasted chat is territorial. Yellow-breasted chats consume a variety of arthropods, including beetles and weevils, true bugs, ants, bees, caterpillars, and spiders. They also eat fruit, especially blackberries (*Rubus* sp.), elderberries (*Sambucus* sp.), and wild grape (*Vitis* sp.). Yellow-breasted chats forage in dense thickets, gleaning off leaves and twigs. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, yellow-breasted chats are known to nest at Cushenbury Springs (SBCM records). There is suitable nesting and foraging habitat for the yellow-breasted chat in Cushenbury Springs and possibly in some parts of Marble Canyon. The proposed quarry and haul road sites are not suitable for nesting or foraging.

V-2.3.4.34 Hepatic Tanager (Piranga flava)

The hepatic tanager is a SBNF Watchlist species and a CDFW Watchlist species. Breeding habitat for hepatic tanager in the San Bernardino Mountains consists of mature pinyon pine woodland with a mixture of taller conifers, such as white fir (*Abies concolor*) or Jeffrey pine (*Pinus jeffreyi*). These tanagers also may occur in pine and deciduous oak woodlands on warm, arid slopes at the interface with the pinyon belt.

Information on the reproductive biology of hepatic tanager is extremely limited. Clutch size is three to five eggs. Hepatic tanagers migrate annually to northern Mexico. In southern California, the species arrives on the breeding grounds in late April or early May and has left the area by the end of August. Males are highly territorial and pairs defend territories during the breeding season. Hepatic tanagers forage on berries, flowers, nectar, and insects, including large ants.

The hepatic tanager is a recent arrival in California, having been first reported in the state in 1967. (Source: **USFS 2006** LMP Species Accounts)

This species is an uncommon breeder in the San Bernardino Mountains, limited to one general area. The analysis area is not very far from known nesting occurrences at Arrastre Creek and Rose Mine. The analysis area and vicinity has suitable nesting and foraging habitat for hepatic tanagers.

V-2.3.4.35 Summer Tanager (Piranga rubra)

The summer tanager is a CDFW Species of Special Concern and is a SBNF Watchlist species. Summer tanagers are reported from the base of the San Bernardino Mountains at Mojave Narrows Regional Park and Whitewater Canyon along the Mojave River and Morongo Valley.

In southern California, summer tanagers breed in valley bottom riparian woodland dominated by Fremont cottonwood and willows (*Salix* spp.) and in mature desert riparian groves, also typically dominated by Fremont cottonwood. At higher elevations, they breed in mesquite (*Prosopis*) and saltcedar (*Tamarix*) in rivers and canyons. Summer tanagers are also found in these habitats during migration. The summer tanager is a long-distance migrant: almost all birds leave the breeding grounds in September and October and begin to arrive in the wintering areas in late September. Spring migration begins in mid- to late February and peaks in March; most birds have left the wintering grounds by mid-April, arriving on the breeding grounds in April. Summer tanagers migrate at night.

Summer tanagers begin nesting from late April to early May, two-four weeks after arriving from the wintering grounds. Summer tanagers are primarily insectivorous, specializing on bees and wasps, which are typically taken in flight by sallying from a treetop perch then carried back to the perch and beaten to remove the sting. Other prey items are typically flying insects, including cicadas, beetles, ants and termites, and grasshoppers; spiders and caterpillars are also taken. Later in the breeding season, on migration, and on the wintering grounds, summer tanagers eat small fruit in addition to insects. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slopes, summer tanagers are known to nest at Cushenbury Springs (SBCM records). There is suitable nesting and foraging habitat for the summer tanager in Cushenbury Springs; it may also occur in Marble Canyon. Nesting is unlikely at the quarry or haul road sites but foraging may occur if nesting occurs nearby.

V-2.3.4.36 Black-Chinned Sparrow (Spizella atrogularis)

The black-chinned sparrow is a SBNF Watchlist species and a USFWS Bird of Conservation Concern. The black-chinned sparrow is a summer resident in southern California, breeding locally on arid mountain slopes of southern California. It occurs mostly on sloping ground in mixed chaparral, chamise-redshank chaparral, sagebrush, and similar brushy habitats, including those in understory of sparse pinyon-juniper, juniper, and other conifer habitats.

Black-chinned sparrows apparently feed on seeds, insects, and fruits associated with shrubs, gleaning on ground beneath shrubs and in shrubs. They find cover in tall sagebrush, chaparral, or other shrubs with similar structure. Their nests are a loosely constructed cup of dry grass and forb stems lined with finer grasses, plant fibers, hair, and feathers. Nests are usually concealed in dense foliage of a shrub 1-3 feet above ground.

Breeding season is April into early August, with a peak in May and June. They may breed in loose colonies. They usually arrive in California in April and depart in August or September. (Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, black-chinned sparrows have been observed in Crystal Creek, Dry Canyon, at Mitsubishi's 16a mitigation parcel and in Jacoby Canyon. There is suitable nesting and foraging habitat for black-chinned sparrows in and near the proposed quarry and haul road areas. There is also suitable habitat in the mitigation parcels that would be protected from future mining.

V-2.3.4.37 Lincoln's Sparrow (Melospiza lincolnii)

The Forest Service has identified Lincoln's sparrow as a local viability concern (**Stephenson and Calcarone 1999**) and is a SBNF Watchlist species. In southern California, Lincoln's sparrows breed in wet montane meadows with typical vegetation components that include corn lily (*Veratrum* sp.), sedges (*Carex* spp.), low willows (*Salix* spp.), thick bushes near marshy ground, and tall grass. Generally, Lincoln's sparrows frequent boggy, moss-dominated habitats where shrub cover is dense. Habitats used in migration are typically riparian sites with abundant shrub cover. Migrating individuals also use marshes, brushy forest edge, urban settings, weedy fields, hedgerows, and blackberry (*Rubus* spp.) thickets. Winter habitats include freshwater sites, savanna, arid subtropical scrub, weedy pastures, and brushy fields.

Lincoln's sparrow nests are small cups built on the ground under grassy or weedy clumps in shrubby growth and forest edge. The breeding season lasts from late May or mid-June until mid-August. Lincoln's sparrows are territorial, and males define their territories using conspicuous trees and shrubs as singing perches. Lincoln's sparrows are considered a short- to long-distance migrant, with movements in spring commencing from mid-April to early June and peaking in May; fall migration lasts from early September to mid-October, peaking in late September.

Lincoln's sparrows eat seeds, insects, millipedes, and other small invertebrates. During the breeding season they take mostly animal foods, including insect larvae and adults of *Diptera*, *Lepidoptera*, *Homoptera*, *Coleoptera*, *Ephimeroptera*, and *Araneae*. The winter diet consists almost entirely of small seeds. Seeds and invertebrates are gleaned from the ground and from low plants, usually under cover of shrubs or thick vegetation. Lincoln's sparrows occasionally scratch the ground or leaf-litter in search of food, and will rarely hawk insects in mid-air. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. Lincoln's sparrows are known to nest at Bluff Lake and Metcalf Meadows near Big Bear Lake. Cushenbury Springs and Marble Canyon may support habitat that is suitable for nesting and foraging. Nesting is unlikely at the quarry site or along the haul road but foraging may occur if nesting occurs nearby.

V-2.3.4.38 Tri-Colored Blackbird (Agelaius tricolor)

The tri-colored blackbird is a SBNF Watchlist species, a BLM Sensitive species, a CDFW Species of Special Concern, and a USFWS Bird of Conservation Concern. Tri-colored blackbirds breed near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, tall herbs. They feed in grassland and cropland habitats. Numbers appear to be declining in California. Animal matter, mostly insects and spiders, made up 86-91% of nestling and fledgling diet and 28-96% of adult diet in spring and summer. Seeds and cultivated grains, such as rice and oats, are other major foods, composing most of fall and winter diet. They forage on ground in croplands, grassy fields, flooded land, and along edges of ponds.

Tri-colored blackbirds usually nest in dense cattails or tules; also nests in thickets of willow, blackberry, wild rose, and tall herbs. The usual breeding season is mid-April into late July. (Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx)

Tri-colored blackbirds are not known to nest in the San Bernardino Mountains. On the North Slope, Cushenbury Spring has habitat that is suitable for nesting, foraging, and migratory stopovers. Six tri-colored blackbirds were detected during a Christmas bird count on 12/17/2005 (**Myers 2005**). They are not likely to nest or forage at the proposed haul road or quarry sites.

V-2.3.5.38 Lawrence's Goldfinch (Carduelis lawrencei)

The Forest Service has identified Lawrence's goldfinch as a riparian species of concern (**Stephenson and Calcarone 1999**), it is a SBNF Watchlist species, and a USFWS Bird of Conservation Concern. Lawrence's goldfinches breed in a variety of habitats in southern California, including blue oak savanna, chaparral, riparian woodland, desert oases, pinyon-juniper woodland, and mixed coniferous-oak forest. Lawrence's goldfinch generally migrates short distances to its wintering grounds in the southwestern United States and northwestern Mexico.

Components of nesting habitat typically include arid, open woodlands with adjacent chaparral or brushy areas; tall, weedy fields; and a nearby water source. The breeding season for Lawrence's goldfinch begins as early as late May and can last into September, although peak activity occurs from late April until August. Nests are typically constructed on the outer branches of a tree, usually an oak. Both male and female Lawrence's goldfinches defend territories only during the breeding season and mostly against conspecific intruders.

Lawrence's goldfinches forage on seeds, with a predilection for those of native plants, primarily of fiddleneck (*Amsinckia* spp.) during the spring and chamise (*Adenostoma fasciculatum*), annual grasses, mistletoe (*Phoradendron* spp.), coffeeberry (*Rhamnus californica*), and possibly star-thistle (*Centaurea* spp.) during other seasons. (Source: **USFS 2006** LMP Species Accounts)

This species is a regular breeder in the San Bernardino Mountains. On the North Slope, Lawrence's goldfinches have been documented in Jacoby Canyon. Suitable nesting and foraging habitat occurs for this species in the analysis area and vicinity.

V-2.3.4.39 Summary of Potential Effects to Birds

There are three types of potential effects to birds using the analysis area:

a) Loss/degradation of areas suitable for breeding/nesting, foraging, sheltering, and migration stopovers. See **Part II-3.2** for general habitat effects discussions. Alternative 1 would affect more acres (~154) than Alternative 2 (~134). The mitigation package for both alternatives includes relinquishment of 540 acres of claims. As a result, those areas would be protected from future mining, providing habitat for Watchlist birds into the future.

b) Disturbance to birds in and near the analysis area as a result of mining operations (see **Part II-3.2.8** Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

a) Death and injury of birds in and near the analysis area (see **Part II-3.2.9**

The Design Features include several measures to help limit the potential for disturbance and/or losses of nesting birds and raptors as a result of mining activities. Surveys would be conducted prior to ground clearing activities to locate and avoid nesting birds. The Design Features also include participation in a Raptor Conservation Strategy (RCS) for the North Slope area that describes protective measures, inventories for nesting raptors, and behavioral response monitoring. The RCS incorporates guidelines in the USFWS interim guidance for golden eagles (**Pagel *et al.* 2010).**

The following section on golden eagles contains a discussion of potential effects that is also relevant for peregrine falcons, prairie falcons, and other nesting raptors.

V-2.3.4.40 Golden Eagle (Aquila chrysaetos)

The golden eagle is a SBNF Watchlist species, a CDFW Watchlist species, a California state fully-protected species, and was identified by the Forest Service as having a local viability concern. It is protected under the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA; Executive Order 13186), and the California Fish and Game Code.

Life History and Baseline Information: In California, golden eagles are an uncommon permanent resident and migrant throughout most of the state, except the floor of the Central Valley (**Zeiner *et al.* 1990**). This species ranges from sea level to 11,500 feet (**Zeiner *et al.* 1990**). It is an uncommon year-round resident in southern California (**Pagel, pers. comm. 2013)**. Historically, golden eagles were considered more abundant in remote parts of southern California than anywhere else in the United States (**Zeiner *et al.* 1990**).

Golden eagles nest primarily on cliffs in southern California but will also nest in trees (**Pagel, pers. comm. 2013)**. They build their nests on cliff ledges or in trees, typically 10-100 feet above the ground. As a species that is skittish about human intrusion, they often occupy remote mountain ranges and upland areas, often at or above tree line where vegetation is short or sometimes absent. Southern California's golden eagles generally avoid nesting in heavily-forested mountains and coastal or urban areas. They hunt for rabbits and other small mammals in nearby open habitats, such as grasslands, oak savannas, and open shrublands**.** Also a scavenger, golden eagles will forage on large dead animals (**Ferguson-Lees and Christie 2001, Garrett and Dunn 1981, Pagel, pers. comm. 2013, Kochert *et al.* 2002)**.

Wintering habitats in the western United States tend to include perches and native shrub-steppe vegetation types (*e.g.,* comprising *Artemisia* and similar shrubs). Habitats with these characteristics typically support substantial prey populations of black-tailed jackrabbits (*Lepus californicus*) (**Johnsgard 1990, Kochert and Steenhof 2002, Kochert *et al.* 2002**).

The golden eagle breeding season in southern California begins in early-mid December. Chicks fledge through July (**Pagel, pers. comm. 2013)**. The nest is constructed of branches, twigs, and is added to during the courtship phase of the nesting period. A nest can be quite large and may become more massive with successive use. Alternative nest sites within the breeding territory are occasionally used; a nesting territory is typically consists of one to four nests, but up to 18 different nest sites per territory has been documented (**Kochert and Steenhof 2012)**. Golden eagles are known to have re-occupied nests that have been vacant for 30-40 years (**Kochert and Steenhof 2012**).

Females typically lay 1-3 eggs and incubate them for 43–45 days. The semi-altricial eaglets are brooded by the female for an additional 30 days. The young fly at about 60-70 days, remaining near the nest site for a few weeks to months (**Baicich and Harrison 1997, Zeiner *et a.* 1990, Pagel, pers. comm. 2013**). Typically, the nest is occupied for about 16 weeks total during the breeding season. Territory fidelity in adult golden eagles is high. Juvenile golden eagles disperse from their natal area. After dispersal, they live nomadically until they establish a territory during the fall of their first year (**Pagel, pers. comm. 2013)**.

In California, golden eagles are resident year-round; however, eagles that nest outside the state also visit California during migration and winter, and nomadic subadults and adult "floater" (*i.e.,* unmated or non-territorial) eagles may travel between California and other regions. Eagles may move altitudinally and latitudinally seasonally and/or in response to changing weather conditions; they may also move upslope after the breeding season (**Zeiner *et al.* 1990, Katzner *et al.* 2012, Pagel 2013, pers. comm.**).

Golden eagles will occasionally hunt from an exposed perch, flying directly toward prey, or will hunt from soaring or low ground-level flights (**Zeiner *et al.* 1990, Kochert *et al.* 2002**). Golden eagles eat primarily lagomorphs and rodents, but they will also take other mammals, reptiles, carrion, and birds (**Johnsgard 1990, Dunne *et al.* 1988**). Studies of golden eagle diets indicate that mammals often comprise 82% of the diet, supplemented by birds at 12.6%, with the remainder consisting of reptiles and fish (**Zeiner *et al.* 1990**).

During the breeding season, golden eagles are highly territorial, and monogamous pairs may occupy a territory repeatedly over their life span. Territorial boundaries are well defined and vigorously defended. Golden eagles tend to nest on the periphery of an adjacent eagle's territory. Territorial size is dependent on food resources available (**Pagel, pers. comm. 2013)** and varies in S. California (**Katzner *et al.* 2012)**. Outside the breeding season, the eagles disperse widely and do not maintain territories.

Threats to golden eagles include powerlines (electrocutions and collisions), contaminants (*e.g.,* lead poisoning from scavenging on carcasses containing spent lead ammunition, secondary poisoning from rodenticides, etc.), intentional shooting/poaching, incidental trapping in furbearer traps, drowning in stock-tanks, vehicle collisions, habitat loss, collisions with other structures including large-scale non-renewable and renewable energy developments, and disturbance to nest sites (**Kochert *et al.* 2002, USFWS 2010, DeLong 2004, Ruddock and Whitfield 2007**). Another threat is poaching due to black market demand (**Pagel, pers. comm. 2013**).

Near National Forest System lands in southern California, golden eagles are affected by private land development and rapid urbanization that encroaches on key foraging areas. There appears to be abundant nesting habitat on public land, but in many places the highest quality foraging areas are on private land. (**Source: USFS LMP 2006**)

Increased recreational activity, particularly rock climbing and hiking, in the vicinity of cliff nests is also a problem in some areas and can cause golden eagles to abandon nest sites. Mining activities on the North Slope of the San Bernardino Mountains may also be a threat to golden eagles if mining results in disturbance to nesting cliffs. (**Source: USFS LMP 2006, USFWS 2010**)

Mortality of golden eagles as a result of wind turbine collisions has been high (79 between 1997 and 2012 in 10 states) (**Pagel *et al*. 2013)**. Large-scale solar panel projects result in losses of large acreages of foraging habitat for golden eagles. Within the foreseeable future, a number of new renewable energy projects are expected to come online in California's deserts, as suggested by the number of applications for renewable energy projects (http://www.energy.ca.gov/siting/solar/; http://www.blm.gov/ca/st/en /prog/energy/wind.html). Those combined with existing developments and other threats to golden eagles contribute to the concern for the golden eagle population in the western U.S. Given the current situation for golden eagles, there are concerns about cumulative effects for this species due to multiple threats (**Pagel, pers. comm. 2013**).

Occurrence in Analysis Area: Golden eagles are known to nest on and near the North Slope. There are six territories within 10 miles of MCC's project area (1 of those is not on the North Slope); four of those are within 5 miles. Each of the territories has several nest structures. Additional territories are known from farther to the southeast, west, and north. The four territories within 5 miles of the project area were monitored in 2014 and 2015. In 2014, all four territories of the North Slope territories were active and successfully produced young (two chicks at one; one chick at each of the other two). In 2015, three of the territories were monitored. Only one was active but the nest ultimately failed.

The North Slope, including the analysis area, also supports suitable foraging habitat and there are a number of golden eagles observations in the North Slope area (**Kielhold 1993, MacKay and Thomas 2008, SBNF records**), including using wildlife drinkers at the mines. Thus, the project and analysis areas are considered occupied by this species.

Potential Effects: Potential effects to golden eagles can be categorized by habitat loss, disturbance and displacement, and death or injury from mining operations. For additional discussion, see **Part II-3.2** for the discussion of effects common to wildlife species.

a) Habitat Loss: The analysis area and vicinity support suitable habitat for nesting and foraging for golden eagles. The northern portion of the SQ has steep rugged slopes without outcrops that are suitable for nesting. Additionally, the slopes on either side of Marble Canyon have suitable nesting sites. The entire analysis area is suitable for prey species used by golden eagles. The project would result in permanent losses of the undisturbed hunting and nesting habitat.

The development of the SQ and haul road would result in complete loss of 134-154 acres (depending on alternative) of the landscape that is currently suitable for prey species. Much of that is also suitable for nesting, particularly the northern portion of the quarry and portions of the proposed haul road (**Figure 16, Figure 17,** and **Figure 18).**

Prey habitat would be permanently lost on the acres that would be cleared of vegetation and no longer support habitat for prey species. Taken cumulatively with other existing, proposed, and future limestone mine developments (over the long life of the proposed project) on the North Slope, the availability of habitat for prey species would be reduced.

At the completion of mining, the inactive quarry benches may provide suitable nest sites for golden eagles. However, the quarry site would mostly be unsuitable for foraging due to lack of cover and forage and limited access for prey species. Parts of the haul road and berm may revegetate over time providing vegetation and cover for prey species. However, it is likely lack of top soil and large areas of bare rock would limit the amount of revegetation and it may only be marginal for prey habitat.

The proposed SQ project also includes mitigation through the relinquishment of mining claims to compensate for the loss of endangered plant habitat. As a result, approximately 540 acres of pinyon/juniper habitat and desert transition habitat will be protected in perpetuity from future mining. These mitigation acres are effectively compensating for the loss of the suitable golden eagle foraging habitat associated with the proposed project.

Alternative 1 would affect several cliff faces with suitable nesting habitat through quarry and haul road development. Alternative 2 would affect fewer cliff faces with suitable nesting habitat, including avoiding direct effects to the highest quality cliffs. The steep slopes that would be affected by Alternatives 1 and 2 also support trees that could also provide nest sites for golden eagles **(Figure 33**). The mitigation parcels (in particular, Cushenbury 15) include cliff faces and steep terrain with suitable nesting habitat and also include a known golden eagle nesting territory.

b) Disturbance: Under the federal Eagle Act, “disturb” is defined in regulations as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.”

Disturbance effects on wildlife species have been well-documented for a number of species including deer, small mammals, reptiles, and nesting and perching birds. Most species exhibit a "flight" response to disturbance resulting in temporary, or if disturbance is constant, permanent displacement. Flight responses and/or disturbances can negatively affect animal health by requiring increased energy expenditures.

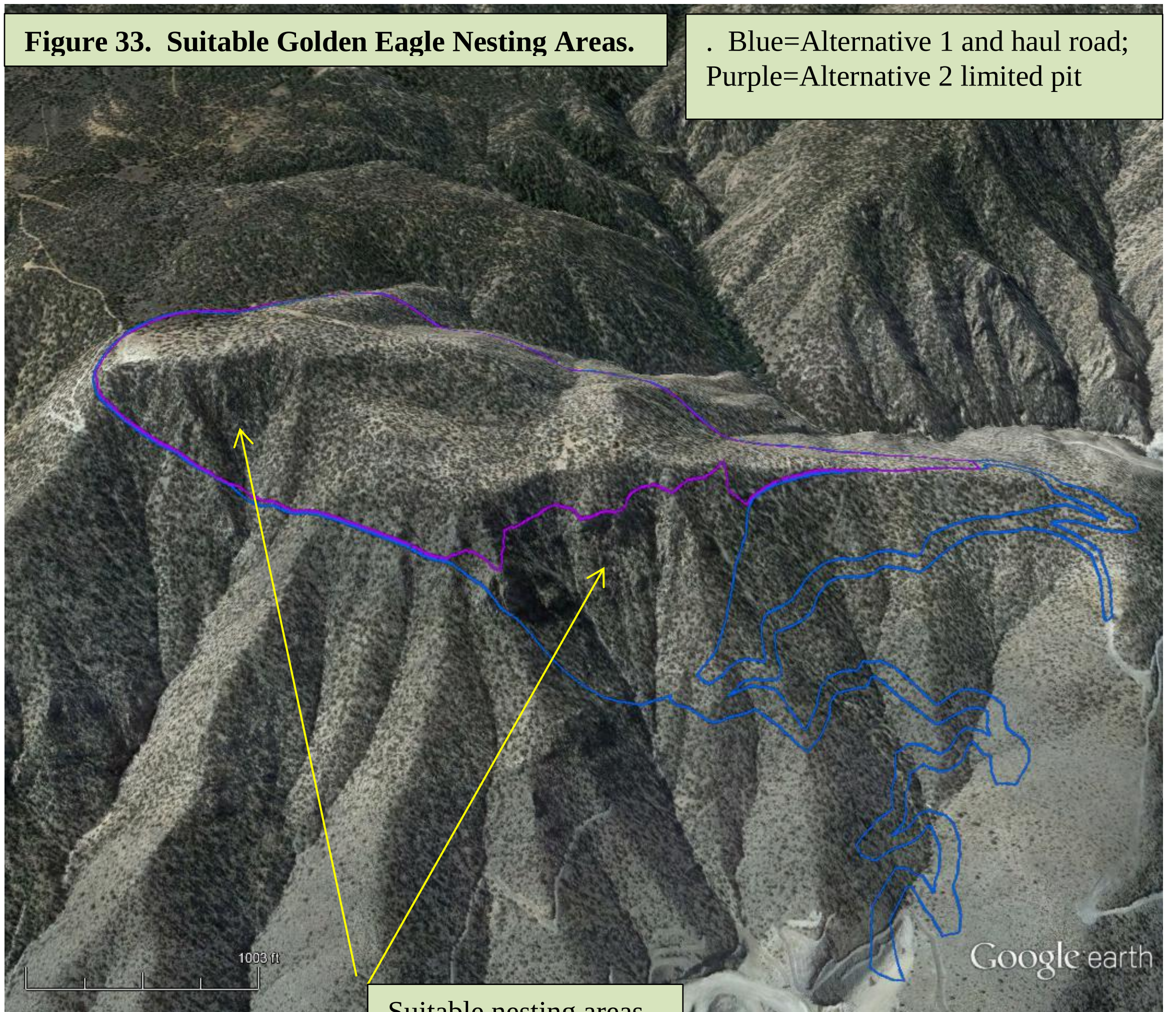

Figure 33. Suitable Golden Eagle Nesting Areas. . Blue=Alternative 1 and haul road; Purple=Alternative 2 limited pit

Animals respond to disturbances through behavioral and/or physiological responses. Disturbance responses are classed in three ways: attraction (curiosity, food-seeking), tolerance, and aversion. Stress requires energy expenditure. In some cases, it may require more energy than an animal can take in, so they must use body energy reserves. Continuous stress may eventually cause illness or death. Stress combined with other factors such as severe winter conditions or constant disturbance may cause individuals to die or fail to reproduce. In such cases, populations would decline. When disturbance occurs over a large region for many years, the population may be unable to continue to reproduce and survive in the area (**Knight and Gutzwiller 1995**).

The distance of displacement depends on several factors: quality of vegetative and topographic cover (line-of-sight from disturbance points); amount and type of disturbance; timing of disturbance (*e.g.* noise during the day may not affect a nocturnal species, and animals may be more or less tolerant of disturbance during breeding season); and tolerance for disturbance (*e.g.*

hunted populations are generally more likely to flee from disturbance than nonhunted/protected populations) (**Knight and Gutzwiller 1995**).

Potential disturbance effects include: alteration of habitat use (avoidance or abandonment of an area – either temporarily or permanently), interruption of reproductive activities (courtship, mating, prenatal care, nesting, etc.), and increased predation (especially of abandoned nests) (**Knight and Gutzwiller 1995**).

Birds are especially sensitive to background noises. Being able to differentiate vocalizations of the same and different species from background noise is important for pair bonding, breeding displays, territory defense, flock communication, etc. (http://www.fhwa.dot.gov/environment/noise/noise_effect_on_wildlife/effects/effects.pdf). Continuous or frequent background sounds may interfere with feeding, breeding, territory defense, and avoiding predators.

Disturbance impacts may include changes in behavior that result from noise disturbance from regular blasting as well as daily operations (loading/moving rock, haul truck traffic, etc.). Humans and vehicles in the area also present a certain level of disturbance, especially for species such as golden eagles that are especially sensitive to visual stimuli.

Blasting associated with mining of the quarry is expected to occur twice a week between the hours of 10:00 am and 6 pm. Blasting during development of the haul road is expected to be smaller blasts but more frequent (up once/day). Disturbance from mining activities, in particular blasting, may affect behavior, reduce amount of time foraging, affect physiology, increase the chances of predation of eggs or nestlings, and change use patterns. At some point, disturbance may cause them to abandon the areas where they have been foraging and nesting, or not use as much which may affect occupancy and reproductive success.

Golden eagles may be disturbed if they nest or forage within line-of-sight of the haul road or quarry or if they nest close enough to be disturbed by the noise and vibrations associated with blasting. They may also be disturbed by activities that they are not accustomed to; if they nest or frequently forage within view of a road, or even blasting, they may have acclimatized to that activity already and have a higher tolerance for those types of disturbance. However, any activity outside of what they are accustomed to may be the cause of disuse or abandonment.

Background disturbance levels around the exiting quarry and cement plant (and adjacent SMI mining operations) are already relatively high. The highest potential for disturbance is probably during the development of the haul road and quarry when areas that previously had no or low disturbance levels are first entered. The blasting and human presence would be new in those areas.

The proposed haul road (especially the eastern portion) is close to some of the best nesting habitat. Eagles using those areas for nesting or foraging during the 2-year construction period of the haul road (when there would be more frequent, if smaller, blasting) may be disturbed, resulting in abandonment of that area.

Once the quarry and haul road are developed and the mine is in an operational phase, the disturbance risks may be lower. For example, an eagle pair choosing to nest in the quarry or haul road vicinity may possibly have a higher tolerance for those types of disturbance due to habituation.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

The Design Features include a several measures to help limit the potential for disturbance of raptors as a result of mining activities, including participation in a Raptor Conservation Strategy for the North Slope area that describes protective measures, inventories for nesting raptors, and behavioral response monitoring if nests are found close to active mining sites. The RCS incorporates guidelines in the USFWS interim guidance (**Pagel *et al.* 2010).**

<u>c) Mortality and Injury from Mining Operations</u>: Over the long life of the proposed operations (depending on alternative), there is some limited potential for individual golden eagles to be injured or killed as a direct or indirect result of mining operations.

The potential risks include death or injury of golden eagles that are scavenging on dead animals on the mine roads as a result of collisions with haul trucks and other mine vehicles. Because of the slow speeds of vehicles on the haul roads, this is considered unlikely but cannot be ruled out completely.

There is also a risk of death or injury as a result of disturbance from the mining operations, particularly from blasting. Blasting during the mining operations typically occurs twice a week between 10:00 am and 6:00 pm. During the two-year haul road construction period, more numerous (up to once/day) blasts would occur.

Adult eagles that already nest or forage frequently close to the mine operations may be habituated to blasting and may not startle to the degree that injury or death would occur. Golden eagles and other raptors often flush from the nest as a result of disturbance. Chilling and overheating of eggs or chicks or starvation of nestlings can result from human activities that appeared not to have caused an immediate response (http://wildlife.state.co.us/SiteCollection Documents/DOW/Wildlife Species/LivingWithWildlife/RaptorBufferGuidelines2008.pdf).

The greatest risk of death or injury would likely be to nesting eagles if a nest were established in very close proximity to the active mining area. This would increase the probability because eagles would be in the analysis area more frequently and in higher numbers (a pair or family compared to a single eagle). The risk is likely highest to nestlings or young eagles that are not adept at flying. Blasting or other unexpected noises or activities could startle young eagles and result in them falling from the nest. Additionally, startled adults could knock eggs or young chicks from the nests (**Harmata *et al.* 1978**). Large explosions in close proximity to nests can also destabilize nest substrates, causing hatch failure or nest destruction for some raptor species (**Holtuijzen *et al*. 1990).**

Although there are a number of studies evaluate disturbance distances for nesting raptors, the distances vary from 1/8 to 1 1/4 mile for a variety of activities (**Ruddock and Whitfield 2007**). There are few published studies that address the potential effects of blasting on golden eagles or other raptors. In a study of frequent construction and experimental blasting, **Holtuijzen *et al.* (1990**) found that prairie falcons had behavioral responses to blasting events in over 50% of the time. Incubating and brooding falcons flushed 22% of the time but returned to the nest within an average of 3.4 minutes. They recommended that blasting does not need to be restricted for distances over 410 feet from prairie falcon aeries provided that peak noise levels do not exceed 140 dB at the aerie and that no more than three blast occur on a given day or 90 blasts during the nesting season. It is difficult to extrapolate these data to golden eagles because of the substantially different behavioral responses among raptor species (**Pagel 2013, pers. comm.)**.

After monitoring sounds, seismic, and behavioral activity for bald eagle nests close to a construction site, **Morgan (pers. comm. 2013; 2012**) stated that the maximum distance they detected a disturbance was 1620 feet. However, they observed a blast within 700 feet of a nest that did not cause a disturbance. The variability is based on the size and methods used for the blast (*i.e.,* noise attenuation and explosive type/technique).

The mining operations would have a variety of environmental hazards that could pose a threat to individual golden eagles. Liquids used by equipment and vehicles (*e.g.,* hydraulic fluid, antifreeze, oil, fuel, etc.) that are spilled, even in small quantities, may be ingested by small mammals resulting in illness or death. Golden eagles are known to scavenge on dead animals and could be at risk of secondary poisoning. Mitsubishi operates a landfill at their plant site; it is covered daily and subject to State and County landfill standards and inspections. The Design Features include a several measures to limit the potential risk from spills, dead animals, etc.

The Design Features include a several measures to help limit the potential for death/injury of raptors as a result of mining activities, including participation in a Raptor Conservation Strategy (RCS) for the North Slope area that describes protective measures, inventories for nesting raptors, and behavioral response monitoring if nests are found in close proximity to active mining sites. The RCS incorporates guidelines in the USFWS interim guidance (**Pagel *et al.* 2010).**

In summary, death or injury of golden eagles is not expected because golden eagles are not currently nesting within close proximity of the project area and because of the incorporation of the Design Features and RCS. However, the conditions may change if a nest is built and used in close proximity to the project area.

<u>d) Cumulative Effects:</u> Golden eagle populations are believed to have local declines in some areas of its range in the U.S. (**Millsap *et al.* 2013, Kochert and Steenhof 2002**). Threats to golden eagles include powerlines (electrocutions and collisions), contaminants (*e.g.,* lead, secondary poisoning from rodenticides), shooting and poaching, incidental trapping in furbearer traps, drowning in stock-tanks, vehicle collisions, habitat loss, disturbance, and large-scale non-renewable and renewable energy developments (**Millsap *et al. 2013***).

Mortality of golden eagles as a result of wind turbine collisions has been high (as many as an average of 64/year at Altamont Pass over the past six years (**Pagel *et al.* 2013**). Large-scale solar panel projects have affected large acreages of foraging habitat for golden eagles. Within the foreseeable future, a number of new renewable energy projects are expected to come online in California's deserts, as suggested by the number of applications for renewable energy projects (http://www.energy.ca.gov/siting/solar/; http://www.blm.gov/ca/st/en /prog/energy/wind.html). Those combined with existing developments and other threats to golden eagles contribute to the concern for the golden eagle population in the western U.S.

Large wildfires also pose a threat to golden eagles by affecting habitat suitability for nesting and foraging. Climate change may increase the frequency and severity of wildfires, reducing the availability of prey, perch, and nest sites.

Currently, the SBNF is evaluating a proposal by Omya to expand the Butterfield-Sentinel quarries a few miles to the west of the SQ project area. Omya has also proposed an expansion of their White Knob limestone mining operations west of Butterfield-Sentinel. Both of those operations have the potential to affect the availability of foraging and nesting habitat and may result in disturbance to golden eagles using the areas. Over the long life of the proposed mining operations, it is likely that more high quality golden eagle nesting and foraging habitat will be affected by limestone mines and that displacement will occur with some part of the North Slope lacking this species.

Given the current situation for golden eagles, there are concerns about effects for this species due to multiple threats throughout the species' range (**Pagel, pers. comm. 2013**). Because of the long life of the proposed project, the cumulative effects over time are expected to continue to pose threats to individuals and habitat. The proposed SQ project would add to the cumulative effects for this species.

e) Take: The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald and golden eagles, including their parts, nests, or eggs. Under the Eagle Act, "take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest or disturb." "Disturb" is defined in regulations as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment (Federal Register 74 (175): 46835-46879 9/11/09).

The regulation set forth in 50 CFR § 22.26 provides for issuance of permits to take golden eagles where the taking is associated with but not the purpose of the activity and cannot practicably be avoided. Most take authorized under this section will be in the form of disturbance; however, permits may authorize non-purposeful take that may result in mortality.

The regulation at 50 CFR § 22.27 establishes permits for removing eagle nests where: (1) necessary to alleviate a safety emergency to people or eagles; (2) necessary to ensure public health and safety; (3) the nest prevents the use of a human-engineered structure; or (4) the activity or mitigation for the activity will provide a net benefit to eagles. Only inactive nests may be taken, except in the case of safety emergencies. Inactive nests are defined by the continuous absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days leading up to the time of take. (Source: http://www.fws.gov/migratorybirds/BaldAndGoldenEagle Management.htm)

The golden eagle is also a "fully-protected" species in the State of California. Fully-protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. "Take" is defined in the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill".

Because there are currently no nests known in the immediate vicinity of the project, take (under the State of California's definition and under the federal Eagle Act) and disturbance to nesting golden eagles would not be expected. The Raptor Conservation Strategy contains provisions for annual surveys and nest monitoring and for actions if an active golden eagle nest were found in close proximity to the active mine site. If an active nest were found within close proximity, the Forest Service would work with the mining company and USFWS to determine whether an incidental take permit is needed at that time.

Summary for Golden Eagle: The proposed project would result in long-term losses of natural nest sites, with Alterative 1 affecting more suitable nesting habitat than Alternative 2. After the completion of mining, the quarry benches may provide man-made nest sites suitable for golden eagles. The project would also result in long-term effects to currently-suitable foraging habitat within the project footprint.

The proposed project would result in high levels of disturbance at and around the site. If, in the future, a nest is located in very close proximity to the active mining operations, there is a potential for death or injury of individuals as a result of mine operations (*e.g.,* blasts startling eagles in the nest resulting in young or eggs falling from the nest; vehicle collisions with eagles scavenging on roadkills; secondary poisoning, etc.). The Raptor Conservation Strategy contains provisions for USFWS coordination, monitoring, and "take" if an eagle nest is built close to the mining operations.

The proposal includes mitigation through relinquishment of mining claims on 540 acres (for development of 134-154 acres, depending on alternative); the mitigation parcels include suitable foraging habitat as well as suitable and occupied nesting habitat. A Raptor Conservation Strategy has been developed, per USFWS guidelines (**Appendix C**), and would help provide for mitigation and a coordinated conservation effort of the North Slope golden eagle population over the life of the project.

There is a degree of uncertainty about the potential effects to the golden eagles on the North Slope, especially for a project that is expected to last between 40 and 120 years. It is difficult to adequately predict the other activities and events over the next 10-20 years (much less 120 years) that may affect this golden eagle population. Taken cumulatively, there is a concern for golden eagle populations in California (http://katznerlab.com/eagles-in-the-california-desert).

V-2.3.5 – SBNF Watchlist Mammals

A number of SBNF Watchlist mammals are known from or near the analysis area (Forest Service observations and records, SBNF "All Species" GIS layer, SBCM records, CNDDB) (**Appendix A**) or have a high potential to occur there due to presence of suitable habitat.

V-2.3.5.1 - Bats

There are known occurrences of several Watchlist bat species on the North Slope and in similar habitat within a few miles of the analysis area. The analysis area has potential to support these species as well as some other species for which suitable habitat exists. Because of the similarity in potential effects for most of the bat species, the discussion of effects is presented after all of the species account and occurrence information for each species.

V-2.3.5.1.1 Western Small-Footed Myotis (Myotis ciliolabrum)

The western small-footed myotis is a SBNF Watchlist species, a BLM Sensitive species, and a Western Bat Working Group Medium Priority species. The western small-footed myotis rears its young in cliff-face crevices, erosion cavities, and beneath rocks on the ground. Some females care for their pups alone, while others form small groups. These bats can also be found hibernating in caves or mines, but little else is known about them; they are among America's least-studied animals (**BCI website**).

Western small-footed myotis bats have been detected at Cactus Flats, Jacoby Canyon, and near the Big Bear landfill (**SBCM surveys 2006**) in similar pinyon/juniper habitat. They are also known from Holcomb Creek and Omya's Butterfield/Sentinel quarry area to the west **(Brown and Rainey 2014)**. They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.*, 2014)**. They are likely to occur in the analysis area.

V-2.3.5.1.2 Long-Eared Myotis (Myotis evotis)

Long-eared myotis is a SBNF Watchlist species, BLM Sensitive species, and a Western Bat Working Group Medium Priority species. Long-eared myotis are found predominantly in coniferous forests, typically only at higher elevations in southern areas (between 7,000 and 8,500 feet). They roost in tree cavities and beneath exfoliating bark in both living trees and dead snags. Pregnant long-eared myotis often roost at ground level in rock crevices, fallen logs, and even in the crevices of sawed-off stumps, but they cannot rear young in such vulnerable locations. Only one other western forest bat has been found regularly roosting at ground level, the western small-footed myotis. Long-eared myotis capture prey in flight, but also glean stationary insects from foliage or the ground (**BCI website**).

Long-eared myotis bats have been detected at Jacoby Canyon (SBCM surveys 2006) and Wright Mine (SBNF surveys 1998) in similar pinyon/juniper habitat. They are also known from Holcomb Creek and Omya's Butterfield/Sentinel quarry area to the west **(Brown and Rainey 2014)**. They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.,* 2014)**. They are likely to occur in the analysis area.

V-2.3.5.1.3 Little Brown Myotis (Myotis lucifugus)

The little brown myotis is a SBNF Watchlist species. The San Bernardino Mountains population has been identified as a Western Bat Working Group Medium Priority species. In the Western U.S., the little brown myotis is found mainly in mountainous and riparian areas in a wide variety of forest habitats; from tree-lined xeric-scrub to aspen meadows. This species is especially associated with humans, often forming nursery colonies containing hundreds or thousands of individuals in buildings, attics, and other man-made structures. In addition to day roosts in tree cavities and crevices, little brown myotis seem quite dependent upon roosts which provide safe havens from predators that are close to foraging grounds. Little brown myotis forage over water where their diet consists of aquatic insects, mainly midges, mosquitoes, mayflies, and caddisflies. They also feed over forest trails, cliff faces, meadows, and farmland where they consume a wide variety of insects, from moths and beetles to crane flies (BCI website).

Little brown myotis bats have been detected at Cactus Flats (SBCM surveys 2006) in similar pinyon/juniper habitat and at Cushenbury Springs (**Kielhold 1993**). They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.,* 2014)**. They are likely to occur in other parts of the analysis area.

V-2.3.5.1.4 Long-Legged Myotis (Myotis volans)

Long-legged myotis is a SBNF Watchlist species and a Western Bat Working Group High Priority species. Long-legged myotis are especially dependent on wooded habitats from pinyon-juniper to coniferous forests, usually at elevations of 4,000 to 9,000 feet. Radio-tracking studies have identified maternity roosts beneath bark and in other cavities. Most nursery colonies live in at least 100 year-old trees that provide crevices or exfoliating bark. Long-legged myotis are typically located in openings or along forest edges where they receive a large amount of daily sun. Though maternity colonies are most often formed in tree cavities or under loose bark, they also are found in rock crevices, cliffs, and buildings. Long-legged myotis forage over ponds, streams, water tanks, and in forest clearings, often on moths (BCI website).

Long-legged myotis bats have been detected at Jacoby Canyon and Cactus Flats (SBCM surveys 2006) in similar pinyon/juniper habitat and at Cushenbury Springs (**Kielhold 1993**). They are also known from Holcomb Creek and possibly at Omya's Butterfield/Sentinel quarry area to the west **(Brown and Rainey 2014)**. They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.,* 2014)**. They are likely to occur in the analysis area.

V-2.3.5.1.5 Yuma Myotis (Myotis yumanensis)

Yuma myotis is a SBNF Watchlist species, a Western Bat Working Group Low-Medium Priority species. Occasionally roosting in mines or caves, Yuma myotis are most often found in buildings or bridges. Single males also sometimes roost in abandoned cliff swallow nests. Tree cavities are used for most nursery roosts. These bats typically forage over water in forested areas (BCI website).

Yuma myotis have been detected at Cushenbury Springs (**Kielhold 1993**). They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.,* 2014)**. They may occur in other parts of the analysis area.

V-2.3.5.1.6 Spotted Bat (Euderma maculatum)
The spotted bat is a SBNF Watchlist species, a CDFW Species of Special Concern, a BLM Sensitive species, and a Western Bat Working Group High Priority species. Spotted bats are found in a variety of habitats ranging from below sea level desert, sagebrush, montane forests and up to high-elevation coniferous forests. This includes foraging habitat in forest openings, pinyon juniper woodlands, large riverine/riparian habitats, and riparian habitat associated with small to mid-sized streams in narrow canyons, wetlands, meadows, and old agricultural fields. They are known from elevations between 3,500–4,000 feet in the Sierra Nevada, but one or more individuals have been heard at several sites up to 8,500 feet.

The spotted bat is rare, but could be anywhere suitable cliff habitat is found. They are closely associated with rock cliffs, where they roost in crevices. The abundance and distribution of suitable cliff habitats may limit the distribution of this species. Mines and caves may also be used during winter. Roost sites are often located in the vicinity of open water. Spotted bats hibernate but occasionally become active during the winter. They subsist almost entirely on moths, foraging over meadows, along forest edges, and in open woodlands. They usually forage above the canopy or above the ground. They may move as far as 6 miles between day roost and feeding areas. Spotted bats are typically solitary, roosting and foraging alone. Females give birth to one young/year between June and July.

Spotted bats have been detected at Cactus Flats (SBCM surveys 2006) in similar pinyon/juniper habitat. They have also been detected at Omya's Butterfield/Sentinel quarry area to the west, suggesting that this species may be roosting in the high walls of the quarries **(Brown and Rainey 2014)**. They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.,* 2014)**. They are likely to occur in the analysis area.

V-2.3.5.1.7 Pocketed Free-Tailed Bat (Nyctinomops femorosaccus)
The pocketed free-tailed bat is a SBNF Watchlist species, a CDFW Species of Special Concern, and a Western Bat Working Group Medium Priority species. Pocketed free-tailed bats live in pinyon/juniper woodlands, and desert habitats. They roost in crevices high on cliff faces of rugged canyons and must drop from the roost site to gain flight. Nursery colonies are relatively small (usually fewer than 100 individuals) and located in rock crevices, caverns/mines, and buildings. They forage over ponds, streams, or arid desert habitat, feeding on flying insects (**Zeiner *et al.* 1990**).

Pocketed free-tailed bats have been detected at Cushenbury Springs (**Kielhold 1993**). Suitable habitat occurs at the project area and it is likely to occur.

V-2.3.5.1.8 Western Mastiff Bat (Eumops perotis californicus)
Yuma myotis is a SBNF Watchlist species, a CDFW Species of Special Concern and a Western Bat Working Group High Priority species. Western mastiff bats roost in cliff-face crevices and feed high above the ground. They are rarely seen and approach the ground only at a few select drinking sites. This bat is severely limited by available drinking water. Its long, narrow wings preclude it from drinking at ponds less than 100 feet long (Source: http://www.batcon.org/index.php/all-about-bats/species-profiles.html).

In California, western mastiff bats appear to feed primarily on moths (Lepidoptera), but may also take beetles and crickets. Western mastiff bats emit an audible echolocation call and can be detected flying throughout the night. These strong, fast fliers cover an extensive foraging area in an evening. Studies have found them foraging 14-18 miles from roost sites. Often multiple animals are detected together, and this species may travel or forage in groups. Unlike Mexican free-tailed bats that undertake long seasonal migrations, western mastiff bats move relatively short distances seasonally. Although capable of lowering their body temperatures for short periods of time, they do not undergo prolonged hibernation, and may be periodically active throughout the winter. (Source: **Brown and Rainey 2014)**

Western mastiff bats are found in a variety of biotic environments from low desert scrub to chaparral, oak woodland and ponderosa pine. However, the abiotic components appear to determine their distribution. This crevice-dwelling species predominantly selects cliff faces (granite, sandstone, or columnar basalt) or exfoliating granite boulders, but also utilizes cracks in buildings. During studies in California, roosts were in crevices at least 10 feet above the ground. Sentinel-Butterfield quarry walls and crevices in near vertical natural limestone exposures nearby likely provide similar roosting habitat for this species. (Source: **Brown and Rainey 2014)**

Western mastiff bats were detected in 2014 during surveys at Omya's Butterfield and Sentinel quarries to the west of the SQ project area. They have also been detected at Cactus Flats in pinyon/juniper habitat (SBNF records) and at Cushenbury Springs (**Kielhold 1993**). They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.*, 2014)**. Suitable habitat occurs at the project area and it is likely to occur.

V-2.3.5.1.9 Potential Effects for Bat Species
Mortality/injury of bats may occur for those species using in rock outcrops, cliffs, and crevices or that roost in trees during vegetation removal and mining operations. Blasting, activities, and noise from the operations could disturb roosting bats during the day causing them to flush, possibly increasing the risk of predation. Bats and other organisms may also be attracted to any water-like surfaces (*e.g.*, open sumps of process waters potentially) associated with operations of the project and be exposed to potentially injurious chemicals (**Brown and Rainey 2014)**.

Blasting would not be conducted at night (due to safety reasons) but night-time mining activities do occur. Noise from night-time mining activities may interfere with important vocalizations (including echolocation) that are used for communicating between colony members and territorial disputes. Night-time noise could also interfere with courtship, breeding, and foraging success.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

The project would result in more clearing of vegetation, affecting foraging opportunities by reducing the localized insect population. All of the alternatives may result in long-term loss of roosting, foraging, breeding, and hibernating habitat for this species.

When mining and reclamation has ceased on each quarry bench, some of the rock faces of the quarry may again provide suitable sheltering habitat, depending on the proximity to ongoing mining activities and disturbance. When all mining and reclamation has ceased, then crevices and fractures throughout the quarry would be available for bat species that use that type of habitat for roosting. In and near areas of active mining operations, it is unlikely that bats would use the rock outcrops and cliff faces due to the disturbance.

The mitigation package for all alternatives includes relinquishment of 540 acres of claims. As a result, those areas would be protected from future mining, providing habitat for Watchlist bats into the future.

V-2.3.5.2 San Bernardino Golden-Mantled Ground Squirrel (Spermophilus lateralis bernardinus)

The golden-mantled ground squirrel is a SBNF Watchlist species. The San Bernardino golden-mantled ground squirrel is a locally-endemic subspecies with few CDFW records. Forest Service records for golden-mantled ground squirrel for the San Bernardino Mountains include: Sugarloaf Mountain, Bear Mountain ski area, Snow Summit ski area, San Gorgonio Peak, the south fork of the Santa Ana River, Holcomb Valley, Snow Valley recreation residence tract, Fawnskin, Green Valley Lake (SBNF records, R. Eliason, pers. observ.).

Golden-mantled ground squirrels inhabit a wide variety of montane habitats from the upper edge of the pinyon belt to above timberline. They are most common in open, well-illuminated forests with a mix of tall trees, brush, and open ground supporting herbaceous plants. Golden-mantled ground squirrels have also been found in sagebrush and meadow habitats with abundant rocks for shelter.

Golden-mantled ground squirrels dig their burrows beneath rocks, stumps, and logs; in banks; along washes; at the base of trees; and beneath buildings. They use these burrows for resting, hibernation, shelter, rearing of young, and escape from predators. Hollowed-out logs, stumps, and rock piles also provide shelter and protection while foraging. Golden-mantled ground squirrels breed shortly after they emerge from hibernation, usually in March or April, but sometimes as late as May. (**Source: USFW 2006** LMP Species Accounts)

Golden-mantled grounds squirrels are known from the vicinity of the analysis area and are very likely to occur throughout it. In the analysis area, there is suitable habitat for this species in the rocky slopes in pinyon-juniper woodland and the mixed conifer/pinyon transition areas at higher elevations.

See **Part II-3.2** discussions about generalized effects that may apply to this species and its habitat. There is potential for mortality of individuals during ground clearing if they were unable to escape den sites. Equipment could collapse burrows and sheltering site, resulting in entrapment or suffocation. Any currently suitable or occupied habitat that would become haul road or quarry would become unsuitable for this species; over time, approximately 154 acres of habitat would become unsuitable.

During the life of the mining operation (40-120 years), golden-mantled ground squirrels inhabiting the areas around the quarry and haul road would experience high levels of disturbance. This may cause temporary displacement, behavioral changes, or displacement. Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2. See **Part II-3.2.8** for a discussion of the effects of disturbance.

The mitigation package for all alternatives includes relinquishment of 540 acres of claims. As a result, those areas would be protected from future mining, providing some suitable habitat for this species into the future.

V-2.3.5.3 Lodgepole Chipmunk (Tamias speciosus speciosus)

The lodgepole chipmunk is a SBNF Watchlist species. The lodgepole chipmunk is found at elevations of 4,921–9,843 feet in the Transition, Canadian, and Hudsonian life zones of California. The distribution of the southern California population of lodgepole chipmunk is discontinuous. This taxon historically occurred on the upper slopes of the San Josito, San Jacinto, San Bernardino, San Gabriel, and Piute Mountains of southern California, but has apparently been extirpated from the San Jacinto Mountains.

Records for the SBNF for lodgepole chipmunk include Whitewater Creek (7,500 feet), Mt. San Bernardino, Fawnskin, Sugarloaf, Bear Mountain and Snow Summit Ski Resorts, Camp Angelus, and Dry Lake (9,000 feet) in the San Gorgonio Wilderness Area.

Throughout their range, lodgepole chipmunks are generally found in open-canopy forests with a mix of shrubs and trees. Lodgepole chipmunks typically occur in habitats with approximately

40% vegetation cover, numerous large boulders, and some open ground. They are common in lodgepole pine forests, but also occur in open-canopy stages of other forest habitats including white fir, Jeffrey pine, and mixed conifer. They appear to avoid pure stands of conifers, preferring an understory shrub component. Lodgepole chipmunks are more arboreal than most other species of chipmunks. They use trees for refuge, observation posts, and nests. They also use cavities in logs, snags and stumps, and underground burrows. (Source: **USFS 2006** LMP).

This species is known from the areas close to the analysis area; it is may occur in the southern portion of analysis area at higher elevations with conifer stands. Habitat on the project area is at the northern end of their distribution in this part of the San Bernardino Mountains and transitions out of suitability to the north on the desert-facing slopes. The effects for lodgepole chipmunks are similar to that described above for golden-mantled ground squirrel.

V-2.3.5.4 San Diego Pocket Mouse (Chaetodipus fallax fallax)
The San Diego pocket mouse is a CDFW Species of Special Concern and is a SBNF Watchlist species. The historical and present distribution of the San Diego pocket mouse is restricted to San Diego, Riverside, and San Bernardino Counties in southern California. The range extends from the eastern San Gabriel Mountains in the interior to near San Onofre on the coast, and south into Baja California. The elevational range of this species extends from sea level in the coastal portion of its range to 4,500 feet the Santa Rosa Mountains in Riverside County and 6,000 feet at Cactus Flat on the north side of the San Bernardino Mountains in San Bernardino County.

A broad range of habitats appears to be occupied on the desert side of the mountains. The San Diego pocket mouse has been found in pinyon-juniper woodland, desert scrub, rocky slopes, and agave-ocotillo habitat. On desert slopes of the eastern San Gabriel Mountains, the species' distribution was closely correlated with the presence of yucca, particularly on dry, rocky southern slopes. The availability of shelter provided by rocky slopes or habitats may increase species abundance. The San Diego pocket mouse generally exhibits a strong microhabitat affinity for moderately gravelly and rocky substrates.

The breeding period for San Diego pocket mouse is generally March-May. The average litter size for this species is four, and the gestation period is 24-26 days. San Diego pocket mice are primarily nocturnal and are active year-round with reduced surface activity during cold weather. They excavate burrows in gravelly or sandy soils for daytime resting, predator escape, and care of young. Pocket mice tend to select microhabitats with shrub or tree canopy cover or rocky areas for nocturnal foraging bouts.

San Diego pocket mice forage for seeds of forbs, grasses, and shrubs, exhibiting a low to moderate preference for forb and shrub seeds and a high preference for grass seed. Seeds are transported in cheek pouches and stored in and around the burrow. San Diego pocket mice occasionally eat insects. Free water is apparently not necessary for survival. San Diego pocket mouse appears to be sensitive to habitat fragmentation and degradation. (Source: **USFS 2006** LMP)

San Diego pocket mice are known Cactus Flats/Lone Valley area (SBCM and CNDDB records 2002, 2006) in habitat that is similar to that found at the analysis area and at Cushenbury Springs (**Kielhold 1993**). The Cactus Flats site is at close to the same elevation as the project area and the Cushenbury Springs site is lower. This species is known from several other locations near the analysis area: Silver Creek (CNDDB record from 1954), Arrastre Canyon (CNDDB record from 1976), and Cushenbury Springs (**Kielhold 1993**). They are likely to occur throughout the analysis area. The rocky slopes in pinyon-juniper woodland and the desert transition habitat are highly suitable for this species.

The effects for San Diego pocket mice are similar to that described above for golden-mantled ground squirrel.

V-2.3.5.5 Southern Grasshopper Mouse (Onychomys torridus ramona)

The southern grasshopper mouse is a SBNF Watchlist species and a CDFW Species of Special Concern. Southern grasshopper mice are found in the Mojave Desert and southern Central Valley of California. Alkali desert scrub and desert scrub habitats are preferred, with somewhat lower densities expected in other desert habitats, including succulent shrub, wash, and riparian areas. It also occurs in coastal scrub, mixed chaparral, sagebrush, low sage, and bitterbrush habitats. This species is uncommon in valley foothill and montane riparian, and in a variety of other habitats. They prefer low to moderate shrub cover. Nests are constructed in burrows abandoned by other rodents or may be excavated. They frequent desert areas with friable soils for digging. Grasshopper mice feed almost exclusively on arthropods, especially scorpions and orthopteran insects. Vertebrates (salamanders, lizards, frogs, and small mammals) and seeds are minor components of the diet.

Grasshopper mince are active year-round and are nocturnal. Peak breeding is from May to July, but may start in January under ideal conditions, and may continue year-round. Gestation is 27-30 days. Litter size averages 4 young (range 2-6). They produce as many as 6 litters per year in the wild. Both males and females care for the young. (Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx).

Southern grasshopper mice are known from Cushenbury Springs (**Kielhold 1993**). This species has a high likelihood of occurring in the analysis area due to abundance of suitable habitat. The effects for southern grasshopper mice are similar to that described above for golden-mantled ground squirrel.

V-2.3.5.6 San Diego Desert Woodrat (Neotoma lepida intermedia)

The San Diego desert woodrat is a CDFW Species of Special Concern and is a SBNF Watchlist species. Desert woodrats commonly inhabit Joshua tree woodlands, pinyon-juniper woodlands, mixed chaparral, sagebrush, and desert habitats. In the Little San Bernardino Mountains, desert woodrats occupy sandy deserts and boulder outcrops. They inhabit Joshua tree woodland, pinyon-juniper woodlands, mixed and chamise-redshank chaparral, sagebrush, and most desert habitats. They are found from sea level to 8500 feet in elevation.

Desert woodrats have been observed actively avoiding open areas that did not provide adequate refuge sites. In rocky outcrops, desert woodrats are known to construct dens in the cracks between boulders using sticks, yucca leaves, tin cans, and other assorted materials. Desert woodrats appear to preferentially occupy dens in habitats with large-sized rocks and boulders because they provide better predator protection. In general, desert woodrats breed from late October or November through April, and females can produce up to four litters of two to four young each year. The gestation period is 30–36 days. Adult desert woodrats are relatively sedentary and are unlikely to disperse to new areas. However, natal site dispersal in the eastern Mojave Desert appears to be greater for male desert woodrats.

Like other woodrats, they construct above-ground houses of twigs, sticks, cactus parts, and rocks. The house is usually built against a rock crevice, at the base of a bush, or in the lower branches of a tree/shrub. Houses are used for breeding, food caching, and shelter.

Desert woodrats exhibit nocturnal foraging behavior; any diurnal activity is restricted to the den site. Desert woodrats are primarily herbivorous and rely on a continuous supply of green vegetation for food and water. They do not appear to be highly selective in the type of vegetation they eat, but may be particular about the parts of each plant species they consume. Desert woodrats do not need to drink water. They are largely dependent upon succulent vegetation such as cactus and agave for moisture, although they can be sustained on creosote year-round. (Sources: **USFS 2006** LMP; http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx).

San Diego desert woodrats are known from Cactus Flats/Lone Valley (SBCM data) in similar habitat. The analysis area is on the edge of the known range of this subspecies. Records for the desert species, *Neotoma lepida*, are known from the Mitsubishi West Quarry site (**White 2000**), Cushenbury Springs (**Kielhold 1993**) and in lower Marble Canyon (**MacKay and Thomas 2008**). The San Diego desert woodrat subspecies may occur in the analysis area due to an abundance of suitable habitat. The effects for San Diego desert woodrats are similar to that described above for golden-mantled ground squirrel.

V-2.3.5.7 Porcupine (Erethizon dorsatum)

The Forest Service has identified this species as a local viability concern (**Stephenson and Calcarone 1999**) and is a SBNF Watchlist species. The porcupine population in California is restricted to the northern Coast, Klamath, and Cascade ranges, and south through the Sierra Nevada. An isolated occurrence has been recorded in the San Bernardino Mountains in southern California. Reported sightings of porcupines in southern California are rare: one historic occurrence was reported from the San Bernardino Mountains in 1906, a road kill in the San Bernardino Mountains in the 1960s, a sighting at Snow Summit Ski Resort in Big Bear Lake in the mid-1990s, and a recent sighting near Bertha Peak in 2013.

In California, porcupines are primarily found in coniferous forests, but across western North America they occur in a wide variety of habitats including pinyon-juniper woodlands, riparian forests, sagebrush, rangelands, and desert chaparral. Porcupines have been known to wander between different habitats and occasionally migrate short to long distances. Porcupines shift their foraging habits between winter and summer. During the winter, they feed primarily on the inner bark of trees and on evergreen needles. In the western portion of their range, porcupines prefer to forage on yellow pine trees. In summer they feed on a variety of food items, including roots, stems, leaves, berries, catkins, seeds, flowers, nuts, riparian vegetation, and grass. In southern California, the status of the porcupine population is unknown. (Source: **USFS 2006** LMP Species Account)

Suitable habitat for porcupines exists in parts of the analysis area. They may occur throughout the analysis area. The effects for porcupines are similar to that described above for golden-mantled ground squirrel.

V-2.3.5.8 Ringtail (Bassariscus astutus)

The Forest Service has identified this species as a local viability concern (Stephenson and Calcarone 1999) and is a SBNF Watchlist species. Ringtails are generally known to occupy brushy and wooded areas along watercourses in foothill and lower montane canyons. The species occurs at elevations from sea level to 8,800 feet. Its principal habitat requirements seem to be den sites among boulders or in hollows of trees and sufficient food in the form of rodents and other small animals. Rocky habitats are apparently preferred. In the San Gabriel Mountains, ringtails occur in canyons in the chaparral belt. Ringtails are similar to raccoons in that they are often found within 0.6 mile of a permanent water source. Unlike raccoons, ringtails reportedly avoid urbanized areas. Ringtail densities can be as high as 27-53 per square mile.

Ringtails produce one litter per year. Dens may be in a hollow tree, a rock pile, a crevice in a cliff, or in abandoned burrows or woodrat nests. Mating occurs in late winter and the litter of three or four young is born in May or June. Ringtail young venture from the den at 45-50 days, and both parents raise the young until August or September, when the young disperse. Ringtails are nocturnal and active year-round. Although primarily carnivorous, ringtails appear to be opportunistic feeders, eating insects, fruits, berries, frogs, birds, rodents (white-footed mouse and woodrat) and rabbits. The species forages both on the ground and in trees, usually near but not in water. In summer and fall, the ringtail diet consists primarily of insects, while birds, mammals, and carrion are eaten in the spring and winter. Ringtails ambush their prey and kill by delivering a fatal bite to the neck.

Ringtails have been observed at Cushenbury Springs (**Kielhold 1993**), near Whiskey Springs (SBNF records), and at wildlife water sources in the Mitsubishi quarry site (**J&J Restoration**). They are expected to occur throughout the analysis area. The effects for ringtails are similar to that described above for golden-mantled ground squirrel.

V-2.3.5.9 American Badger (Taxidea taxus)
The American badger is a CDFW Species of Special Concern and is a SBNF Watchlist species. Known localities of badgers in the San Bernardino Mountains are largely in desert montane areas, including Coxey Creek, Burnt Flats, Redonda Ridge, Burnt Flats, and the Big Bear Ranger Station. Additional records for the San Bernardino Mountains include observations of road-killed badgers at Mill Creek Ranger Station, and in the towns of San Bernardino and Colton adjacent to the San Bernardino Mountains.

American badgers occur in a wide variety of open, arid habitats, but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub; they are not usually found in mature chaparral. The principal habitat requirements for this species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground. American badgers are primarily found in areas of low to moderate slope. Burrows are used for denning, escape, and predation on burrowing rodents. Badgers may change dens every day, except during breeding. American badgers are carnivorous and are opportunistic predators, feeding on mammal species such as mice, chipmunks, ground squirrels, gophers, rabbits, and kangaroo rats. They also eat reptiles, insects, birds and their eggs, and carrion. They are nocturnal and diurnal.

While there are no records of American badgers in the analysis area, suitable habitat exists and it may occur due to the proximately of known occurrences. Portions of the analysis area may support soils suitable for digging; much of the analysis area's carbonate rock substrates would not. The likelihood of occurrence may be low due to rocky soils and paucity of burrowing mammals for pretty. The effects for the American badger are similar to that described above for golden-mantled ground squirrel.

V-2.3.5.10 Western Spotted Skunk (Spilogale gracilis)
The western spotted skunk is a SBNF Watchlist species. The western spotted skunk is believed to be widespread throughout California, but the present distribution and abundance of this species on NFS lands is not well-understood. In 2008-2009, several spotted skunks were caught on motion-sensor cameras in the Big Bear area. One was observed in near Bluff Mesa (SBCM), one near Van Dusen Canyon (SBCM), and another near Delamar Mountain (**Borchert pers. comm.).**

These Big Bear area records are all considerably higher in elevation than CDFW's Wildlife Habitat Relationship's description of occupied habitat (between sea level and 4,500 feet). Historically, this species was known to occur in rocky canyons on the coastal side of the San Gabriel Mountains and probably occurred in desert slope canyons as well. In other portions of its range, western spotted skunk is commonly found near streams, in canyons, on rocky cliffs, in arid valleys, and in a variety of forest and woodland habitats. It has also been reported on ocean beaches and often inhabits old buildings and other artificial structures. The western spotted skunk uses underground burrows, cavities in rocks or trees, and crevices in artificial structures for protection, resting, and rearing of young.

While spotted skunks have not been recorded from the analysis area, there is potential that they may occur in the pinyon/juniper habitat portions of the analysis area. The effects for spotted skunks are similar to that described above for golden-mantled ground squirrel.

V-2.3.5.11 Nelson's Bighorn Sheep (Ovis canadensis nelsoni)
Nelson's bighorn sheep is a BLM Sensitive species, was identified by the Forest Service as a local viability concern species (**Stephenson and Calcarone 1999**), and is a SBNF Watchlist species. Nelson's bighorn sheep are considered a CDFW fully-protected mammal under section 4700 of the Fish and Game Code, which prohibits all "take," defined in the Fish and Game Code as, "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill". The following discussion was prepared with substantial review and input from Jeff Villepique, California Department of Fish and Wildlife biologist with local expertise and knowledge of the San Bernardino Mountains population of bighorn sheep.

Life History and Baseline: The following information is summarized from the LMP species accounts (**USFS 2006**) and updated in a review by CDFW biologist Jeff Villepique (**pers. comm. 2013**). Nelson's bighorn sheep in the San Bernardino Mountains are considered to constitute two separate populations: the larger population (San Gorgonio Herd) occurs in the vicinity of Mount San Gorgonio in the San Gorgonio Wilderness; the other population (Cushenbury Herd) occurs on the northern edge of the range in desert-facing canyons (*e.g*., Furnace, Bousic, Arctic, and Marble Canyons). Desert bighorn sheep occur in isolated populations distributed among xeric mountain ranges in the southwestern U.S. and northern Mexico.

Escape terrain and sufficient forage and separation from domestic livestock are identified as the most important habitat components for desert bighorn sheep. Escape terrain is defined as steep slopes (80 percent or steeper) with abundant rock outcrops and sparse shrub cover (canopy cover of 30 percent or less). Nelson's bighorn sheep in the San Bernardino Mountains occur at elevations of 2,500-11,490 feet (*i.e.,* to the summit of Mount San Gorgonio). During the winter and early spring, Nelson's bighorn sheep occur primarily in escarpment chaparral in the lower canyons at 3,000-6,000 feet.

The breeding season of Nelson's bighorn sheep exhibits substantial plasticity; young may be born as early as December 25 (observed in the San Gorgonio population) and as late as August (inferred from <2 month old lamb observed in the Cushenbury population in October; CDFW records). Single lambs (and rarely twins) are born following a six month gestation; however, the timing of breeding varies and is dependent on maternal condition. Such variation is most likely a response to variability in seasonal timing of precipitation, which affects the timing of peak nutrition in available forage species. Female body condition and ovulation, in turn, depend upon timing of peak nutrition.

Wide variation in timing of parturition has been demonstrated among Nelson's bighorn sheep populations. While the majority of lambing may occur in a particular 1–2 month span, lambs may be born far outside of those modal periods (**Rubin *et al.* 2000**). Over a four-year period in one Sonoran Desert population of desert bighorn in California, lambing spanned 7 months (February through August; **Rubin *et al.* 2000**). Most models of future climate for southern California predict variation in timing and quantity of precipitation. The winter droughts of 2011-2012 and 2012-2013, and 2013-2014, combined with above average summer precipitation could be a harbinger of future variability. Empirical observations and predicted climate variability support the potential presence of vulnerable neo-natal bighorn lambs at almost any time of year.

During the first few weeks after giving birth, ewes remain alone with their lambs in steep terrain until they join a nursery group. Lambs are weaned at 3–6 months, and juveniles remain with the ewes through their first or second year. Rams may mature physiologically at 6 months of age; however, behavioral constraints preclude mating by juvenile males in the presence of dominant adult males. During the height of the rutting period, mature rams seemed to have little fear of humans and, in the San Gabriel Mountains, made movements of 6 or more miles in search of ewes (CDFW data).

From birth, ewes remain together in "ewe groups." Their gregarious and philopatric behavior limits their dispersal. While genetic data suggest that movement of ewes from the San Gorgonio, population was responsible for establishment of the Cushenbury population, the lack of heterozygosity in the Cushenbury population does not provide evidence of immigration from that source population in the recent past (**Epps *et al.* 2010**). A single mitochondrial haplotype (*i.e.,* lineage from one female founder) was detected among 15 samples evaluated by Epps *et al.* (**2010**), while microsatellite DNA illustrate the lowest genetic diversity among all populations of desert bighorn evaluated (**Epps *et al.* 2010**).

In contrast to the fidelity that young ewes exhibit toward their maternal ewe group, young rams generally leave the maternal group at about 2 years of age, joining other males during sexual segregation. Males and females often select different resources and home ranges throughout much of the year, aggregating through the mating period, but diverging for the majority of the year. This pattern of sexual segregation is well-established among dimorphic ungulates including Nelson's bighorn sheep, and researchers have suggested that habitat requirements for males and females may be so different that the sexes should be managed as though they are different species (**Bleich *et al.* 1997**).

Genetic and observational data suggest that ram movement among ewe groups is common. Young ewes learn the locations of resources, such as foraging areas, water sources, bedding/resting areas, etc. from their mothers and/or older females in a ewe group and demonstrate a high degree of philopatry to these traditional home ranges throughout their lives. Rams do not exhibit the same site fidelity as ewes and tend to move among ewe groups. Home ranges in one study were found to average 9.8 square miles and 7.8 square miles for rams and ewes, respectively.

Bighorn sheep in montane environments often migrate between winter and summer ranges, generally moving downslope in winter and spending summer in higher elevation habitats. The Cushenbury bighorn population inhabits a limited band of suitable habitat, lacking both the alpine habitat and lower-elevation range used by bighorn sheep in the San Gorgonio and San Gabriel bighorn sheep ranges. Data from GPS collars deployed in the Cushenbury and San Gabriel populations demonstrate that bighorn sheep in the Cushenbury herd, on average, occupied winter elevations (mean 5551'[1,692 m]; range 4364-8005' [1,330–2,440 m]) only 384' (117 m) lower than those used in summer (mean 5935' [1,809 m]; range 4416-8032' [1,346–2,448 m]), whereas animals in the San Gabriel population exhibited twice the average seasonal change in elevation (840' [256 m]; winter mean 6093' [1,857 m]; range 3287-9144' [1,002–2,787 m]; summer mean 6936' [2,114 m]; range 3199-9701' [975–2,957 m]; CDFW data).

Upper elevations used by bighorn sheep in the Cushenbury herd are constrained by the transition to conifer forest, a cover type generally avoided by bighorn sheep, particularly females, on those north-facing slopes. A shift to higher elevations is predicted as a future response by bighorn sheep to habitat alternations expected under a warmer, more xeric climate predicted under a majority of climate change scenarios (**Epps *et al.* 2004**). The relatively narrow elevation band occupied by the Cushenbury population and lack of high-elevation habitat may limit the resilience of the population to future changes. Water availability may also restrict movement of bighorn sheep during hot summer months.

In general, bighorn sheep feed in the early morning, at midday, and in the evening, lying down and chewing their cud at other times, and bedding down for the evening. Foraging and bedding spots may be used for years. Daily foraging and resting cycles also vary depending on forage quality. Seasonal activity depends on availability of water, forage, and escape terrain. Typically, bighorn sheep congregate near dependable water sources from May through October, when temperatures are highest. This aggregation of individuals also corresponds with breeding activities. Young bighorn sheep learn locations of escape terrain, water sources, and lambing habitat from older individuals in the group.

Until the mid-1990s, there were no documented observations of bighorn in the areas between the Cushenbury and San Gorgonio Populations. In the past, all of the North Slope sightings were to the west of Highway 18, although suitable habitat may exist to the east. It was suspected that Arrastre Creek's steep slopes might provide a travel corridor and link between the two populations. A sighting in Arrastre Creek at the crossing with 2N02 a couple of years ago and a skull in Round Valley in 2003 may confirm that linkage. It is not known, however, if these anecdotal reports reflect rare movements by males during the rut, or indicate contiguous habitat sufficient to allow movement by females among the North Slope and the San Gorgonio populations. These records may not provide evidence of immigration/emigration; they may have simply been exploratory moves that did not result in mixing of the herds. Although the Granite Peaks of the San Bernardino Mountains may provide suitable habitat, there are no records of bighorn in that area.

The following additional information was derived from a Forest Service records, personal observations and communications, and literature, as cited. The first Forest Service records for bighorn sheep on the North Slope were from May 1975 when personnel from Specialty Minerals Incorporated (formerly Pfizer, Inc.) observed three ewes in Furnace Canyon and using Netthill spring area (**Forest Service memo 1975)**. In 1990, the Forest Service received information of an older sighting from October 1948 when a pair of hunters in upper Arctic Canyon observed six bighorn. At the time, that was reported to be "the most bighorn sheep seen at one time on the North Slope" (**Forest Service records 1990).**

It is believed that subsistence miners and squatters residing in the north-facing canyons in the 1960s and 1970s regularly poached deer and bighorn sheep, potentially limiting the bighorn sheep population size in the area. By the 1980s, the expansion of the limestone mining operations resulted in large areas of the North Slope being blocked off and becoming inaccessible to the general public. During that time, the Forest Service was also actively discouraging squatting on NFS lands and they were essentially gone by the 1980s (**Forest Service records.).** There is speculation that after that occurred, the North Slope bighorn population was able to expand. By the early 1990s, small groups of bighorn sheep were regularly observed at all three of the large limestone mining operations and the population size was estimated to be 40-50 animals.

The Cushenbury bighorn sheep herd is likely limited by a carrying capacity of some 50 animals, the largest number thought to have been present at any time (1970s; CDFW data). While data validating a carrying capacity of ~50 animals are lacking (*e.g.*, recruitment rates, body condition), limited resources were suggested by documentation (in the 1990s) of prominent "browse lines" on shrubs used as forage by bighorn sheep, suggesting forage limitation **(S. Torres,** CDFW, personal communication with J. Villepique**)**. The home range of the Cushenbury population is approximately 34 km^2 (95% composite kernel home range 1995–2003 and 2006–2010; CDFW data), comparable to the area occupied by a single sub-group in other Transverse Range populations (*e.g.*, the South Fork of Lytle Cr.), where the environment is less xeric, with greater productivity.

Management for the long-term viability of the Cushenbury population must be based on a cautionary estimate of an upper bound for numbers of animals that the habitat may sustain. Available information supports 50 as a reasonable estimate of carrying capacity. **Berger (1990**) demonstrated empirically that bighorn sheep populations under 50 animals were not viable over a 50-year period. Because the Cushenbury population of bighorn sheep is likely limited by habitat to a small population (<50) having a high probability of local extinction, a probability which is inversely proportional to numbers of animals, losses of habitat are likely to reduce the probability of long-term viability.

For the Cushenbury herd in the San Bernardino Mountains, major threats are disease transmission from domestic sheep and goats; predation by feral dogs and mountain lions; collisions with cars along Highway 18; potential death from ingesting balloons; habitat loss and fragmentation from large scale open pit mining operations; potentially reduced survival due to *Psoroptes sp*. mite infections; and, effects of drought and wildfire on habitat quality and availability. Unlike fire-adapted chaparral habitats of the San Gabriel Mountains, desert transition habitat in the Cushenbury bighorn herd may be negatively affected by wildfire. **Bleich *et al.*** (2009) determined that bighorn sheep in the Cushenbury population avoided recently burned areas and acknowledged differences in response by bighorn sheep to fire may have resulted from differences in precipitation between those sheep populations.

Until 2007, the Cushenbury herd was thought to number in the 30s (SBNF records). In October 2007, a herd of domestic sheep and goats was discovered at the top of Crystal Creek by USFS fire personnel mopping up “hot spots” from the Butler II wildfire. Those domestic animals apparently were released by their owner at the base of Crystal Creek, when the owner evacuated the fire, approximately three weeks earlier. Domestic sheep and goats were observed in the vicinity of the old Butterfield quarry and near the communications repeater a full four weeks after the start of the Butler II fire, and were likely present in bighorn sheep habitat for one month. A group of 17 uncollared bighorn sheep of mixed sex and age classes had been observed in this area immediately prior to the start of the Butler II fire (**Villepique, pers. comm. 2013**).

Following this proximate occurrence of domestic sheep and goats, bighorn sheep were not observed in the western portion of the range from 2008 to 2012. All indications are that only a small group of 10-15 bighorn sheep persisted in the Cushenbury range, occupying its east end (primarily east of Marble Canyon), while the western group of bighorn is presumed to have died from diseases transmitted from the domestic sheep and goats. Mass die-offs caused by disease transmission occur regularly in bighorn sheep and are a predictable outcome of contact between domestic and wild sheep (Wild Sheep Working Group. 2012).

In fall 2012, several ewes and a young ram were again observed and photographed in the western portion of the range at the OMYA mine. Their composition (including collared animals) was consistent with the movement of animals from the remnant group in the east end of the range, not a reappearance of long-missing bighorn sheep (**Villepique, pers. comm. 2013**).

The second-most frequent cause of mortality (after the inferred transmission of disease from domestics) is mountain lion predation. CDFW began limited captures of bighorn sheep and fitted radio-collars to three bighorn in 1995 and monitoring movement and survival using radio telemetry. Twelve of 24 (50%) of radio-collared bighorn sheep monitored by CDFW between 1995 and 2010, whose cause of mortality was investigated, are known to have been killed by mountain lions. An additional 7 mortalities were investigated and deemed likely to have been killed by mountain lions (with some uncertainty, *e.g.,* feeding sign was evident but cause of mortality could not be established unequivocally). Together, 79% of investigated mortalities are attributed to likely mountain lion predation. Sustained high levels of predation by mountain lions may have implications for long-term viability of bighorn sheep herds (**Hayes *et al.* 2000).**

In 5 of 9 (55%) of mortalities of North Slope bighorn sheep investigated in 2007-2009, numerous latex balloons and attached ribbons were discovered in the rumen. All five animals showed unequivocal sign of mountain lion predation as the proximate cause of death, and none appeared malnourished, however, the extent to which balloon or ribbon blockage may have contributed to vulnerability to predation is unknown. Ingestion and subsequent entrapment of balloons in the rumen may have been sub-clinical in nature, with limited negative impact from displacement of digesta, or at the other extreme, animals could have suffered alimentary lacerations as a result of gastric motility, a normal part of rumen digestive process (*e.g*., eructation), causing the serrated ribbons to act like knives (**B. Gonzales, CDFW, personal communication with J. Villepique**).

Vulnerability to predation may have been increased if balloon ingestion caused coughing/choking. In all five incidents where a mountain lion preyed on a bighorn sheep that had ingested balloons, the esophagus and neck where damaged or consumed, as is commonly the result of the feeding patterns of mountain lions. Consequently, what, if any, role the ingestion of latex balloons and attached ribbons played in the vulnerability to predation by mountain lions remains unknown.

The ingestion of balloons by ruminants is capable of causing direct mortality through mechanisms mentioned, and is clearly detrimental. The San Bernardino Mountains is frequently a landing area for balloons that have escaped or been released, due to weather patterns and landscape terrain. Biologists believe that bighorn are attracted to, and ingest brightly colored balloons, having experienced no selective pressure in their evolutionary history to differentiate novel substances that mimic colors of bright colored forage, beneficial flowers, or fruits.

The Cushenbury bighorn sheep population hosts an endemic infection of *Psoroptes*, a parasitic mite, causing a condition known as psoroptic mange or psoroptic scabies. They can affect the general health of bighorn sheep. *Psoroptes* mites can result in lesions in the external ear canal resulting in hearing impairment that may result in increased predation due to the inability to detect predators (**Norrix *et al.* 1995**).

Over the past couple of decades, there have been a number of reports of feral or loose dog packs roaming in and near the Cushenbury bighorn sheep herd. An attack by 3 apparently feral dogs on two male bighorn sheep was documented in 2007, with an injured ram observed the following day. The ram was not seen again and is presumed to have been killed by the dogs, which remained in the area for weeks. Predation by dogs on female bighorn sheep may be an additive mortality factor linked to the apparent decline in this herd (**Villepique, pers. comm. 2013**).

Since 1990, there have been at least two bighorn sheep killed on Highway 18 in Cushenbury Canyon, including a ram in the early 1990s and a collared 2-year-old ewe in November 2008 (**Villepique, pers. comm. 2013**). Prior to 2006, there were few records of bighorn using the east side of Highway 18; however GPS collars deployed in 2006 and 2007 indicated a total of 61 crossings of Highway 18 by six GPS-collared females. Because GPS collars were programmed to collect data at a frequency of 4–6 hours (longer in practice, because of reduced GPS fix success inside the deep Cushenbury Canyon), these data represent the minimum number of crossings as movements of up to 6 hours duration could go unrecorded. Use of areas east of Highway 18 typically lasted 1–2 days; however, in one instance, several GPS-collared ewes remained east of Highway 18 for 36 days. There may be deficiencies in the habitat quality (*e.g.,* water sources, browse availability, lack of escape terrain, etc.) east of Highway 18, however, systematic habitat evaluations and comparisons have not been conducted.

Bighorn sheep may be crossing Highway 18 more frequently than in the past and using areas east of Highway 18. Reports from drivers seeing groups, rather than individuals, seem to be increasing. Additionally, drivers reporting seeing sheep actually crossing the road (instead being seen above or along the road) seem to be more frequent On January 6, 2013, a group of 7 bighorn sheep were observed crossing Highway 18 (SBNF records). On January 3, 2013, a group of ten bighorn sheep were documented crossing Highway 18, west-east, and observed again on the east side on January 4th. A group was also photographed crossing Highway 18, west-east, by a motorist in June, 2013 (**Villepique, pers. comm. 2013**).

The Forest Service has a single record of poaching of a bighorn sheep in the mid-1980s in the White Mountain area. A prospector came upon a campsite (probably a subsistence miner as described above) that appeared to have been occupied for some time. A butchered bighorn sheep was hanging from an oak limb. All that remained was the head, suggesting that the animal was taken for food (**Forest Service records 1991)**.

While the Cushenbury herd of bighorn sheep appears to tolerate ongoing mining activities, the effects of additional losses of habitat and disturbance outside of the existing footprint of quarries and active roads is unknown. Novel disturbance in formerly undisturbed areas used by bighorn sheep may result in negative demographic impacts. Long-term viability is a concern as a result of the small and isolated nature of this herd. Short-term viability may also be in jeopardy.

The Cushenbury herd appears isolated from other bighorn herds. Genetic studies indicate the source of this population is the San Gorgonio herd (Epps 2010). While SBNF records suggest occasional sightings between those populations, those sparse observations, and lack of evidence for genetic mixing (**Epps 2010**) suggest that these movements are rare, and unlikely to result in immigration to the Cushenbury population. This level of isolation may have negative genetic consequences; while, demographic isolation remains of great concern. Stochastic mortality (*e.g.,* heavy snowfall events, predation, landslides) in addition to human-caused mortality (*e.g.,* vehicle strike, falls as a result of anthropogenic disturbance) present a greater risk to the population because demographic rescue by immigration appears to be unlikely. Even the loss of an individual bighorn ewe is significant in small isolated herds. Without occasional movements between subpopulations, the abilities for genetic exchange and repopulation of depleted areas are compromised (**Bleich 2010**).

The Cushenbury bighorn population has a relatively low genetic diversity and was identified as having experienced a bottleneck, with lower diversity than its presumed source, the San Gorgonio population (**Epps *et al.* 2010). Epps *et al*. (2010)** concluded that the founder event that colonized the Cushenbury population was not followed the level additional immigration/ emigration and gene flow, as was the case in other populations analyzed, and was the likely cause that the Cushenbury population had the lowest level of genetic heterozygosity of populations sampled. If the Cushenbury herd now contains some fifteen animals as suspected, the herd may have experienced further loss of genetic variation reducing the population's potential to adapt to environmental conditions.

Biologists are concerned about the Cushenbury population because it is so small and isolated. This places it at a higher risk for extirpation than larger, less-isolated populations, including the San Gorgonio Wilderness bighorn sheep population. A single episode such as disease, drought resulting in lack of forage or water, a mountain lion targeting bighorn sheep, etc. could have devastating effects to this herd.

Occurrence in the Analysis Area: The Cushenbury bighorn sheep herd is currently believed to be about 15 individual animals (**Villepique, pers. comm. 2013**), down from an estimated 40-50 in the 1990s. Lambing areas have not been validated. Tracking data suggest important foraging areas and movement patterns. CDFW's tracking studies of the Cushenbury herd have found high use of the area between the proposed SQ and the existing Cushenbury quarry, and the lower and upper slopes of Marble Canyon. The proposed haul road location would bisect the two high-use areas.

During the 1990s and early 2000s, when the Cushenbury herd was apparently larger, the steep rugged terrain around Arctic Canyon, Furnace Canyon, Bousic Canyon, and Crystal Creek was also regularly used by bighorn sheep. The use in those western areas appears to have declined since the late 2007 due to a presumed disease outbreak caused by feral sheep and goats described above. Recent bighorn sightings may indicate that the local herd is again using those areas.

CDFW tracking studies have found statistical significance in areas selected by Cushenbury bighorn sheep within areas disturbed by mining (defined as roads, quarries, and waste dumps visible on NAIP 1-m aerial photos). Sheep selected mine re-vegetation sites for foraging twice as often as would be expected and selected inactive mine quarries more than would be expected, while avoiding active mine quarries (**Villepique, pers. comm. 2013**). Another CDFW analysis provided preliminary results indicating that the best predictor of habitat use by the Cushenbury herd is ruggedness of habitat. The analysis found that ewes generally avoid areas with trees, but rams.

Bighorn sheep ewes generally lamb in solitary locations, away from all other sheep. This strategy of isolation confers protection from predation for vulnerable neonatal lambs. Other studies have shown simultaneous and near simultaneous use of disparate lambing areas. Data from GPS collars deployed in the North Slope population suggest multiple lambing areas, leading to the inference that rugged areas in several places may be important for lambing (**Villepique, pers. comm. 2013**).

Figure 16, Figure 17, and **Figure 18** (in **Part II-2.0**) display the rugged terrain that would be affected by the proposed project.

Potential Effects: Some mining operations have been shown to have a positive influence on habitat use where steep slopes are created or vegetation is altered to improve visibility (**Jansen *et al.* 2006, *Bleich et al.* 2009**). The activity may also result in decreased foraging efficiency by bighorn sheep (**Oehler *et al.* 2005**). Blasting during road-construction and associated with pioneering of the previously undisturbed SQ vicinity may displace animals eastward, resulting in increased likelihood for vehicle strike on Highway 18. The footprint of the SQ (Alternative 1) and haul road occupy 1.7% of the 34.1 km^2 home range of the Cushenbury herd, yet intersect 2.3% of all GPS locations from collared bighorn sheep, yielding a selection ration of 1.35, or, by definition, “preferred habitat”. Where prime habitat is abandoned and home range sizes are affected, the effects to a population could be significant (**Bleich *et al.* 1994)**. This is especially important for small, isolated populations such as the Cushenbury herd.

Potential effects to the Cushenbury sheep herd include loss of habitat, habitat fragmentation, disturbance, displacement, death or injury from mining operations. See **Part II-3.2** for the discussion of effects common to wildlife species.

a) Habitat Effects: **Figure 16, Figure 17,** and **Figure 18** (in **Part II-2.0)** display the rugged terrain features of the area surrounding the proposed SQ and haul road sites. The SQ and proposed haul road areas are well-used by bighorn sheep (**Villepique 2013, pers. comm., SBNF observations)**.

   The quarry development would affect 128 acres under Alternative 1 and 108 acres under Alternative 2. Both alternatives also include an additional 2.7 acres berm and 22.2 acre haul road, for an additional 24.9 acres of bighorn sheep habitat being lost for the life of the project. In all, Alternative 1 would affect 154 acres and Alternative 2 would affect 134 acres of habitat that is suitable for foraging, resting, moving between use areas, and escape terrain. Some of the area, particularly the rugged areas at the north margin of the SQ likely provide lambing habitat; most of this area would become part of the quarry under Alternative 1 but would not be developed into quarry under Alternative 2 (the partial implementation alternative).

   Under the proposal, MCC would relinquish claims on 540 acres, providing those acres long-term protection from future mining effects. None of the currently-proposed mitigation lands represent habitat known to be used by bighorn sheep. The Cushenbury 7Pa and 7Pb claims were previously accepted by CDFW in January 2007 as suitable mitigation for loss of habitat for bighorn sheep resulting from the West Pit expansion. Those parcels of habitat suitable for bighorn sheep may not be counted again as mitigation for bighorn sheep.

   Cushenbury #9 claim falls outside of the known home range of the Cushenbury herd. It contains a single aerial telemetry location 100 m within claim; this record is almost certainly in error. The ewe that was located by air was also fitted with a GPS collar, which located her 2 hours before and 2 hours after the aerial telemetry location. Those GPS locations placed the ewe 764 m and 808 m to the northwest, before and after the aerial location respectively, both location falling >500 m northwest of the nearest boundary of Cushenbury # 9 (**Villepique, pers. comm. 2014**).

None of the unused mitigation claims (Cushenbury 9, 15, 16A) are known to be used by bighorn sheep, nor is there any obvious value to sheep as potential habitat; the terrain of Cushenbury 9, 15, and 16A claims appears to lack escape terrain features (*e.g.,* rock outcroppings, and steeper slopes) found on preferred habitat. Those proposed mitigation claims likely have value to other species that would be affected by loss of habitat; however, assignment of their values as habitat for bighorn sheep has no objective basis of support. Two of the claims (Cushenbury 9, 16A) lie along a pathway that would hypothetically provide habitat connectivity to the San Gorgonio Herd. However, there is no evidence that such movements have occurred in the past 50 years or more, and genetic evidence suggests little, if any movement has occurred post-colonization (**Epps *et al.* 2010**).

After reclamation (which is planned to be concurrent with mining), the project area may provide for escape/resting terrain and vegetation for forage, the value of which will depend on the success of revegetation efforts. Revegetation sites have been demonstrated to provide preferred habitat for bighorn sheep and will be an imperative component to mitigating for loss of habitat value during active mining. Analysis of habitat selection demonstrated significant avoidance of quarries where active mining (*e.g.,* blasting, excavation, hauling) occurred during the study. While revegetation areas experienced significant positive selection, those areas can be created only following the duration of active mining when degradation of habitat quality occurs.

b) Fragmentation of Habitat and Isolation: Fragmentation of habitat and impediments to movement may negatively affect the health and survival of individual bighorn by requiring them to move more and spend more energy seeking adequate food and water, and suitable habitat for shelter, escape, and lambing.

The development of the quarry and a haul road are likely to contribute to fragmentation of bighorn sheep habitat, including some areas that have high frequency use. Because of the switchbacks and location on the landscape, Alternatives 1 and 2's haul road would require bighorn sheep to cross the haul road one to three times to move east-west between frequently-used areas. The proposed haul road would be 50-60 feet wide, including an east-west segment of >1640' (>500 m) in length where the upslope cut of ~40 ft. vertical, would likely prevent terrestrial animals from crossing. There are no comparable haul roads on the North Slope where such a deep cut and impediment to movement spans such a distance. An evaluation of GPS collar data showed >250 movement "steps" where bighorn sheep traveled across the proposed haul road (CDFW data). Because of the number of crossings that would be required and the difficulty in finding sites that are crossable, Alternatives 1 and 2's haul road may present an impediment to movement for bighorn sheep for much of the haul road length. Under Alternatives 1 and 2, the frequently-used habitat would be fragmented by unusable habitat.

Both alternatives include measures to create safe bighorn sheep crossings along the haul road. Whether those crossings will facilitate bighorn sheep movement north-south and east-west across the landscape is uncertain. The success of creating wildlife crossings depends on a number of factors (*e.g.,* crossing design, suitable habitat at the crossing; correct cover matrix in the surrounding habitat so that the animals feel secure; adequate sight distance for the animals and vehicles; potential for predators to take advantage of animals being concentrated at restricted crossings; how far out of the way the animals have to move to use the crossings, etc.). The location of crossings must consider the landscape level as well as the habits of the target species. While crossing location is generally considered the most critical factor that affects use of the crossing, literature on how to select the best location for the crossing is scarce (**http://www.deercrash.org/Toolbox/CMToolboxCrossings.pdf**).

The overall effects to bighorn sheep would depend on the degree of impermeability created by the haul road and quarry. If the quarry and haul road represent major impediments to movement, the health of individuals as well as the entire Cushenbury bighorn population may be affected due to inability to access areas important for reproduction and lambing, obtaining food and water, and escaping predators. Where crossings are limited to a few areas, individuals may be more susceptible to predators that lay in wait at or near crossings. Bighorn sheep may also be more susceptible to predators if it takes longer to reach escape terrain due to impediments in movement.

Under both alternatives, MCC would relinquish 540 acres of claims for mitigation of rare plant habitat. See the discussion above under “Habitat Effects” for details about the value of those claims for bighorn sheep habitat. Because of the location of those mitigation claims, they would provide a negligible contribution to preservation of habitat connectivity for this species.

c) Displacement: If bighorn sheep are not able to acquire adequate food and water as a result of the expanded mining operations at Mitsubishi (and over time at the other mining operations), they may be displaced to areas with lower quality habitat. Bighorn sheep may be displaced from areas they currently occupy as a result of new disturbance or if habitat availability and quality are reduced to a point that they need to move to obtain adequate browse and water.

It is believed that the Cushenbury bighorn sheep herd currently occupies some of the highest quality habitat on the North Slope. Areas to the west of the Omya Butterfield quarry and east of Cushenbury Canyon lack the steep slopes and abundance of escape terrain found within the known home range. Bighorn sheep may be displaced to areas east of Highway 18, higher up on the North Slope, or farther west. There are some indications that topographic features and water availability east of Highway 18 are of inferior quality to support bighorn sheep than those habitats west of the highway. Differences in aspect and steepness of terrain may affect the availability of vegetation for browse; water sources are thought to be scarcer; terrain is not as rugged, etc. Areas higher on the North Slope generally lack the rugged steep terrain preferred by bighorn sheep. Areas to the west of the project area are affected by similar mining operations. (**Villepique, pers. comm. 2014**).

Over the 40-120 year life of the proposed mining operations, it is likely that more high quality bighorn sheep habitat will be affected by limestone mines and that displacement of bighorn sheep will occur in parts of the North Slope.

d) Mortality and Injury: Nelson's bighorn sheep are Fully Protected Mammals under section 4700 of the Fish and Game Code, which prohibits all "take". Strict adherence to avoidance measures is imperative for preventing "take" of bighorn sheep.

The risks include death or injury as a direct result of mining operations, particularly blasting. A radio-collared female bighorn sheep was killed by "fly-rock" following a blast in August 2003 at Specialty Minerals quarry. The risk is two-fold: a) bighorn sheep near the blast may be hit by flying rocks; and, b) bighorn sheep may be startled by a blast and suffer injury or death in a fall; responses such as running or jumping in response to disturbance have been observed to result in injuries and death, particularly for lambs. The Design Features include a measure requiring a minimum of 5 minutes of surveillance by naked eye, and with optics, prior to blasting or other activity that could propel or roll rocks downslope, to insure the absence of bighorn sheep.

In addition, there are risks associated with the nearby State Highway 18 in Cushenbury Canyon. There are records of two bighorn sheep deaths on Highway 18 just east of the Mitsubishi operations; however, the actual number is likely higher, as animals frequently move away from roadways before succumbing to death from injuries sustained in a vehicle collision. Analysis of impacts to bighorn sheep identified the potential for bighorn sheep to cross the roadway in response to both the overall decline in available forage consequential to removal of approximately 150 acres of habitat on the project area, and in response to disturbances associated mining activities. If bighorn sheep cross Highway 18 more often and in larger groups, it is likely that the frequency of death and injuries due to vehicle collisions will increase.

The Design Features/Mitigation Measures include measures to help reduce the likelihood of collision by mine vehicles or injury/death from blasting. The Design Features also include installation of signs on Highway 18 to increase driver awareness and reduce the risk of collisions with wildlife. While the potential of such instances to result in take cannot be eliminated, adherence to avoidance measures can reduce the likelihood, making take an improbable event. With population numbers as low as they are, loss of even one bighorn sheep may be significant to the viability of the population.

e) Disturbance: Construction of the proposed South Quarry and associated haul road will create a disturbance novel in magnitude (*e.g.*, frequency of blasting during road construction) and in a formerly undisturbed area. Additional impacts may include noise disturbance from occasional blasting as well as daily operations (moving/loading rock, haul truck traffic, etc.). Humans and vehicles in the area also present a certain level of disturbance. Disturbance, particularly novel disturbance, can affect behavior, reduce amount of time foraging, affect physiology, increase the chances of predation, and change use patterns. See **Part II-3.2.8** for disturbance effect discussions.

Ewes seek out the steepest rugged terrain, lacking disturbance, for lambing and rearing young (**Bleich *et al.* 1997**). Extremely steep and rugged terrain, consistent with lambing habitat, is found within 0-500 m north of the South Quarry, and in fact within the northern portion of its footprint. Those rugged areas, approximately 1,000 m south from active mining areas within the main Cushenbury pit, are unlikely to maintain value as potential lambing areas because of the proximity to disturbance of the South Quarry.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

f) <u>Exposure to Environmental Hazards</u>: The mining operations would have a variety of environmental hazards that could pose a threat to individual bighorn sheep. Liquids used by equipment and vehicles (*e.g.,* hydraulic fluid, antifreeze, oil, fuel, etc.) that are spilled, even in small quantities, may be ingested by bighorn sheep resulting in illness or death. The presence of people and equipment also results in litter and other materials being inadvertently present. Bighorn sheep are known to ingest balloons and other litter (see discussion above); this could also lead to death or injury. The EIS for this project contains a discussion of environmental hazards and methods that would be used to control them.

CDFW Take for Nelson's Bighorn Sheep: Nelson's bighorn sheep are considered a CDFW fully protected mammal under section 4700 of the Fish and Game Code, which prohibits all "take". Under the Fish and Game Code, there is no provision for "take" and all projects must be designed to avoid "take". The Design Features and mitigation measures are expected to be sufficient to avoid "take" of bighorn sheep, as defined by CDFW. In addition, the Design Features state that MCC will participate in a North Slope Bighorn Sheep Conservation Strategy. The Strategy will include guidance for monitoring and herd augmentation.

Summary for Nelson's Bighorn Sheep: Due to the small size of the Cushenbury bighorn sheep herd and apparent decline over the past two decades, there is concern that the Cushenbury herd may not be viable and is very susceptible to extirpation, even without the SQ development (**Bleich 2010**). If the herd is only fifteen animals or fewer, loss of any individual may be problematic and significant, thus implementation of the North Slope Bighorn Sheep Conservation Strategy, which includes a mechanism for augmentation, will be essential to the long-term viability of the bighorn sheep population.

While there is evidence that bighorn sheep will tolerate human activities (including these mining operations), key life-history activities such as lambing are likely to be excluded from areas near the new disturbance. With the cumulative effects from past and ongoing activities on the North Slope, the sphere of habitat unaffected by disturbance is likely to see continued reduction (see

Part II-3.2.13 for cumulative effects discussions). Reclamation to restore habitat value for bighorn sheep (*e.g.,* creation of ramps allowing movement between restoration benches) may mitigate cumulative impacts.

A population of fewer than 15 animals poses a variety of problems for viability, including genetic bottlenecking and extremely high susceptibility to stochastic events. Such a low number warrants augmentation to achieve demographic, and particularly in the case of the Cushenbury population, genetic rescue. Further reductions in habitat for foraging, lambing, and escape, however, are likely to reduce carrying capacity below ~50, which, combined with fragmenting important use areas, may cause the Cushenbury bighorn sheep population to "blink out". Disturbance and lack of adequate high quality habitat may result in displacement of bighorn into areas of lower quality habitat that are unable to sustain the herd over the project life. Small groups of bighorn sheep may hang on for a few years in lower quality habitat and in patches of higher quality habitat; but over time, the herd may disappear without a strategic plan to protect high quality habitat and movement throughout their range, and effect augmentation when criteria suggest it is warranted.

The proposed haul road would likely present an impediment to movement for bighorn sheep for much of the haul road length. While some of the existing haul roads do not pose an impediment to movement for bighorn sheep, the proposed haul road is qualitatively different from any existing haul road on the North Slope; the proposed haul road would traverse a steeper slope with taller cut banks for a longer span than any other existing haul road. The vertical cuts of up to 15 feet would effectively block movement by bighorn sheep. The Design Features would incorporate some haul road crossings. However, the effectiveness of those crossings cannot be predicted. Under both alternatives, the frequently-used habitat would be fragmented by unusable habitat.

There is a high degree of uncertainty about the potential effects to the Cushenbury bighorn sheep population, especially for a project that is expected to last between 40 and 120 years. We cannot adequately predict the other activities and events over the next 10-20 years (much less 120 years) that may affect this bighorn sheep population. If the number of animals is at the current carrying capacity for the finite North Slope landscape, any further impediments to movement, losses of habitat, through direct effect or behavioral impact (*e.g*., avoidance) may increase the odds of loss of this population during the life of the project.

The proposed project is not expected to affect the viability of Nelson's bighorn sheep, as a species, on the SBNF. However, it may contribute to viability concerns for the Cushenbury herd of Nelson's bighorn sheep. Concern for the long-term viability for the North Slope occurrence of this species will be addressed through an adaptive management approach in the North Slope Bighorn Sheep Management Plan.

V-2.3.5.12 Mountain Lion (Felis concolor californica)

The mountain lion is a SBNF Watchlist species and a CDFW Specially Protected Mammal. The following discussion was prepared with substantial review and input from Jeff Villepique, California Department of Fish and Wildlife biologist with local expertise and knowledge of the San Bernardino Mountains population of mountain lions.

While mountain lions remain one of the most widely distributed terrestrial mammals in the western hemisphere; populations have been reduced in urbanized areas, such as southern California, where concerns have been raised about population viability.

Mountain lions are habitat generalists, inhabiting a variety of habitat types throughout California, from deserts to humid Coast Ranges. They are most abundant in areas that support a large population of deer, their primary prey. Within these habitat types, mountain lions tend to prefer rocky cliffs, ledges, and other areas that provide cover. They are rare at higher elevations in pure stands of conifers and at lower elevations in pure stands of chamise *(Adenostoma fasciculatum)*.

Fire plays an important role, in many habitat types, in determining the suitability of habitat for mountain lions, by benefitting to their primary prey, mule deer. Fires, which reduce canopy closure, increase vigor and accessibility, and improve palatability of shrub species preferred by deer, ultimately benefitting mountain lion populations. The diet of mountain lions in California is almost 80 percent mule deer. Because mountain lions are opportunistic feeders, they exploit whatever food source is available, including bighorn sheep, skunk, porcupine, rabbit, raccoon, badger, squirrels, mice, wild pig, and domestic animals.

Mountain lions reach sexual maturity at approximately 2.5 years of age, after which time they are capable of breeding throughout the year. They generally produce one litter every other year but can breed in consecutive years under optimal conditions. A peak in births occurs during the summer.

Mountain lions are solitary, secretive, and elusive. They are primarily nocturnal and commonly forage at dawn and dusk. Mountain lions are closely associated with mule deer populations in California and follow deer along migration routes. The home range of adult males in California was reported to encompass more than 100 square miles. Female home ranges are generally much smaller, covering 20-60 square miles. The size of an individual's home range can vary from season to season and year to year, and is probably dependent on prey density and available stalking cover. (Source: **USFS 2006** LMP Species Accounts)

Mountain lions are keystone predators with the ability to exert population-level influences on primary and alternate prey species under certain conditions. Mountain lion numbers are ultimately governed by the population of mule deer, their primary prey. Studies show that declines in mule deer may lead to prey switching by mountain lions with negative impacts on populations of alternate prey, specifically bighorn sheep, although this may not always be the case (**Villepique *et al*. 2011**). In light of the potential for declines in mule deer numbers to lead to perturbations in prey selection by mountain lions with negative impacts on bighorn sheep numbers, maintenance of a healthy mule deer population is critical to both the conservation of mountain lions, and the stability of the predator-prey food web (**Villepique, pers. comm. 2013**).

Occurrence in Analysis Area – Mountain Lion: Mountain lions have been documented in the analysis area, including using the wildlife water developments at the mines on the North Slope. They are occasionally hit by vehicles on Highway 18 (and other roads). The population in Big Bear/North Slope area may be declining, primarily due to impediments to immigration as a result of urbanization, road kill and the barrier presented by the Interstate 15, and a reduced carrying capacity as a result of a persistent depressed population of mule deer, their primary prey, in the overall San Bernardino Mountains (**Villepique, pers. comm. 2014**).

Potential Effects – Mountain Lion: The types of potential effects are similar to those discussed above for Nelson's bighorn sheep in terms of disturbance, habitat loss/degradation/ fragmentation, environmental toxins, death/injury, etc. In addition, if the project caused displacement, or reduction in size, or loss of the North Slope deer herds, mountain lions may be excluded from the area due to lack of a sustainable prey base.

Mule deer are found at higher densities and appear to have more reproductive success in North Slope habitats than in adjacent areas in the SBNF. The high quality of habitat for mule deer is likely the result of lack of disturbance from recreational users, afforded by the reduced density of roads and trails compared to the less rugged areas to the south, and to several consistent water supplies and high quality forage associated with springs and seeps. The quality of habitat for mule deer on the North Slope likely plays are role beyond the area, as the North Slope likely serves as a source of individual deer into habitat to the south, where high human activity may impact the quality of habitat for fawning, with a concomitantly lower recruitment rate.

The mitigation package for all alternatives includes relinquishment of 540 acres of claims. As a result, those areas would be protected from future mining, providing habitat for this species and its prey into the future. This would provide some mitigation in terms of acreages of habitat lost but not in terms of location on the landscape.

V-2.4 – SBNF Watchlist Animals – Potential Effects of No Action

The discussion in **Part II-** is applicable for Watchlist species that occur in the analysis area.

V-2.5– Other Animal Species of Concern – Potential Effects from Alternatives 1 and 2

There are some other wildlife species known or with potential to occur in the analysis area that carry special status from other agencies but are not on the SBNF Watchlist or Regional Forester's Sensitive list. These species have been identified as having either localized or regional declines or threats.

V-2.5.1 San Diego Coast Horned Lizard (*Phrynosoma coronatum blainvillii*)

The coast horned lizard was removed from the Forest Service's Regional Forester Sensitive species list in early 2013. It is a CDFW Species of Special Concern.

It is endemic to southern California and northern Baja California, México. San Diego horned lizards are found in a wide variety of habitats including coastal sage scrub, chaparral, grassland, coniferous forest, oak woodland, riparian, and the margins of the higher elevation desert where it is restricted to the juniper-desert chaparral. Within each of these habitats, this species prefers areas with loose, fine soils, an abundance of open areas for basking and plenty of native ants and other insects. This species has been reported from elevations ranging from sea level to above 8,000 feet.

Seasonal activity occurs between late March and early October, with hibernation setting in as early as August. *P. c. blainvillei* emerges from hibernation in March, and becomes surface active in April through July, after which most adults estivate. The adults reappear again briefly in late summer and return to overwintering sites between August and early October depending upon elevation.

The defense that *P. c. blainvillei* most often uses against approaching predators is to depend on their cryptic appearance and simply lie motionless. Horned lizards of the genus *Phrynosoma* are primarily ant-eating reptiles whose dietary habits are well known. Up to 90 percent of the diet of *P. c. blainvillei* consists of native harvester ants (*Pogonomyrmex spp*.), and this species does not appear to eat nonnative Argentine ants that have replaced native ants in much of southern California. Other slow-moving insects, such as termites, beetles, flies, wasps, grasshoppers and caterpillars are consumed opportunistically when encountered.

The specialized diet and habitat requirements, site fidelity, and cryptic defense behavior make *P. c. blainvillei* highly vulnerable. Commercial collecting, and habitat loss due to agriculture and urbanization is the main reasons cited for the decline of these taxa. Most surviving populations inhabit upland sites with limited optimal habitat. However, the most insidious threat to *P. c. blainvillei* is the continued elimination of its food base by exotic ants. Argentine ants colonize around disturbed soils associated with building foundations, roads and landfills, and expand into adjacent areas, eliminating native ant colonies. Under these conditions *P. c. blainvillei* populations have become increasingly fragmented, and have undergone the added stress of a number of other factors, including fire, grazing, off-road vehicles, domestic cats, and development . This taxon is unable to survive habitats altered by development, agriculture, off-road vehicle use, or flood control structures. (Source: **USFS 2006** LMP Species Accounts)

Coast horned lizards are known from the Cactus Flat/Lone Valley area and the mitigation parcel 16a. This species has potential to occur in the project and analysis area.

The SQ and haul road developments may result in some loss of occupied coast horned lizard habitat. Coast horned lizards would have some risk of death or injury due to vehicle traffic and human activities associated with the mining operations. Due to their cryptic coloration and tendency to freeze when threatened, they are especially vulnerable to being run over. Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

The Design Features include an educational training for MCC employees to encourage them to protect (and not collect) them when encountered. The project would result in relinquishment of mitigation claims, including some that likely have coast horned lizards; these claims would be protected from future mining.

V-2.5.2 Swainson's Hawk (*Buteo swainsoni*)

The Swainson's hawk was a Forest Service Region 5 Sensitive species but was removed from the list in 2013. It is a CDFW Threatened species.

In California, Swainson's hawk habitat generally consists of large, flat, open, undeveloped landscapes that include suitable grassland or agricultural foraging habitat and sparsely distributed trees for nesting.

Swainson's hawks usually nest in large native trees such as valley oak (*Quercus lobata*), cottonwood (*Populus fremontia*), and willow (*Salix* spp.), although nonnative trees, such as eucalyptus (*Eucalyptus* spp.), are occasionally used. Nests occur in riparian woodlands, roadside trees, trees along field borders, isolated trees, small groves, trees in windbreaks, and on the edges of remnant oak woodlands. Nests are constructed using materials from the nest tree or nearby trees, are up to 24 inches in diameter, and are usually constructed as high as possible in the tree, providing optimal protection and visibility from the nest.

Swainson's hawks require wide-open landscapes for foraging. Historically, the species used grass-dominated and desert habitats throughout most of lowland California. Over the past century, conversion of much of the historic range to agricultural uses has shifted the nesting distribution into agricultural areas that mimic grassland habitats or otherwise provide suitable foraging habitat. Suitable agricultural crop patterns include a mixture of hay, grain, and row crops with low-lying vegetation that support adequate rodent prey populations.

Swainson's hawks arrive on the breeding grounds from early March to early April. Pair bonding begins immediately and includes courtship displays, reestablishment of territorial boundaries, and nest construction or repair. One to four eggs are usually laid in early to mid-April and hatch in mid-May.

During the breeding season, Swainson's hawks feed primarily on small rodents, including voles (*Microtus* sp.), deer mice (*Peromyscus* sp.), house mice (*Mus musculus*), and pocket gophers (*Thomomys* sp.). Swainson's hawks typically forage in large fields that support low vegetative cover (to provide access to the ground) and provide the highest densities of prey. In agricultural regions, these habitats include fields of hay and grain crops; certain row crops, such as tomatoes and sugar beets; and lightly grazed pasturelands. Other less frequent food items include reptiles, birds, and insects. Swainson's hawks are open-country hunters. The usual foraging technique involves searching for prey from a low altitude soaring flight, 98-295 feet above the ground and attacking prey by stooping toward the ground.

Swainson's hawks are entirely diurnal. In California, Swainson's hawks begin their fall migration from late August to mid-September.

Early accounts described the Swainson's hawk as one of the most common raptors in California, occurring throughout much of lowland California. Since the mid-1800s, native habitats have undergone a gradual conversion to agricultural uses. Today, native grassland habitats are virtually nonexistent in the state, and only remnants of the once vast riparian forests and oak woodlands still exist. This habitat loss has caused a substantial reduction in the breeding range and the size of the breeding population in California. Swainson's hawks are also sensitive to habitat fragmentation. The state currently supports between 700 and 1,000 breeding pairs, which represents less than 10 percent of the historic population. (Source: **USFS 2006** LMP Species Account)

This species is not a regular breeder in the San Bernardino Mountains. Swainson's hawks have been detected at Cushenbury Springs (**Kielhold 1993)**, Blackhawk Mountain (**Myers 1998**) and CNDDB has some records from nesting Swainson's hawks in the Mojave Desert. Nesting in or near the SQ project area is considered very unlikely. The agricultural fields around Lucerne Valley provide suitable foraging habitat for Swainson's hawks.

While the SQ site does not support preferred foraging habitat, Swainson's hawks may fly over on an occasional basis. Over the extended life of the project, this species has potential to forage in the vicinity of the analysis area but it is considered a low likelihood. Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

No substantial changes to habitat availability would result for Swainson's hawk. No impacts to this species are expected. No "take" under the California Endangered Species Act is expected.

V-2.5.3 Olive-Sided Flycatcher (*Contopus cooperi)*

The olive-sided flycatcher is a CDFW Species of Special Concern and a USFWS Bird of Conservation Concern. This flycatcher is an uncommon transient and uncommon summer resident (breeding bird) in conifer forest as well as montane riparian habitats with the San Bernardino Mountains.

Olive-sided flycatchers are predominantly a montane and northern coniferous forest species, usually at mid- to high-elevations. Within coniferous forest, it is most often associated with forest openings, forest edges near natural openings (*e.g.*, meadows, bogs, canyons, rivers) or human-made openings (*e.g.,* harvest units), or open to semi-open forest stands. Presence in early successional forest appears to be dependent on the availability of snags or residual live trees for foraging and singing perches. The olive-sided flycatcher can occur along wooded shores of streams, lakes, rivers, beaver ponds, bogs and muskegs, where natural edge habitat occurs and standing dead trees are present.

They prefer forest edges and openings either natural or human-made, and tend to increase in density as canopy cover decreases. Olive-sided flycatchers have been linked to burned areas of mixed conifer and ponderosa pine.

Nests are generally placed high up in the tree (usually coniferous), away from the main trunk, on a horizontal branch. The open cup nest is constructed of twigs, lichens, moss, and pine needles, lined with fine grasses, lichens, and rootlets and held firmly to the branch with spider webs. The species is monogamous. June is the peak of egg-laying with nests being noted as early as mid-May and as late as July. Incubation lasts 14–17 days. Nestlings are cared for by both parents and typically fledge in 15–19 days. Olive-sided flycatchers are sustained nearly entirely on flying insects.

Olive-sided flycatchers are neo-tropical migrants. The species is known to be a nocturnal migrant. First migrants arrive in southern California in mid-April and in northern California in early May. Some transients are still moving through the state in June and rarely birds have been known to winter in southern California

This species is a regular breeder in the San Bernardino Mountains and it is known the North Slope and other areas near the project area: Omya's Butterfield/Sentinel area (SBNF records 2011) and Jacoby Canyon (SBCM survey records for 2002 and 2005). Suitable habitat for nesting, roosting, and foraging habitat for this species occurs in the analysis area and vicinity. See **Part V-2.3.4.39** for a discussion of potential effects.

V-2.5.4 Black-Tailed Gnatcatcher (*Polioptila melanura)*

The black-tailed gnatcatcher is a CDFW Watchlist species (formerly a CDFW Species of Special Concern). The black-tailed gnatcatcher is a fairly common resident below about 1,000 ft. in desert wash habitat from Palm Springs and Joshua Tree National Monument south, and common along the Colorado River. It is now rare in eastern Mojave Desert north to the Amargosa River, Inyo Co. It nests primarily in wooded desert wash habitat, but also occurs sparingly in desert scrub habitat, especially in winter. This species gleans insects and spiders from foliage. Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx.

This species was documented breeding in the Cushenbury Spring area in 1993 (Kielhold 1993) and may occur in suitable habitat at the lower elevations along the haul road. See **Part V-2.3.4.39** for a discussion of potential effects.

V-2.5.5 Yellow-Headed Blackbird (*Xanthocephalus xanthocephalus*)

The yellow-headed blackbird is a CDFW Species of Special Concern. Yellow-headed blackbirds nest in fresh emergent wetland with dense vegetation and deep water, often along borders of lakes or ponds. They forage in emergent wetland and moist, open areas, especially cropland and muddy shores of lacustrine habitat. This species is a migrant and local breeder in deserts. It has bred as high as 6600 feet in the San Bernardino Mountains near Big Bear Lake.

Adults feed primarily on seeds and cultivated grains; they eat insects in breeding season. Young are fed mostly insects, some spiders and snails. Yellow-headed blackbirds forage in emergent vegetation, along moist shorelines, and in nearby grasslands and croplands, preferably near water or on moist ground. They often hawk flying insects. They nest in colonies in dense emergent wetland vegetation, often bordering a pone or lake. They only breed where large insects such as dragonflies are abundant with nesting timed to coincide with maximum emergence of aquatic insects. (Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx)

Yellow-headed blackbirds are known from the Baldwin Lake area, a few miles south of the analysis area. Because of their presence during summer months, nesting is suspected in that area. Cushenbury Spring has habitat that is suitable for nesting and foraging. See **Part II-3.2.7** for a discussion of potential effects at Cushenbury Springs. The project area does not support suitable habitat for this species. Disturbance effects at Cushenbury Springs are considered part of the baseline conditions and would not change as a result of this project.

V-2.5.6 California Leaf-Nosed Bat (*Macrotus californicus*)

The California leaf-nosed bat was removed from the Forest Service's Regional Forester Sensitive species list in 2013. It is a CDFW Species of Special Concern, a BLM Sensitive species, and a Western Bat Working Group high priority species.

The California leaf-nosed bat is the only species of the genus *Macrotus* that occurs in California. California leaf-nosed bats are strongly associated with desert riparian and wash habitats and favor caves, mines or cave-like structures. In southern California deserts they forage almost exclusively in desert washes. Roosts are generally located in proximity to desert wash areas below elevations of 3,000 feet. Night roosting habitat includes buildings, cellars, porches, bridges, rock shelters, and mines. Favored day roosts include mineshafts and caves. California leaf-nosed bats do not migrate. However, some local movement between roosts may occur, particularly on a seasonal basis.

Long, geothermally-heated mine tunnels are utilized for maternity and winter roosts. California leaf-nosed bats do not become torpid as do other sympatric bat species, and sustained exposure to ambient temperatures below 26 ° C can result in death. The warmth of the geothermally heated roosts provides a stable year-round temperature of approximately 29 ° C, allowing resident California leaf-nosed bats to minimize energy expenditure during winter as well as summer.

Females form maternity colonies and give birth to single young during May and June. Young are weaned and become volant in July and August. Males roost separately during these months but rejoin females in the late summer and early fall. Males congregate at lekking (courtship display) sites in mines and caves.

California leaf-nosed bats feed primarily on grasshoppers, cicadas, moths, butterflies, dragonflies, beetles, and caterpillars. Prey items are gleaned from the ground or vegetation. Foraging ranges are small, with most activity within 0.9 mile of day roosts in winter months and up to 1.9 miles during summer months. This species does not require drinking water.

As is true for many cave-or cave-like dwelling bat species, loss of suitable roost sites and associated foraging habitat and disturbances/vandalism at roost sites are thought to be responsible for the observed population declines of California leaf-nosed bat. If roost sites are not altogether destroyed or eliminated, bats may abandon roosts if they are disturbed. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. Disturbance that arouses a bat during their winter hibernation will cause loss of accumulated fat reserves and possible starvation. Desert riparian habitats and suitable mine shafts are important to the conservation of this species. (Source: **USFS 2006** LMP Species Account)

California leaf-nosed bats records exist for the Arrastre Creek, in similar pinyon/juniper and desert transition habitat to that found at the project area. However, there is some question about the validity of that record. Because this species is generally associated with low-elevation desert habitat, it is unlikely that it occurs at the SQ expansion site. It may occur at lower elevations in desert habitat along the proposed haul road and near/at Cushenbury Springs, but even those areas are above the typical elevation distribution for this species. See **Part V-2.3.5.1.9** for a discussion of effects to bats.

V-2.5.7 Western Red Bat (*Lasiurus blossevillii*)

The western red bat was removed from the Forest Service's Regional Forester Sensitive species list in early 2013. It is a CDFW Species of Special Concern and a Western Bat Working Group high priority species.

The western red bat occurs in western Canada, western United States, western Mexico, and Central and South America. The western red bat is associated with large deciduous trees in riparian habitat. It often occurs in streamside habitats dominated by cottonwood, oaks, sycamore, and walnut. Foraging occurs in association with streams, forest openings, and clearings.

The western red bat is primarily a solitary species that roosts in the foliage of trees and shrubs in habitats bordering forests, rivers, cultivated fields, and urban. This solitary foliage roosting species typically selects roost sites in riparian trees such as cottonwood and sycamore. Roost sites are generally hidden from view from all directions except below; lack obstruction beneath, allowing the bat to drop downward for flight; lack lower perches that would allow visibility by predators; have dark ground cover to minimize solar reflection and have nearby vegetation to reduce wind and dust. This species has also been described as using saguaro cavities and cave-like structures for roosting habitat.

The diet of western red bat consists of a variety of flying insects such as moths, but it also includes flies, bugs, beetles, cicadas, ground-dwelling crickets, and hymenopterans. Foraging generally begins at high altitude in the air, but later moves to between tree canopy level and a few feet above the ground. Red bats mainly feed on moths by aerially hawking along edges, over meadows and along riparian courses.

Little information is available regarding migration patterns for this species. During winter months, western red bats move to milder coastal areas in the Pacific Northwest. In the southwest, western red bats are only present during the summer months, indicating that a seasonal migration does occur. In northern California this species is present through winter in the San Francisco area but is absent during the summer, further suggesting that migration occurs Young are born between mid-May and late June.

In general, declines of bat populations can often be attributed to roost site disturbance, loss of foraging habitat, and loss of roost sites. Many bats are shy and highly vulnerable to disturbances at roost sites. Disturbance at roost sites can lead to short and long term abandonment. Generally, bats have high site fidelity to winter and maternity roosts. Low reproductive potential, high longevity and high roost fidelity make populations highly sensitive to roost threats. (Source: **USFS 2006** LMP Species Accounts)

Red bats are known from the Big Bear area. They were also detected in 2014 in the forested area adjacent to Omya's Butterfield-Sentinel quarries, a few miles to the west of the SQ project. They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.,* 2014)**. They are likely to occur in the analysis area where there are trees. See **Part V-2.3.5.1.9** for a discussion of effects to bats.

<u>V-2.5.8 Silver-Haired Bat (*Lasionycteris noctivagans*)</u>
The silver-haired bat is a Western Bat Working Group Medium priority species and a "Recommended Watch" species for CDFW. Silver-haired bats are common, but erratic in abundance. Summer habitats include coastal and montane coniferous forests, valley foothill woodlands, pinyon-juniper woodlands, and valley foothill and montane riparian habitats. They are primarily forest dwellers, feeding over streams, ponds, and open brushy areas. Summer range is generally below 9000 feet.

This species feeds mainly on moths and other soft-bodied insects. They also eat beetles and hard-shelled insects to some extent. Foraging flight is slow and fluttery with short glides. They feed less than 20 feet above forest streams, ponds, and open brushy areas. Silver-haired bats roost in hollow trees, snags, buildings, rock crevices, caves, and under bark. Females may form nursery colonies or occur as solitary individuals in dense foliage or hollow trees. This species needs drinking water.

Silver-haired bats make long migration flights to hibernation sites. Though the migratory paths of individual bats are unknown, it is likely that some California silver-haired bats winter in Mexico. (Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx)

Bats, in general, are threatened by disturbance, vandalism, habitat loss, and pesticide use. Silver-haired bats have the potential to occur in the analysis area.

Silver-haired bats are known from near the project (in Van Dusen Canyon) and have a potential to occur in/near the analysis area, particularly at the higher elevations in the mixed conifer habitat. They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.,* 2014)**. See **Part V-2.3.5.1.9 9** for a discussion of potential effects to bats from the proposed project.

<u>V-2.5.9 Hoary Bat (*Lasiurus cinereus*)</u>
The hoary bat is a Western Bat Working Group Medium priority species and a "Recommended Watch" species for CDFW. This species be found at any location in California, although distribution patchy in southeastern deserts. This common, solitary species winters along the coast and in southern California, breeding inland and north of the winter range. This species migrates between summer and winter ranges, probably over long distances. During migration in southern California, males are found in foothills, deserts and mountains; females in lowlands and coastal valleys. Habitats suitable for bearing young include all woodlands and forests with medium to large-size trees and dense foliage. Hoary bats have been recorded from sea level to 13,200 feet.

The hoary bat feeds primarily on moths, although various flying insects are taken. These bats generally roost in dense foliage of medium to large trees. Preferred sites are hidden from above, with few branches below, and have ground cover of low reflectivity. Females and young tend to roost at higher sites in trees. Females bear young while roosting in trees, preferring sites as described under cover requirements. Females may leave the young in the roosting site while foraging. Hoary bats require water as they have relatively poor urine-concentrating abilities. They prefer open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. (Source: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx)

Hoary bats are known from near the project (in Van Dusen Canyon) and have a potential to occur in the analysis area. Bats that were probably hoary bats were detected in 2014 during surveys at/near Omya's Butterfield/Sentinel quarry area a few miles to the west of SQ and single hoary bat was captured at Holcomb Creek **(Brown and Rainey 2014)**. They were also detected during an acoustic study for the North Peak Wind Energy project to the west of MCC (**Mabee *et al.*, 2014)**. See **Part V-2.3.5.1.9** for a discussion of potential effects to bats from the proposed project.

V-2.5.10 Mohave Ground Squirrel (*Xerospermophilus mohavensis*)

The Mohave ground squirrel is a CDFW Threatened species. It has no Forest Service status because it is not thought to currently occur on NFS lands.

Mohave ground squirrels occur at elevations up to 5,600 feet and have been found in most of the habitat associations present within the species' 7,600-square mile range. Optimal habitats at lower elevations include open desert scrub, creosote-burrobush, and saltbush communities. Optimal habitats at higher elevations include Joshua tree woodland and monotypic blackbrush. Large alluvium-filled valleys with deep, fine- to medium-textured soils vegetated with creosote scrub, shadscale scrub, or alkali sink scrub and with no desert pavement appear to be preferred habitats. Mohave ground squirrels typically construct burrows in the sandy soils of desert washes, while steep slopes and rocky terrain are generally avoided.

Mating occurs shortly after emergence from estivation. A litter of four to six young is produced after a gestation period of 28–30 days. Successful reproduction appears to be correlated with rainfall, and reproduction may not occur in drought years. Mohave ground squirrels eat a wide variety of seeds, flowers, forbs, shrubs, grasses, fungi, and arthropods. Diet composition in a given year varies according to food availability. Mohave ground squirrels often cache food in burrows for later consumption. (Source: **USFS 2006** LMP Species Account)

The Mohave ground squirrel population has declined primarily because of habitat destruction, fragmentation, and degradation resulting from agricultural, urban, energy, and mineral development. Livestock grazing; off-highway vehicle use; and the application of pesticides, poisons, and contaminants have also contributed to the species' decline (**USFS 2006** LMP Species Account). Lucerne Valley's residential and agricultural development has contributed to habitat loss for this species (http://www.blm.gov/ca/pdfs/cdd_pdfs/Mgs1.pdf).

The current range for this species is well north of the San Bernardino Mountains in the Mojave Desert. However, there are historic records from Apple and Lucerne Valleys, close to the San Bernardino Mountains and suitable habitat extends a short distance up onto NFS lands (**USFS 2006** LMP Species Account). Recent modeling of habitat for this species indicates that the area around Lucerne Valley is suitable for Mohave ground squirrel (**Inman *et al.* 2013**).

Even if the population of Mohave ground squirrels expanded or was re-introduced into the Lucerne Valley area over the 40-120 year life of the project, this species would be unlikely to occupy the quarry and upper haul road area. It might occupy the lower portions of Marble Canyon, the lower part of the haul road and areas around the processing plant and Cushenbury Springs. Effects would be unlikely since the analysis area is on the periphery of what would be considered suitable habitat.

Under the Proposed Action, mining would continue for 120 years after approval (approximately 2134) plus the reclamation period. Under Alternative 2, mining would be permitted for 40 years (approximately 2054) plus the reclamation period. As such, if this species were present sometime during the project's life, the disturbance-associated effects would have a longer duration for the proposed action compared to Alternative 2.

V-2.5.11 Mule Deer (*Odocoileus hemionus*)

The mule deer is a popular California game species. The following species account information was taken from the LMP species account (**USFS 2006** LMP) and updated by CDFW biologist J. Villepique (**pers. comm. 2013**). The following discussion was prepared with substantial review and input from Jeff Villepique, California Department of Fish and Wildlife biologist with local expertise and knowledge of the San Bernardino Mountains population of mule deer.

Mule deer populations have declined throughout western North America over the past three decades, prompting concern over the diminished role of this dominant herbivore in most forest and shrub habitats in western North America. Mule deer play a role in shaping bottom-up dynamics in ecosystems, affecting plant communities through browsing, seed dispersal, and nutrient transport, while also regulating top trophic predators, particularly mountain lions, which depend on mule deer populations as the primary source of prey.

The characteristics of habitat used by mule deer differ geographically, including oak woodlands, riparian areas, grassland/meadow margins, open scrub, young chaparral, and pine forests. The availability of water during the summer is a critical habitat requirement; some studies have found that they are within 0.6 miles of a water source in arid areas, with lactating females most dependent on access to water. Mule deer are herbivores and require adequate supplies of highly digestible, succulent forage. Although mule deer have traditionally been identified as browsers (consuming predominantly woody forage), studies of their diet and stomach structure have induced researchers to reclassify them as intermediate feeders (consuming equal proportions of woody and herbaceous forage).

Mule deer usually reach sexual maturity at 1.5 years, and most females breed during their second year. Breeding records from 23 separate studies indicate that mule deer breed from mid-September to early March. A peak in breeding appears to occur from late November through mid-December. Young are born from late spring to early autumn, and the peak birth period in the San Bernardino Mountains is generally from mid-June to early July.

Mule deer may be active day or night but are generally crepuscular. Migratory mule deer establish distinct summer and winter home ranges and use approximately the same home ranges in consecutive years. Non-migratory mule deer maintain yearlong home ranges. Mule deer are neither highly gregarious nor solitary. During much of the year they are widely dispersed, occurring individually or in small groups. Female groups include individuals related by maternal descent, and bucks occur in groups of unrelated males sharing common or overlapping home ranges.

A study in the San Bernardino Mountains found that deer largely avoided areas regularly occupied by humans (*e.g*., campgrounds and summer cabins), to the extent that they did not utilize habitats that would otherwise be of high quality (*e.g*., riparian habitats and meadows; **Nicholson *et al*. 1997**). Nicholson concluded that mule deer avoided areas of high human activity, consequently avoiding potentially valuable resources. The tendency of mule deer to avoid areas of frequent human use is an important management issue (Source: **USFS 2006** LMP Species Accounts).

Mule deer on the North Slope had higher densities and greater recruitment than in adjacent areas in the SBNF in helicopter surveys for deer (CDFW files). The North Slope of the San Bernardino Mountains provides high-quality habitat for reproduction and growth of mule deer, likely as a result of reduced disturbance from human recreation due to the reduced density of roads and trails, compared to the less rugged areas to the south, as well as to the availability of several water supplies and high quality forage associated with these springs and seeps.

Mule deer occupying the North Slope likely serve as a source population to areas of lower mule deer density at higher elevations to the south. Consequently, mule deer habitat on the north slope of the San Bernardino Mountains plays an important role in the health of the mule deer population in the San Bernardino Mountains (**Villepique, pers. comm. 2013**). Mule deer are known to use the analysis area and have been documented using the wildlife drinkers at the mines on the North Slope, as well as at nearby water sources including the spring at Burnt Flats.

The types of potential effects are similar to those discussed above for Nelson's bighorn sheep in terms of disturbance, with the caveat that (1) mule deer are less likely to habituate to human activity and maintain habitat use or activity patterns (**Lendrum *et al*. 2013**), and (2) mule deer on the North Slope are part of a much larger contiguous population throughout the mountains, not at risk from localized stochastic events. The same concerns exist for habitat loss/degradation/ fragmentation, environmental toxins, death/injury, etc. The mitigation package for all alternatives includes relinquishment of 540 acres of claims. As a result, those areas would be protected from future mining, providing habitat for this species into the future.

V-2.5.12 Migratory Birds

Implementation of the Proposed Action may result in unintentional impacts to individual migratory birds. However, the project complies with the Migratory Bird Executive Order (January 11, 2001), because the analysis meets direction defined under the 2008 Memorandum of

Understanding between the USDA Forest Service and U.S. Fish and Wildlife Service (USFWS). Specifically, this is because this project incorporated Design Features and conservation features as directed in the MOU.

In late 2008, the Memorandum of Understanding between the USDA Forest Service and the U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds was signed. The intent of the MOU is to strengthen migratory bird conservation through enhanced collaboration and cooperation between the FS and the USFWS as well as other federal, state, tribal, and local governments. Within the National Forests, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales and ensuring that bird conservation is addressed when planning for land management activities.

Loss or injury of adult birds would be unlikely during the ground-clearance phases and operation of the mine because they would tend to flush when disturbed. It may be possible for adult cavity-nesting species to be killed or injured if cavities collapse during blasting. Nests, eggs, and young birds would be more vulnerable because of the inability to escape. Nests and their contents within bushes, in trees, and on the ground may be impacted during initial vegetation removal activities and long-term mining operations. Losses during initial ground clearing would be minimized due to the Design Features that call for avoidance of the breeding season and pre-work nest searches.

The proposed project will result in losses of nesting and foraging sites as vegetation is cleared and developed for the quarry and haul road. The operation of the mine would result in abandonment and/or displacement of migratory birds using the area due to the ongoing disturbance from human activities and machinery. Some birds may become habituated to the disturbance and continue to use the areas near the active sites.

The project may impact individual migratory landbirds and their habitat, but would not be expected to adversely impact migratory landbird populations or their associated habitats on a large-scale level.

V-2.6 – Other Animal Species of Concern – Potential Effects of No Action

The discussion in **Part II-** is applicable for other animals of concern that are discussed above.

V-3.0 –FINDINGS

SBNF Watchlist Animals and Other Animal Species of Concern: Implementation of the either of the action alternatives would eliminate or degrade habitat for many of the Watchlist animals discussed above. Additionally, there would be high levels of disturbance for the life of the mining operations (40-120 years depending on alternative). However, the proposed project is not expected to result in a loss of viability for the wildlife species discussed in **Part V** of this document. While the proposed project is not expected to affect the viability of Nelson's bighorn sheep, as a species, on the SBNF, it may contribute to viability concerns for the Cushenbury herd of Nelson's bighorn sheep.

Migratory Birds: Implementation of either of the action alternatives may unintentionally affect individual migratory birds. The project complies with the Migratory Bird Executive Order

(January 11, 2001), because the analysis meets direction defined under the 2008 Memorandum of Understanding between the Forest Service and USFWS.

SBNF Watchlist Plant Species: Implementation of either of the action alternatives would affect individual watch-list plants and would likely have effects to Watchlist plant populations, as described above. However, the proposed project would not result in a loss of viability for the plant species discussed in **Part V** of this document.

PART VI: INVASIVE SPECIES RISK ASSESSMENT

VI-1.0 – INTRODUCTION

See Part I of for a description of the Proposed Action and Design Features. The following evaluation addresses the risk on introduction, establishment, and spread of non-native plants (including California Department of Food and Agriculture (CDFA) listed noxious weeds and other invasive non-native plant species) and animals and recommends measures to offset these risks.

Forest Service Manual direction for Invasive Species Management is contained in section FSM 2900 (effective December 5, 2011). This direction sets forth National Forest System policy, responsibilities, and direction for the prevention, detection, control, and restoration of effects from aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens). The direction is included in **Appendix B - Section 2.0.**

VI-2.0 - NON-NATIVE PLANT ASSESSMENT

Table 20 displays noxious and other invasive plants addressed in the EIS for SBNF LMP (2006, Table 463) and those species known to occur in or near the analysis area for this project, or along access routes into the project area. All of these species were considered in this analysis.

VI-2.1 – Occurrences of Non-Native Plants in the Analysis Area

An inventory for noxious and other invasive plant species was performed concurrently with focused rare plant surveys and floristic inventories for this project, as well as for previous projects. Non-native species recorded during project surveys are shown in bold in **Table 20.** The surveys are described in Part I of this document. The surveys that were performed had a moderate likelihood of detecting all target species (including weeds) due to season of surveys and favorable rainfall conditions.

There is a potential that other non-native plants occur but were not detected during surveys in the analysis area or on the mitigation parcels.

VI-2.2 – Risk of Introducing and Establishing New Occurrences into Analysis Area

The risk of transporting new weed infestations into the analysis area is considered high. Heavy equipment would be used in the analysis area over a very long period of time (40-120 years depending on alternative). Areas of ground disturbance caused by ground-based heavy equipment operations are especially vulnerable to establishment and rapid spread of weeds.

VI-2.3 - Risk Assessment of Spread of Existing Populations of Non-Native Plants

There is a risk of spreading existing occurrences of non-native plants as a result of soil disturbance associated with any of the action alternatives. Soil disturbance associated with mining operations would likely lead to an increased prevalence of cheatgrass and other weeds, as well as a risk of new introductions and spread through the use ground-based equipment adjacent to roads (where most infestations start) and continuing away from roads.

Table 20. Noxious and Invasive Plant Species Known from the SBNF					
SPECIES NAME	**COMMON NAME**	**HABITATS**	**CALIPC LISTING***	**CFDA RATING***	**IN PROJECT**
RED ALERT: Potential To Spread Explosively					
Centaurea stoebe subsp. *micranthos*	spotted knapweed	riparian, grassland, meadows, forest	red-alert	A	
Linaria genistifolia subsp. *dalmatica*	Dalmatian toad flax	mountain meadows, pebble plains, forest floor	red-alert	A	
LIST A-1&2: Most Invasive					
Ailanthus altissima	tree of heaven	riparian, grasslands, oak woodlands	A-2	C#	
Arundo donax	giant reed	riparian	A-1	C#	
Atriplex semibaccata	Australian saltbush	grasslands, shrublands, alkali wetlands	A-2		
Brassica tournefortii	African mustard	washes, alkaline flats, Sonoran desert scrub	A-2		
Bromus madritensis subsp. rubens	**red brome**	**shrublands, grasslands, desert scrub**	**A-2**		
Bromus tectorum	**cheatgrass**	**sagebrush, pinyon juniper woodlands, etc.**	**A-1**		
Centaurea solstitialis	yellow star thistle	grasslands	A-1	C	
Cortaderia selloana	pampas grass	grasslands, wetlands, etc.	A-1		
Delairea odorata	German ivy	coastal shrublands, riparian	A-1	C#	
Eichhornia crassipes	water hyacinth	waterways	A-2		
Elaegnus angustifolius	Russian olive	interior riparian	A-2		
Eucalyptus globulus	Tasmanian blue gum	riparian, grasslands	A-1		
Ficus carica	edible fig	riparian woodlands	A-1		
Foeniculum vulgare	wild fennel	grasslands, shrublands	A-1		
Pennisetum setaceum (A)	fountain grass	roadsides, grasslands, etc.	A-1		
Rubus discolor	Himalayan blackberry	riparian, marshes, woodlands	A-1		
Saponaria officinalis	bouncing bet	meadows, riparian	A-2		
Tamarix chinensis, T. gallica, T. parvifolia, T. ramosissima	**tamarisk, salt cedar**	**desert washes, riparian, seeps and springs**	**A-1**	**C#**	
LIST B: Lesser Invasive					
Ageratina adenophora	eupatory	coastal slopes and canyons, riparian	B		
Bassia hyssopifolia	bassia	alkaline habitats	B		
Brassica nigra	black mustard	coastal grasslands, disturbed areas	B		
Centaurea militensis	tocolote	widespread	**B**	**C#**	
Cirsium vulgare	bull thistle	riparian, marshes, meadows	B	C#	
Conium maculatum	poison hemlock	riparian, oak woodlands	B		
Festuca arundinacea	tall fescue	coastal scrub, grasslands	B		
Hedera helix (A)	English ivy	coastal and mountain forests, riparian	B		
Holcus lanatus	velvet grass	coastal grasslands, wetlands	B		
Olea europaea	olive	riparian	B		
Phaliris aquatica	harding grass	coastal, mesic soils	B		
Potamogeton crispus	curlyleaf pondweed	ponds, lakes, streams	B		
Ricinus communis	castor bean	coastal and interior, widespread	B		
Robinia psudoacacia	black locust	riparian, canyons	B		
Schinus molle	Peruvian pepper tree	riparian, canyons	B		
Spartium junceum	Spanish broom	roadsides, canyons, widespread	B	C#	

Table 20. Noxious and Invasive Plant Species Known from the SBNF					
SPECIES NAME	**COMMON NAME**	**HABITATS**	**CALIPC LISTING***	**CFDA RATING***	**IN PROJECT**
Verbascum thapsus	woolly mullein	widespread	B		
Vinca major	periwinkle	riparian, oak woodland	B		
Need More Info, and Other Weeds of Note					
Asphodelus fistulosus	asphodel	highways			
Capsella bursa-pastoris	shepherd's purse				
Carduus pycnocephalus	Italian thistle				
Chenopodium album	common lamb's quarters	widespread			
Cnicus benidictus	blessed thistle				
Convolvulus arvensis	field bindweed	disturbed areas			
Cynodon dactylon	Bermuda grass				
Descurainia sophia	tansy mustard	Mojave desert scrub, desert transition			
Dimorphotheca sinuata	cape marigold	sage scrub, alluvial fan scrub			
Dipsacus fullonum	Fuller's teasel	roadsides and other disturbed sites			
Dipsacus sativus	wild teasel	roadsides and other disturbed sites			
Elytrigia elongata	tall wheatgrass				
Elytrigia intermedia	Intermediate wheatgrass	Meadows, forest floor			
Erodium botrys	storksbill	widespread			
Erodium cicutarium	storksbill	widespread			
Euphorbia lathyris	gopher plant	interior sage scrub			
Hirshfeldia incana	shortpod mustard				
Hordium murinum	barley				
Hypochaeris glabra	Smooth cat's ear				
Lactuca serriola	**Prickly lettuce**				
Lathyrus latifolius	sweetpea	many habitat types			
Malva neglecta	common mallow	disturbed roadsides			
Malva parviflora	cheeseweed				
Nicotiana glauca	tree tobacco	coastal scrub			
Lepidium perfoliatum	clasping pepperweed	open vegetation, clay-rich soils			
Lunaria annua	dollar plant	riparian, forest, woodland			
Medicago polymorpha	California bur-clover	many habitat types			
Medicago sativa	alfalfa	roadside, trailside			
Medilotus albus	**white sweet-clover**	**many habitat types**			
Melilotus officinalis	yellow sweet-clover	many habitat types			
Mentha spicata var. spicata	spearmint	streamside			
Nerium oleander	oleander	persists/naturalizes in riparian			
Oxalis pes-capre (A)	Bermuda buttercup	disturbed grasslands			
Pennisetum clandestinum	Kikuyu grass	disturbed sites, roadsides			
Picris echioides	bristly ox-tongue	disturbed sites, near Lake Silverwood			
Piptatherum miliaceum	smilo grass	creeks and canyons			
Plantago lanceolata	English plantain				

Table 20. Noxious and Invasive Plant Species Known from the SBNF					
SPECIES NAME	**COMMON NAME**	**HABITATS**	**CALIPC LISTING***	**CFDA RATING***	**IN PROJECT**
Poa bulbosa	bulbous bluegrass	conifer forest and grassy mountain areas			
Polygonum aviculare subsp. depressum	oval-leaved knotweed				
Prunus cerasifera	cherry plum	oak woodland, riparian			
Ranunculus testiculatus	bur buttercup				
Rumex crispus	curly dock				
Salsola tragus	**Russian thistle**	**many habitats**			
Salsola paulsenii	barbwire Russian thistle	Mojave desert scrub, disturbed sites			
Senecio vulgaris	groundsel				
Silene gallica	common catchfly				
Silybum marianum	milk thistle	pasturelands, disturbed grasslands			
Sisymbrium altissimum	**tumble mustard**	**disturbed places, mainly transmontane**			
Sonchus oleraceus	sow thistle				
Tribulus terrestris	puncture vine	dry disturbed areas			
Taraxacum officinale	dandelion				
Tragopogon dubius	goat's beard				
Vulpia myuros	rat-tail fescue				
Xanthium spinosum	spiny cocklebur	riparian and other wetlands			
Annual Grasses That Pose Significant Threats					
Avena barbata	slender wild oat	coastal slopes, coastal sage scrub, disturbed			
Avena fatua	wild oat	coastal slopes, coastal sage scrub, disturbed			
Bromus diandrus	**ripgut brome**	**many habitat types**			
Lolium spp.	ryegrass	Meadows, wetlands. Persists when seeded post-fire			
Schismus barbatus	**Mediterranean grass**	**coastal and desert shrublands**			

***California Exotic Pest Plan Council (CEPPC) List Categories:**

List A: Most Invasive Wildland Pest Plants; documented as aggressive invaders that displace natives and disrupt natural habitats. Includes two sub-lists; List A-1: Widespread pests that are invasive in more than 3 Jepson regions, and List A-2: Regional pests invasive in 3 or fewer Jepson regions

List B: Wildland Pest Plants of Lesser Invasiveness; invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption; may be widespread or regional.

Red Alert: Pest plants with potential to spread explosively; infestation currently small or localized. If found, alert Cal IPC, County Agricultural Commissioner or California Department of Food and Agriculture.

Need More Information: Plants for which current information does not adequately describe nature of threat to wildlands, distribution or invasiveness. Further information is requested from knowledgeable observers.

Annual Grasses: A preliminary list of annual grasses, abundant and widespread in California, that pose significant threats to wildlands. Information is requested to support further definition of this category in next list edition.

***California Dept. of Food and Agriculture Pest Ratings:**

All weeds on California's 130 plus noxious weed list have a rating. The overall rating system is NOT based on how bad a weed is-all weeds are considered "bad"- but rather on overall distribution throughout the state. Ratings and formal definitions by the CDFA are:

A=rated weeds are normally limited in distribution throughout the state. Eradication, containment, rejection or other holding action at the state-county level. Quarantine interceptions to be rejected or threat at any point in the state.

B=rated weeds are more widespread. Eradication, containment, control or other holding action at the discretion of the commissioner. State endorsed holding action and eradication only when found in a nursery.

C=rated weeds are generally widespread throughout the state. Action to retard spread outside of nurseries at the discretion of the commissioner. Reject only when found in a cropseed for planting or at the discretion of the commissioner.

Q=rated species are treated as temporary "A" weeds. Denoting action outside nurseries at the state-county level pending determination of permanent rating.

D=rated weeds are organisms considered to be of little or no economic importance. No action. Anything not rated as "A", "B", "C", or ""Q' is given a "D" rating.

#= plant added to CDFA noxious weed list 8/2003, pest rating not finalized but "C" rating expected.

VI-2.4– Measures to Prevent, Control, and Eliminate Non-Native Plant Risks
Both of the alternatives include Design Features intended to reduce the potential for establishment and/or spread of invasive weeds during implementation of this project.

Application of the Design Features and incorporation of decommissioning and restoration elements of the Proposed Action would reduce the risk of weed introduction and spread as a result of project implementation. These measures are all fully incorporated into the project description. The overall risk of weed introduction is considered **moderate** with the incorporation of the above measures.

VI-2.5– Risk Determination for Non-Native Plants
With the incorporation of the Design Features and monitoring measures into the decision, the risk of invasive plant introduction and spread of weeds would be reduced from a high level of risk to a moderate level of risk. Without the Design Features and monitoring measures, the risk of introduction and spread would remain high.

VI-3.0 - NON-NATIVE ANIMAL AND PATHOGENS ASSESSMENT
Table 21 displays a list of non-native animals and pathogens addressed in the EIS for SBNF LMP (2006, Table 464) and those known to occur in or near the analysis area for this project, or along access routes into the analysis area. All of these species were considered in this analysis.

VI-3.1 – Occurrences of Non-Native Animals and Pathogens in the Analysis Area
An inventory for non-native animals was performed concurrently with focused wildlife surveys and inventories for this project, as well as for previous projects. The surveys are described in Part I of this document. The surveys that were performed had a moderate likelihood of detecting all target species (including non-native). **Table 21** lists non-native animals recorded in the surveyed areas.

There are records for rock pigeon, house sparrow, European starling, brown-headed cowbird, red fox, feral dogs, feral cats, domestic sheep and goats, and wild burros on the North Slope in the vicinity of the MCC operations.

Surveys were likely not sufficient to detect all non-native animals or pathogens present in the analysis area. Therefore, there is an unknown risk associated with unknown/undetected non-native animals/pathogens.

VI-3.2 – Risk of Introducing and Establishing New Occurrences into Analysis Area
The risk of introducing and establishing new occurrences of non-native animals in the analysis area is considered low. The types of activities proposed are unlikely to attract new non-native animals that are considered threats at the time of this analysis.

Table 21. Non-Native Animals Known from the SBNF (From SBNF LMP EIS 2006)					
Scientific Name	**Common Name**	**Threat Level***	**Native Species Affected or Other Effects**	**On SBNF****	**Occurrence in Analysis Area**
Invertebrates					
Linepithema humile	Argentine ant	2	Native ants & species that eat ants, prey base for coast horned lizard & arroyo toad, plant seeds dispersed by native ants	Y	**P**
Procambarus clarkii	Louisiana crayfish	2	Native fish/amphibians	Y	**N**
Solenopsis invicta	Red imported fire ant	1	Small mammals, birds, humans	A	**N**
Apis mellifera scutellata	Africanized honey-bee	4	Native animals, humans	A	**N**
Apis melliferaspp.	European honey bee	3	Native bees	Y	**P**
Reptiles/Amphibians					
Rana catesbeiana	Bullfrog	1	Native fish/amphibians	Y	**U**
Chelydra serpentina	Snapping turtle	4	Native fish/amphibians	Y	**N**
Chrysemys picta, C. scripta	Red-eared slider, painted turtle	4	Native fish/amphibians	Y	**N**
Fish					
Lepomis spp.	Green sunfish, bluegill, pumpkinseed	1	Native fish/amphibians, insects	Y	**N**
Micropterus spp.	Largemouth and smallmouth bass	1	Native fish/amphibians	Y	**N**
Cyprinella lutrensis	Red shiner	1	Native fish/amphibians	A	**N**
Carrasius auratus	Goldfish	2	Native fish/amphibians	Y	**N**
Cyprinus carpio	Carp	2	Native fish/amphibians	Y	**N**
Pimephales promelas	Fathead minnow	2	Native fish/amphibians	Y	**N**
Ameiurus (Ictalurus) melas	Black bullhead catfish	1	Native fish/amphibians, insects	Y	**N**
Ictalurus punctatus	Channel catfish	3	Native fish/amphibians	Y	**N**
Gambusia afinis	Mosquitofish	1	Native fish/amphibians, insects	Y	**N**
Oncorhynchus mykiss	Rainbow trout (stocked)	1,3	Native fish/amphibians	Y	**N**
Salmo trutta	German brown trout	1	Native fish/amphibians	Y	**N**
Mammals					

Table 21. Non-Native Animals Known from the SBNF (From SBNF LMP EIS 2006)					
Rattus, R. norvehicus	Black rat, Norway rat	3	Woodrats, mice	Y	**P**
Sus scrofa	European boar, feral pig	2	Disrupts habitat, eats many species	Y	**N**
Vulpes fulva	Red fox	1	Small ground dwelling native species	Y	**Y**
Castor Canadensis	Beaver	1	Native vegetation	Y	**N**
Felis domesticus	Feral cat	2	Native birds, reptiles	Y	**Y**
Canis familiaris	Feral dog	1	Bighorn sheep, deer	Y	**Y**
Equus cabullus	Feral horse	2	Bighorn sheep	A	**N**
Equus asinus	Feral burro	2	Deer	Y	**Y**
Bos taurus	Feral cattle	1	Riparian habitats, desert tortoise	Y	**P**
Didelphus virginiana	Opossum	3,4	Native vegetation and animals	Y	**U**
	Domestic sheep and goats	1	Bighorn sheep	Y	**Y**
Birds					
Molothrus ater	Brown-headed cowbird	1	Riparian dependent birds	Y	**Y**
Sternus vulgaris	European starling	1	Cavity nesting birds	Y	**Y**
Bibulus ibis	Cattle egret	3		Y	**N**
Meleagris gallopavo	Wild turkey	2	Native vegetation, native birds	Y	**U**
Passer domesticus	House sparrow	2	Native birds	Y	**Y**
Columba livia	Rock pigeon	2	Native birds	Y	**Y**

<u> Threat Level</u>*
1- serious, documented threat to sensitive species or ecosystems;
2-moderate threat to native species or ecosystems;
3-benign, low risk;
4-potential threat, but impacts not well documented.

Species with multiple threat levels are considered a threat in some areas, but not a problem in other areas.

*<u>** Occurrence</u>*
A=Known from sites adjacent to SBNF, reasonable to expect to invade Forest ecosystems within next 5 years.
Y=Known occurrences on the SBNF
P=Potential
U=Unlikely

However, there is a degree of uncertainty about the types of non-native animals that could pose threats to native habitats and species in the future, including the 40-120 year life of the project. It is likely that the greatest risk of new non-natives over the life of the project comes from invertebrates and pathogens that could affect native vegetation on localized or large scales. The frequency of introduction of non-native invasive pathogens and species in North America has substantially increased due to international trade, travel, and development. These species and pathogens have the potential to dramatically affect native ecosystems and species in North American forests. There are over 20 non-native invasive pathogenic microorganisms and over 360 species of non-native insects that have become established in U.S. forests (**Moser *et al.* 2009**).

The Design Features include a measure that would provide for coordination and adaptive management at the project area in order to develop detection, control, and eradication measures over the life of the project if new non-native invasive species become established in the region.

VI-3.3 - Risk Assessment of Spread of Existing Populations of Non-Native Animals

Most of the non-native animal occurrences in the area are around the plant, landfill, and Cushenbury Springs. These include rock pigeon, European startling, house sparrow, and brown-headed cowbirds, feral/domestic dogs, feral/domestic cats, and domestic sheep and goats. All of these species have negative effects on native animals by competition for limited resources (*e.g.,* food, nest sites, etc.) and/or acting aggressively toward native species (*e.g.,* displacing, killing, preying upon, etc.).

Brown-headed cowbirds pose the greatest threat to nesting native birds due to nest parasitism (*i.e.,* laying their eggs in the nest of other birds). Brown-headed cowbird parasitism has contributed to the decline of a number of rare species, including federally-endangered least Bell's vireo and southwestern willow flycatcher. European starlings aggressively out-compete native birds for nesting cavities (*http://www.aphis.usda.gov/wildlife_damage/nwrc/publications/05pubs/avery053.pdf*). House sparrows aggressively defend their nesting territories, often destroying eggs and chicks of native birds and also killing adults defending young *(http://www.mdinvasivesp.org/archived_invaders/archived_invaders_2006_03.html; http://www.aphis.usda.gov/wildlife_damage/nwrc/publications/05pubs/avery053.pdf*). Large flocks of seed eaters such as rock pigeons, house sparrows, and European starlings may affect native plant populations.

Activities at the proposed SQ could increase the likelihood of spread of the urban birds mentioned above. However, the Design Features include measures prohibiting litter and feeding animals at the site. If food is not made available at the quarry site, it is unlikely that these species would spread.

House cats have been detected using wildlife water drinkers on the North Slope. Free-roaming cats, whether feral or domestic, can have significant effects on wildlife. Studies estimate that over one billion birds are killed by cats annually (**Dauphine and Cooper 2009**). Studies have found a correlation between declining bird diversity and increasing cat abundance (**Crooks and Soule 1999**). In addition to killing and injuring a huge number of animals, cats also compete with native predators for pretty. Cats can also be vectors for diseases and parasites. Even one cat in the analysis area can have substantial effects on native species, especially nesting birds and rare species. Cats at Cushenbury Springs could threaten federally-listed species including least Bell's vireo and southwestern willow flycatchers.

Feral sheep, goats, and dogs represent one of the greatest threats to North Slope bighorn sheep population. Sheep and goats can transmit respiratory and skin diseases that are readily spread throughout the bighorn population, resulting in reduced recruitment of young or death of all classes of bighorn sheep. Dogs are suspected of killing bighorn sheep on the North Slope. See **Part V-2.3.5.11** for a more discussion about threats from non-native animals to bighorn sheep.

The Design Features include measures for training/coordination of MCC employees and contractors to increase the awareness of non-native species risks and also require reporting of sightings of sheep, goats, dogs, and cats. Another Design Feature measure provides for control and removal of sheep, goats, dogs, and cats. Increasing the awareness of MCC's employees and immediate reporting of sightings are perhaps the most effective method of reducing the risks associated with these animals.

VI-3.4– Risk Determination for Non-Native Animals

There is some risk of introduction, establishment, or spread of non-native animals or pathogens in the analysis area. The Design Features include measures that would help reduce that risk substantially.

VI-4.0 – SUMMARY OF RISK FROM NON-NATIVE SPECIES

The risk from currently known non-native plants, animals, and pathogens is expected to increase from the current risk levels in the analysis area as a result of new ground disturbing activities, and heavy equipment use in an area not currently accessible to motorized vehicles. Over the long life of the project, other non-native plants, animals, and pathogens may be introduced into the area or region. Thus, there is a high level of uncertainty about the long-term risks. The Design Features contain measures for monitoring and adaptive management over the life of the project. These measures should help ensure that threats to the ecosystem, vegetation communities, and native plants and animals are minimized.

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Appendix A: Floral and Faunal Compendium – Mitsubishi South Quarry Expansion

Plants known from the Mitsubishi Project Area							
Family	**Genus**	**Species**	**var/ssp**	**Variety/Subspecies**	**Common name**	**Notes**	**Status**
Agavaceae	*Hesperoyucca*	*whipplei*			chaparral yucca		
Agavaceae	*Yucca*	*brevifolia*			Joshua tree		
Agavaceae	*Yucca*	*schidigera*			yucca	Wood 2012	
Apiaceae	*Berula*	*erecta*			water parsnip	Wear 1992 (CS)	
Apiaceae	***Cymopterus***	***multinervatus***				**White 1995**	**2B.2**
Apiaceae	*Lomatium*	*mohavense*				Wood 2010	
Apiaceae	*Tauschia*	*parishii*				Thomas 2008	
Apocynaceae	*Apocynum*	*cannabinum*			Indian hemp	Wear 1992 (CS)	
Asteraceae	*Acamptopappus*	*sphaerocephalus*	*var*	*sphaerocephalus*		White 1998	
Asteraceae	*Achillea*	*millefolium*			common yarrow		
Asteraceae	*Ambrosia*	*dumosa*			burrobush	Wear 1992 (CS)	
Asteraceae	*Ambrosia*	*psylostachya*			western ragweed	Wear 1992 (CS)	
Asteraceae	*Artemisia*	*ludoviciana*			mugwort	Wear 1992 (CS)	
Asteraceae	*Artemisia*	*tridentata*			big sagebrush		
Asteraceae	*Baccharis*	*glutinosa*			mule fat	Wear 1992 (CS)	
Asteraceae	*Baileya*	*pleniradiaia*				White 1998	
Asteraceae	*Brickelia*	*arguta*				White 1998	
Asteraceae	*Brickelia*	*californica*				Wear 1992 (CS)	
Asteraceae	*Brickelia*	*oblongifolia*	*var*	*linifolia*	narrowleaf brickellbush		
Asteraceae	*Calycoseris*	*parryi*				White 1998	
Asteraceae	*Chaenactis*	*fremontii*				White 1998	
Asteraceae	*Lepidospartum*	*squamatum*				Wood 2010	
Asteraceae	*Chaenactis*	*macrantha*				White 1998	
Asteraceae	*Chaenactis*	*stevioides*				White 1998	
Asteraceae	*Cirsium*	*mohavense*				Wear 1992 (CS)	
Asteraceae	*Cirsium*	*occidentale*	*var*	*californicum*		Wood 2010	
Asteraceae	*Ericameria*	*nauseosa*			rubber-rabbitbrush		
Asteraceae	*Chrysothamnus*	*viscidiflorus*				Thomas 2008	

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Plants known from the Mitsubishi Project Area							
Family	**Genus**	**Species**	**var/ssp**	**Variety/Subspecies**	**Common name**	**Notes**	**Status**
Asteraceae	*Encelia*	*actonii*				Thomas 2008	
Asteraceae	*Ericameria*	*cuneata*				Thomas 2008	
Asteraceae	*Ericameria*	*cooperi*				Wear 1992 (CS)	
Asteraceae	*Ericameria*	*linearifolia*				White 2000	
Asteraceae	***Erigeron***	***parishii***			**Parish's fleabane**		**Threatened**
Asteraceae	*Eriophyllum*	*confertiflorum*			golden yarrow	Wear 1992 (CS)	
Asteraceae	*Gnaphalium*	*luteoalbum*				White 1998	
Asteraceae	*Gutierezia*	*microcephala*				Thomas 2008	
Asteraceae	*Gutierezia*	*sarothrae*			broom snakeweed		
Asteraceae	***Hulsea***	***vestita***	***subsp.***	***parryi***		**Wood 2010**	**watch list**
Asteraceae	*Hymenoclea*	*salsola*				Thomas 2008	
Asteraceae	***Lactuca***	***serriola***			**prickly lettuce**	**Wear 1992 (CS)**	**Non-Native**
Asteraceae	*Lepidospartum*	*squamatum*			scale-broom	Wear 1992 (CS)	
Asteraceae	*Leucosyris*	*carnosa*				Hist. Cush Springs	
Asteraceae	*Malocothrix*	*sp.*					
Asteraceae	*Prenanthella*	*exigua*				White 1998	
Asteraceae	*Psathyrotes*	*annua*				White 1998	
Asteraceae	*Senecio*	*flaccidus*	*var.*	*monoensis*		White 1998	
Asteraceae	*Solidago*	*confinis*			marsh goldenrod	Wear 1992 (CS)	
Asteraceae	*Stephanomeria*	*exigua*				Wood 2012	
Asteraceae	*Stephanomeria*	*pauciflora*				Thomas 2008	
Asteraceae	*Symphyotrichum*	*ascendens*			long-leaved aster	Wear 1992 (CS)	
Asteraceae	***Symphyotrichum***	***defoliatum***				**Hist. Cush Springs**	**FS Sensitive**
Asteraceae	*Tetradymia*	*axillaris*	*var.*	*longispina*		Wear 1992 (CS)	
Asteraceae	*Xylorhiza*	*tortifolia*				White 1998	
Berberidaceae	***Berberis***	***fremontii***				**cnddb, Hist. Cush Springs**	**3**
Boraginaceae	*Cryptantha*	*barbigera*				Wood 2010	

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Plants known from the Mitsubishi Project Area							
Family	**Genus**	**Species**	**var/ssp**	**Variety/Subspecies**	**Common name**	**Notes**	**Status**
Boraginaceae	*Cryptantha*	*circumsissa*				Wood 2010	
Boraginaceae	*Cryptantha*	*confertiflora*				White 2000	
Boraginaceae	*Cryptantha*	*gracilis*				Wood 2010	
Boraginaceae	*Cryptantha*	*maritima*				White 2005	
Boraginaceae	*Cryptantha*	*oxygona*				Wood 2010	
Boraginaceae	*Cryptantha*	*pterocarys*				White 1998	
Boraginaceae	*Cryptantha*	*utahensis*				Wood 2010	
Boraginaceae	*Heliotropium*	*curassavicum*				Wear 1992 (CS)	
Boraginaceae	*Pecotcarya*	*setosa*				White 1998	
Boraginaceae	*Pholisma*	*arenarium*				Wood 2010	
Boraginaceae	*Pholistoma*	*auritum*				White 2000	
Boraginaceae	*Plagiobothrys*	*jonesii*				White 1998	
Brassicaceae	***Arabis***	***shockleyi***			**Shockley's rockcress**		**FS Sensitive**
Brassicaceae	*Arabis*	*sp.*			rockcress		
Brassicaceae	*Arabis*	*perennans*				Soza 1998, Thomas 2008	
Brassicaceae	*Arabis*	*pulchra*				Wood 2010	
Brassicaceae	*Arabis*	*sparsiflora*				Wood 2010	
Brassicaceae	***Boechera***	***lincolnensis***				**Historic, Cush Springs**	**2B.3**
Brassicaceae	*Caulanthus*	*cooperi*				Wood 2010	
Brassicaceae	*Caulanthus*	*major*				Wood 2010	
Brassicaceae	*Descurainia*	*pinnata*				White 1998	
Brassicaceae	*Draba*	*cuneifolia*				White 2000	
Brassicaceae	*Lepidum*	*fremontii*				White 1998	
Brassicaceae	*Lepidum*	*lasiocarpum*				White 1998	
Brassicaceae	*Lepidum*	*nitidum*				Sanders 1995	
Brassicaceae	*Lepidum*	*virginicum*				White 1998	
Brassicaceae	*Lepidum*	*squamatum*				Wood 2010	

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Plants known from the Mitsubishi Project Area							
Family	**Genus**	**Species**	**var/ssp**	**Variety/Subspecies**	**Common name**	**Notes**	**Status**
Brassicaceae	***Sisymbrium***	***altissimum/orientale***				**Wood 2012**	**Non-Native**
Brassicaceae	*Stanleya*	*pinnata*				Thomas 2008	
Brassicaceae	*Thelypodium*	*integrifolium*	*subsp.*	*affine*		Wear 1992 (CS)	
Cactaceae	*Echinocerus*	*engelmannii*			Engelmann's hedgehog cactus		
Cactaceae	*Echinocerus*	*mojavensis*			Mojave kingcup cactus		
Cactaceae	*Cylindropuntia*	*echinocarpa*			golden cholla	Wear 1992 (CS)	
Cactaceae	*Cylindropuntia*	*ramosissima*			diamond cholla	Wear 1992 (CS)	
Cactaceae	*Opuntia*	*basilaris*			beavertail pricklypear		
Cactaceae	*Opuntia*	*phaecantha*				Thomas 2008	
Campanulaceae	*N00 nh7y`12 amacladus*	*californicus*				Sanders 1995	
Campanulaceae	*Namacladus*	*orientalis*				Wood 2010	
Campanulaceae	*Namacladus*	*sigmoideus*				Wood 2010	
Caprifoliaceae	*Symphoricarpos*	*rotundifolius*				Thomas 2008	
Caryophyllaceae	*Arenaria*	*macradenia*	*var.*	*macradenia*		Thomas 2008	
Chenopodiaceae	*Atriplex*	*canescens*				White 1998	
Chenopodiaceae	***Atriplex***	***parishii***				**Historic, Cush Springs**	**FS Sensitive**
Chenopodiaceae	*Chenopodium*	*berlandieri*				Sanders 2000	
Chenopodiaceae	*Chenopodium*	*fremontii*	*var*	*fremontii*		Wood 2010	
Chenopodiaceae	*Kraschenínnikovia*	*lanata*				White 2000	
Chenopodiaceae	***Salsola***	***tragus***				**Wood 2012**	**Non-Native**
Crassulaceae	***Dudleya***	***abramsii***	***subsp.***	***affinis***		**Wood 2010**	**FS Sensitive**
Crossomataceae	*Glossopetalon*	*spinescens*				White 1998	
Cupressaceae	*Juniperus*	*occidentalis*			western juniper		
Cupressaceae	*Juniperus*	*osteosperma*			Utah juniper		
Euphorbiaceae	*Chamaesyce*	*albomarginata*				White 1998	
Euphorbiaceae	*Tragia*	*ramosa*				Thomas 2008	

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Plants known from the Mitsubishi Project Area							
Family	**Genus**	**Species**	**var/ssp**	**Variety/Subspecies**	**Common name**	**Notes**	**Status**
Ephedraceae	*Ephedra*	*nevadensis*			Nevada jointfir		
Ephedraceae	*Ephedra*	*viridis*			mormon tea		
Ephedraceae	*Ephedra*	*sp.*			jointfir		
Ericaceae	*Arctostaphylos*	*glauca*			bigberry manzanita		
Ericaceae	*Acrtostaphylos*	*patula*			greenleaf manzanita		
Fabaceae	*Amorpha*	*californica*				Wood 2012	
Fabaceae	***Astragalus***	***albens***			**cushenbury milkvetch**		**Endangered**
Fabaceae	***Astragalus***	***bernardinus***					**FS Sensitive**
Fabaceae	*Astragalus*	*douglasii*				Thomas 2008	
Fabaceae	*Astragalus*	*laynae*			widow's milkvetch		
Fabaceae	***Astragalus***	***leucolobus***			**Bear Valley milkvetch**		**watch list**
Fabaceae	***Astragalus***	***tidestromii***			**milkvetch**	**Soza 1998**	**FS Sensitive**
Fabaceae	*Glycyrrhiza*	*lepidota*			American licorice	Wear 1992 (CS)	
Fabaceae	***Melilotus***	***albus***			**white sweet clover**	**Wear 1992 (CS)**	**Non-Native**
Fagaceae	*Quercus*	*john-tuckeri*			Tucker oak		
Fagaceae	*Quercus*	*chrysolepis*				Wood 2012	
Fagaceae	*Quercus*	*cf cornelius-mulleri*				Wood 2012	
Hydrophyllaceae	*Emmenanthe*	*penduliflora*				White 1998	
Hydrophyllaceae	*Eriodictyon*	*trichocalyx*			hairy yerba santa		
Hydrophyllaceae	*Nama*	*demissum*				Wood 2010	
Hydrophyllaceae	*Phacelia*	*affinis*			limestone phacelia		
Hydrophyllaceae	*Phacelia*	*californica*			California phacelia		
Hydrophyllaceae	*Phacelia*	*campanularia*				Wood 2010	
Hydrophyllaceae	*Phacelia*	*crypantha*				Wood 2010	
Hydrophyllaceae	*Phacelia*	*fremontii*				White 1998	

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Plants known from the Mitsubishi Project Area							
Family	**Genus**	**Species**	**var/ssp**	**Variety/Subspecies**	**Common name**	**Notes**	**Status**
Hydrophyllaceae	*Phacelia*	*rotundifolia*				Wood 2010	
Juncaceae	*Juncus*	*mexicanus*				Wear 1992 (CS)	
Krameriaceae	*Krameria*	*erecta*				Wood 2010	
Lamiaceae	*Poliomintha*	*incana*				Historic, Cush Springs	
Lamiaceae	*Scutellaria*	*mexicana*			Mexican bladdersage		
Lamiaceae	*Salvia*	*dorii*			sage	Wood 2012	
Lamiaceae	*Salvia*	*pachyphylla*				Wood 2012	
Lennoaceae	*Pholisma*	*arenarium*			desert christmas tree		
Liliaceae	***Allium***	***parishii***			**Parish's onion**		**watch list**
Liliaceae	***Calochortus***	***striatus***				**Hist at Whiskey Springs, Cush Springs**	**FS Sensitive**
Liliaceae	*Muilla*	*maritima*				MacKay 2008	
Liliaceae	***Muilla***	***coronata***				**White**	**watch list**
Loasaceae	*Mentzelia*	*laevicaulis*				Wood 2012	
Loasaceae	*Petalonyx*	*nitidus*				Wood 2010	
Lythraceae	*Lithrum*	*californicum*				Wear 1992 (CS)	
Malvaceae	*Sphaeralcea*	*ambigua*				White 1998	
Nyctaginaceae	***Abronia***	***nana***	***var***	***covillei***	**Coville's dwarf sand verbena**		**FS Sensitive**
Nyctaginaceae	*Mirabilis*	*laevis*	*var.*	*villosa*		White 1998	
Orobanchaceae	*Orobanche*	*bulbosa*				White 1998	
Onograceae	*Camissionia*	*boothii*				White 1998	
Onograceae	*Epilobium*	*canum*				Wood 2013	
Onograceae	*Oenothera*	*californica*				White 1998	
Oleaceae	*Menodora*	*spinescens*			Greenfire	Thomas 2008	
Papaveraceae	*Argemone*	*munita*				Wood 2013	
Papaveraceae	*Eschscholzia*	*minutiflora*				White 1998	
Pinaceae	*Pinus*	*monophylla*			singlelear pinyon		

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Plants known from the Mitsubishi Project Area							
Family	**Genus**	**Species**	**var/ssp**	**Variety/Subspecies**	**Common name**	**Notes**	**Status**
Poaceae	*Achnatherum*	*hymenoides*			Indian ricegrass		
Poaceae	*Achnatherum*	*speciosum*			desert needlegrass		
Poaceae	*Agrostis*	*exarata*				White 1998	
Poaceae	*Aristida*	*purpurea*	*var*	*neallyi*		Wood 2012	
Poaceae	***Bromus***	***diandrus***			**ripgut brome**	**White 1998**	**Non-Native**
Poaceae	***Bromus***	***rubens***			**red brome**		**Non-Native**
Poaceae	***Bromus***	***tectorum***			**cheatgrass**		**Non-Native**
Poaceae	*Distichlis*	*spicata*				Wear 1992 (CS)	
Poaceae	*Elymus*	*elymoides*			squirreltail		
Poaceae	*Elymus*	*sp.*			wildrye		
Poaceae	*Hilaria*	*rigida*				White 1998	
Poaceae	*Melica*	*frutescens*				Thomas 2008	
Poaceae	*Phragmites*	*australis*				Wear 1992 (CS)	
Poaceae	*Poa*	*secunda*			bluegrass	White 1998	
Poaceae	***Schismus***	***barbatus***				**Thomas 2008**	**Non-Native**
Poaceae	*Sporobolus*	*airoides*				Wear 1992 (CS)	
Poaceae	*Stipa*	*coronata*	*subsp.*	*depauperata*		Wood 2012	
Polemoniaceae	*Eriastrum*	*diffusum*				Wood 2010	
Polemoniaceae	*Eriastrum*	*sapphirinum*				Wood 2010	
Polemoniaceae	*Gilia*	*cana*				Thomas 2008	
Polemoniaceae	*Linanthus*	*bigelovii*				Sanders 1995	
Polemoniaceae	***Linanthus***	***killipii***				**Porter 2005**	**FS Sensitive**
Polemoniaceae	*Saltugilia*	*grinnellii*	*ssp*	*granti*	grand gilia		
Polemoniaceae	***Saltugilia***	***latimeri***				**Historic, above Whiskey Spr**	**FS Sensitive**
Polygonaceae	*Centrostegia*	*thurberi*				White 2005	
Polygonaceae	*Chorizanthe*	*brevicornu*				White 1998	
Polygonaceae	*Eriogonum*	*deflexum*			flatcrown buckwheat		

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Plants known from the Mitsubishi Project Area							
Family	**Genus**	**Species**	**var/ssp**	**Variety/Subspecies**	**Common name**	**Notes**	**Status**
Polygonaceae	*Eriogonum*	*fasiculatum*	*var.*	*polifolium*	Eastern Mojave buckwheat		
Polygonaceae	*Eriogonum*	*heermannii*				Wood 2010	
Polygonaceae	*Eriogonum*	*inflatum*			desert trumpet		
Polygonaceae	*Eriogonum*	*maculatum*				Wood 2010	
Polygonaceae	***Eriogonum***	***microthecum***	***var***	***corymbosoides***	**San Bernardino buckwheat**		**watch list**
Polygonaceae	*Eriogonum*	*nidularium*				Wood 2010	
Polygonaceae	***Eriogonum***	***ovalifolium***	***var***	***vineum***	**Cushenbury buckwheat**		**Endangered**
Polygonaceae	*Eriogonum*	*pusillium*			yellowturbans		
Polygonaceae	*Eriogonum*	*saxatile*			hoary buckwheat		
Polygonaceae	*Eriogonum*	*viredescens*				Sanders 1995	
Polygonaceae	***Oxytheca (Acanthoscyphus)***	***parishii***	***var***	***goodmaniana***	**Cushenbury oxytheca**		**Endangered**
Portulacaceae	*Claytonia*	*parviflora*				White 1998	
Pteridaceae	*Argyrochosma*	*jonesii*				Wood 2010	
Ranunculaceae	*Aquilegia*	*formosa*				Wood 2012	
Ranunculaceae	*Clematis*	*linguisticifolia*				Wood 2012	
Ranunculaceae	*Delphinium*	*parishii*				White 1998	
Rhamnaceae	*Ceanothus*	*greggii*	*var.*	*perplaxans*	desert ceanothus		
Rhamnaceae	*Ceanothus*	*sp.*			ceanothus		
Rhamnaceae	*Rhamnus*	*ilicifolia*				White 1998	
Rosaceae	*Cercocarpus*	*ledifolius*			curl-leaf mountain mahogany		
Rosaceae	*Cercocarpus*	*ledifolius*	*var*	*intricatus*	curl-leaf mountain mahogany		
Rosaceae	*Coleogyne*	*ramosissima*				Thomas 2008	
Rosaceae	*Prunus*	*fremontii*			desert apricot		
Rosaceae	*Prunus*	*fasciculata*				Wood 2010	

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Plants known from the Mitsubishi Project Area							
Family	**Genus**	**Species**	**var/ssp**	**Variety/Subspecies**	**Common name**	**Notes**	**Status**
Rosaceae	*Purshia*	*tridentata*			antelope bitterbrush		
Rosaceae	*Rosa*	*woodsii*	*subsp.*	*gratissima*	Mojave rose	cf. var. glabrata at CS per Ertter	
Rubiaceae	*Galium*	*angustifolium*	*subsp.*	*angustifolium*	bedstraw	Thomas 2008	
Rubiaceae	*Galium*	*angustifolium*	*subsp.*	*gracillimum*	bedstraw	Wood 2010	
Rubiaceae	*Gallium*	*hallii*				Wood 2012	
Rubiaceae	*Galium*	*hilendiae*	*subsp.*	*hilendiae*		Wood 2010	
Rubiaceae	*Galium*	*parishii*				White 1998	
Salicaceae	*Populus*	*fremontii*				Wear 1992 (CS)	
Salicaceae	*Salix*	*exigua*				Wear 1992 (CS)	
Salicaceae	*Salix*	*laevigata*				Wear 1992 (CS)	
Saururaceae	*Anemopsis*	*californica*				Wear 1992 (CS)	
Scrophulariaceae	*Antirrhinum*	*kingii*				White 1998	
Scrophulariaceae	*Castilleja*	*sp.*			Indian paintbrush		
Scrophulariaceae	*Mimulus bigelovii*					Sanders 1995	
Scrophulariaceae	*Penstemon*	*eatonii*			firecracker penstemon		
Scrophulariaceae	*Penstemon*	*sp.*			beardtongue		
Solanaceae	*Solanum*	*sp.*			nightshade		
Scrophulariaceae	*Castilleja*	*angustifolia*	*var*	*dubia*		Castilleja chromosa	
Scrophulariaceae	*Castilleja*	*applegatei*	*subsp.*	*martinii*			
Scrophulariaceae	*Castilleja*	*linearifolia*				Wear 1992 (CS)	
Scrophulariaceae	*Cordalanthus*	*sp.*			bird's-beak		
Solanaceae	*Datura*	*meteloides*				Wear 1992 (CS)	
Solanaceae	*Lycium*	*cooperi*				Wear 1992 (CS)	
Solanaceae	*Solanum*	*xantii*				Wear 1992 (CS)	
Tamarixaceae	***Tamarix***	***sp***					**Non Native**
Typhaceae	*Typha*	*latifolia*				Wear 1992 (CS)	
Urticaceae	*Urtica*	*holosericea*				Wear 1992 (CS)	

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Plants known from the Mitsubishi Project Area							
Family	**Genus**	**Species**	**var/ssp**	**Variety/Subspecies**	**Common name**	**Notes**	**Status**
Viscaceae	*Phoradendron*	*bolleanum*				Sanders 1999	
Viscaceae	*Phoradendron*	*densum*				Wood 2010	
Vitaceae	*Vitus*	*girdiana*				Wear 1992 (CS)	
Zygophyllaceae	*Larrea*	*tridentata*				Wear 1992 (CS)	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Invertebrates						
Acmon Blue	*Plebejus acmon*	Class Insecta, Order Lepidoptera	MacKay and Thomas 2008	Lower Marble Canyon	May-08	
Ants (one species red with black abdomen)	5 additional unidentified species	Class Insecta, Order Hymenoptera	MacKay and Thomas 2008	Lower Marble Canyon	May-08	
Banded River-skimmer	Not identified to Species	Class Insecta, Order Odonata	MacKay and Thomas 2008	Lower Marble Canyon	May-08	
Big-horn Sheep Tick	Not identified to Species	Class Arachnida, Order Acarina	MacKay and Thomas 2008	Lower Marble Canyon	May-08	
Cabbage Butterfly	*Pieris rapae*	Class Insecta, Order Lepidoptera	MacKay and Thomas 2008	Lower Marble Canyon	May-08	
California dogface butterfly	*Zerene eurydice*		SBNF Surveys	Mitsubishi @ Claim 9	Jun-11	
California dogface butterfly	*Zerene eurydice*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
California sister butterfly	*Adelpha californica*		SBNF Surveys	Mitsubishi @ Claim 9	Jun-11	
Carabid Beetle	Not identified to Species	Class Insecta, Order Coleoptera, Family Carabidae	MacKay and Thomas 2008	Lower Marble Canyon	May-08	
Common buckeye butterfly	*Junonia coenia*		SBNF Surveys	Mitsubishi @ Claim 9	Jun-11	
Common Robber Fly	Not identified to Species	Class Insecta, Order Diptera, Family Asilidae	MacKay and Thomas 2008	Lower Marble Canyon	May-08	
Desert monkey grasshopper	*Psychomastax deserticola*		CNDDB	Cushenbury Canyon	1919	Watchlist
Desert monkey grasshopper	*Psychomastax deserticola*		CNDDB	Lone Valley	1919	Watchlist
Grasshopper (not identified to species)	Not identified to Species	Class Insecta, Order Orthoptera	MacKay and Thomas 2008	Lower Marble Canyon	May-08	
Harvester Ant	Veromessor pergandei	Class Insecta, Order Hymenoptera	MacKay and Thomas 2008	Lower Marble Canyon	May-08	
San Bernardino Mountains Silk Moth	*Coloradia velda*		SBNF GIS	Coxey Meadow Area	1997	Watchlist

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Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Sphingid moth larva	Not identified to Species	Class Insecta, Order Lepidoptera: Sphingidae	MacKay and Thomas 2008	Lower Marble Canyon	May-08	
West Coast Lady	*Vanessa carye*	Class Insecta, Order Lepidoptera	MacKay and Thomas 2008	Lower Marble Canyon	May-08	
Reptiles and Amphibians						
Black-collared lizard	*Crotaphytus insularis*		Scott White Report 2000	West Quarry Site @ Mitsubishi	2000	Watch
California Striped racer	*Coluber lateralis lateralis*		SBCM	Cactus Flats-Joshua Tree	2006	
California Striped racer	*Coluber lateralis lateralis*		USFS Surveys	Mitsubishi Claim 15	June 2011	
California Toad	*Bufo boreas halophilus*		SBCM	Cactus Flats-Joshua Tree	2006	
Coast Horned Lizard	*Phrynosoma blainvillii*		CNDDB	Lone Valley - in MCC claims 9 and 16a	?	Watch
Coast Horned Lizard	*Phrynosoma blainvillii*		SBCM	Cactus Flats-Pinyon	2006	Watch
Coast Horned Lizard	*Phrynosoma blainvillii*		USFS Surveys	Mitsubishi Claim 16a	June 2011	Watch
Desert horned lizard	*Phrynosoma platyrhinos*		Lilburn 2013	Omya White Knob	5/4-6/2012; 6/14-16/2012	
Desert Night Lizard	*Xantusia vigilis*		SBCM	Cactus Flats-Joshua Tree	2006	Watch
Desert Night Lizard	*Xantusia vigilis*		Kielhold 1993	Cushenbury Springs	Summer/Fall 1992	Watch
Desert Spiny Lizard	*Sceloporus magister*		MacKay and Thomas 2008	Lower Marble Canyon	2008	
Desert Spiny Lizard	*Sceloporus magister*		Kielhold 1993	Cushenbury Springs	Summer/Fall 1992	
Desert Tortoise	*Gopherus agassizii*		BioSystems 1993	Cushenbury Canyon	1993	
Gopher Snake	*Pituophis catenifer*		SBCM	Cactus Flats-Joshua Tree	2006	
Great Basin Collard Lizard	*Crotaphytus bicintores*		USFS Surveys	Mitsubishi Claim 16a	June 2011	Watch
Great Basin Collared Lizard	*Crotaphytus bicintores*	Juvenile	USFS Surveys	Mitsubishi Claim 15	June 2011	Watch
Great Basin Collared Lizard	*Crotaphytus bicintores*		MacKay and Thomas 2008	Lower Marble Canyon	2008	Watch

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Great Basin collared lizard	*Crotaphytus bicintores*		Scott White Report 2012	South Quarry	2012	Watch
Great Basin fence lizard	*Sceloporus occidentalis longipes*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Great Basin Whiptail	*Aspidoscelis tigris tigris*		SBCM	Cactus Flats-Joshua Tree	2006	
Great Basin Whiptail	*Aspidoscelis tigris tigris*		SBCM	Cactus Flats-Pinyon	2006	
Large-Blotched Ensatina	*Ensatina klauberi*		CNDDB	Upper Marble Canyon @ 5800'	April 2005	
Large-Blotched Ensatina	*Ensatina klauberi*		CNDDB	Upper Arctic Canyon @ 5800'	March 2005	
Large-spotted leopard lizard	*Gambelia wislizenii wislizenii*		Lilburn 2013	Omya White Knob	5/4-6/2012; 6/14-16/2012	
long-nosed leopard lizard	*Gambelia wislizenii*		USFS Surveys	Mitsubishi Claim 15	June 2011	
long-nosed leopard lizard	*Gambelia wislizenii*		Scott White Report 2000	West Quarry Site @ Mitsubishi	2000	
Long-tailed brush lizard	*Urosaurus graciosus*		Lilburn 2013	Omya White Knob	5/4-6/2012; 6/14-16/2012	
rattlesnake	*Crotalus spp.*		J&J Restoration	North Slope drinkers		
San Bernardino Mountain Kingsnake	*Lampropeltis zonata parvibra*		CNDDB	Furnace Canyon @ 6600'	1996	Sensitive
Side-blotched Lizard	*Uta stansburiana*		SBCM	Cactus Flats-Joshua Tree	2006	
Side-blotched Lizard	*Uta stansburiana*		MacKay and Thomas 2008	Lower Marble Canyon	2008	
Side-blotched Lizard	*Uta stansburiana*		Scott White Report 2000	West Quarry Site @ Mitsubishi	2000	
Side-blotched lizard	*Uta stansburiana*		Scott White Report 2012	South Quarry	2012	
Side-blotched Lizard	*Uta stansburiana*		Scott White Report 2012	Mitsubishi Marble Canyon Haul Road	August 2012	
Side-blotched Lizard	*Uta stansburiana*		Kielhold 1993	Cushenbury Springs	Summer/Fall 1992	
Southen sagebrush lizard	*Sceloporus graciosus vandenburgianus*		USFS Surveys	Mitsubishi Claim 15	June 2011	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Southern Pacific Rattlesnake	*Crotalus oreganus helleri*		SBCM	Cactus Flats-Pinyon	2006	
Southern Pacific Rattlesnake	*Crotalus oreganus helleri*		USFS Surveys	Mitsubishi Claim 9	June 2011	
Speckled Rattlesnake	*Crotalus mitchellii pyrrhus*		MacKay and Thomas 2008	Lower Marble Canyon	2008	Watch
Speckled Rattlesnake	*Crotalus mitchelli*		Scott White Report 2000	West Quarry Site @ Mitsubishi	2000	Watch
Speckled rattlesnake	*Crotalus mitchellii*		Scott White Report 2012	South Quarry	2012	Watch
Western Fence Lizard	*Sceloporus occidentalis*		MacKay and Thomas 2008	Lower Marble Canyon	2008	
Western Fence Lizard	*Sceloporus occidentalis*		SBCM	Cactus Flats-Joshua Tree	2006	
Western Fence Lizard	*Sceloporus occidentalis*		SBCM	Cactus Flats-Pinyon	2006	
Western Fence Lizard	*Sceloporus occidentalis*		SBCM	Jacoby Canyon	2007	
Western Fence Lizard	*Sceloporus occidentalis biseriatus*		Scott White Report 2000	West Quarry Site @ Mitsubishi	2000	
Western Fence Lizard	*Sceloporus occidentalis*		Kielhold 1993	Cushenbury Springs	Summer/Fall 1992	
Western Red-tailed Skink	*Eumeces gilberti rubricaudatus*		SBCM	Cactus Flats-Joshua Tree	2006	
Western skink	*Plestiodon skiltonianus*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Western Whiptail	*Cnemidophorus tigris tigris*		MacKay and Thomas 2008	Lower Marble Canyon	2008	
Western Whiptail	*Cnemidophorus tigris*		Scott White Report 2000	West Quarry Site @ Mitsubishi	2000	
Western Whiptail	*Cnemidophorus tigris*		USFS Surveys	Mitsubishi Claim 15	June 2011	
Western Whiptail	*Cnemidophorus tigris*		USFS Surveys	Mitsubishi Claim 16a	June 2011	
Western Whiptail	*Cnemidophorus tigris*		Kielhold 1993	Cushenbury Springs	Summer/Fall 1992	
Zebra-tailed lizard	*Callisaurus draconoides*		Lilburn 2013	Omya White Knob	5/4-6/2012; 6/14-16/2012	
Birds						
Acorn Woodpecker	*Melanerpes formicivorus*		SBCM	Jacoby Canyon	2006	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Acorn Woodpecker	*Melanerpes formicivorus*		SBCM	Jacoby Canyon	2008	
Acorn Woodpecker	*Melanerpes formicivorus*		SBCM	Jacoby Canyon	2007	
Acorn Woodpecker	*Melanerpes formicivorus*		SBCM	Jacoby Canyon	2002	
Acorn Woodpecker	*Melanerpes formicivorus*		SBCM	Jacoby Canyon	2005	
Allen's hummingbird	*Selasphorus sasin*		Scott White Report 2010	South Quarry @ Mitsubishi	2010	
Allen's hummingbird	*Selasphorus sasin*		Scott White Report 2012	Mitsubishi Marble Canyon Haul Road	August 2012	
American kestrel	*Falco sparverius*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
American kestrel	*Falco sparverius*		Myers 2005	Cushenbury Spring	12/17/2005	
American kestrel	*Falco sparverius*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
American Robin	*Turdus migratorius*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
American Robin	*Turdus migratorius*		SBCM	Jacoby Canyon	2005	
American Robin		Camera trap	J&J Restoration	North Slope Wildlife Drinkers		
Anna’s hummingbird	*Calypte anna*	Breeding, territory defense	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Anna's Hummingbird	*Calypte anna*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Anna's Hummingbird	*Calypte anna*		Myers 2005	Cushenbury Spring	12/17/2005	
Anna's Hummingbird	*Calypte anna*		SBCM	Jacoby Canyon	2007	
Anna's Hummingbird	*Calypte anna*		SBCM	Jacoby Canyon	2006	
Anna's Hummingbird	*Calypte anna*		SBCM	Jacoby Canyon	2005	
Anna's Hummingbird	*Calypte anna*		SBCM	Jacoby Canyon	2008	
Anna's Hummingbird	*Calypte anna*		SBCM	Jacoby Canyon	2002	
Anna's Hummingbird	*Calypte anna*		Scott White Report 2012	Mitsubishi Marble Canyon Haul Road	August 2012	
Anna's Hummingbird	*Calypte anna*			OMYA Butterfield 3 and Sentinel ~7800'		
ash-throated flycatcher	*Myiarchus cinerascens*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	

Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Ash-throated Flycatcher	*Myiarchus cinerascens*		SBCM	Jacoby Canyon	2002	
Ash-throated Flycatcher	*Myiarchus cinerascens*	Breeding, carrying insects	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Band-tailed Pigeon	*Columba fasciata*		SBCM	Jacoby Canyon	2007	Watchlist
Band-tailed Pigeon	*Columba fasciata*		SBCM	Jacoby Canyon	2008	Watchlist
Band-tailed Pigeon	*Columba fasciata*		SBCM	Jacoby Canyon	2006	Watchlist
Band-tailed Pigeon	*Columba fasciata*		SBCM	Jacoby Canyon	2002	Watchlist
Band-tailed Pigeon	*Columba fasciata*		SBCM	Jacoby Canyon	2005	Watchlist
barn swallow	*Hirundo rustica*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Bewick's Wren	*Thryomanes bewickii*	Breeding, likely	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Bewick's Wren	*Thryomanes bewickii*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Bewick's Wren	*Thryomanes bewickii*		Myers 2005	Cushenbury Spring	12/17/2005	
Bewick's Wren	*Thryomanes bewickii*		SBCM	Jacoby Canyon	2005	
Bewick's Wren	*Thryomanes bewickii*		SBCM	Jacoby Canyon	2002	
Bewick's Wren	*Thryomanes bewickii*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
Black Phoebe	*Sayornis nigricans*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Black Phoebe	*Sayornis nigricans*		SBCM	Jacoby Canyon	2002	
Black Phoebe	*Sayornis nigricans*		SBCM	Jacoby Canyon	2007	
Black-chinned Hummingbird	*Archilochus alexandri*		SBCM	Jacoby Canyon	2002	
Black-chinned Sparrow	*Spizella atrogularis*		SBCM	Jacoby Canyon	2002	Watchlist
Black-chinned Sparrow	*Spizella atrogularis*		SBNF Surveys	Mitsubishi @ Claim 16a	June 2011	Watchlist
Black-headed Grosbeak	*Pheucticus melanocephalus*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Black-headed Grosbeak	*Pheucticus melanocephalus*		SBCM	Jacoby Canyon	2002	
Black-headed Grosbeak	*Pheucticus melanocephalus*		SBCM	Jacoby Canyon	2006	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Black-headed Grosbeak	*Pheucticus melanocephalus*		SBCM	Jacoby Canyon	2008	
Black-headed Grosbeak	*Pheucticus melanocephalus*		SBCM	Jacoby Canyon	2005	
Black-headed Grosbeak	*Pheucticus melanocephalus*		SBCM	Jacoby Canyon	2007	
Black-headed Grosbeak	*Pheucticus melanocephalus*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	June 2011	
black-tailed gnatcatcher	*Polioptila melanura*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	CDFW Species of Special Conerrn
Black-throated Gray Warbler	*Dendroica_nigrescens*		SBCM	Jacoby Canyon	2007	
Black-throated Gray Warbler	*Dendroica_nigrescens*		SBCM	Jacoby Canyon	2002	
Black-throated Sparrow	*Amphispiza bilineata*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Black-throated Sparrow	*Amphispiza bilineata*	Breeding, territory defense	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Black-throated Sparrow	*Amphispiza bilineata*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
Black-throated Sparrow	*Amphispiza bilineata*		Lilburn 2013	Omya White Knob	5/4-6/2012; 6/14-16/2012	
blue grosbeak	*Guiraca caerulea*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Blue-gray Gnatcatcher	*Polioptila caerulea*		SBCM	Jacoby Canyon	2002	
Blue-gray Gnatcatcher	*Polioptila caerulea*	Breeding, territory defense	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Brewer's blackbird	*Euphagus cyanocephalus*		Myers 2005	Cushenbury Spring	12/17/2005	
Brown Creeper	*Certhia americana*		SBCM	Jacoby Canyon	2007	
Brown Creeper	*Certhia americana*		SBCM	Jacoby Canyon	2002	
Brown-headed Cowbird	*Molothrus ater*		Myers 2005	Cushenbury Spring	12/17/2005	non-native species
Brown-headed Cowbird	*Molothrus ater*		SBCM	Jacoby Canyon	2002	Non-Native Invasive

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Brown-headed Cowbird	*Molothrus ater*		SBCM	Jacoby Canyon	2006	Non-Native Invasive
Brown-headed Cowbird	*Molothrus ater*		SBCM	Jacoby Canyon	2005	Non-Native Invasive
Bullock's Oriole	*Icterus bullockii*		SBCM	Jacoby Canyon	2002	
bushtit	*Psaltriparus minimus*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Bushtit	*Psaltriparus minimus*	Breeding, individual foraging	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Bushtit	*Psaltriparus minimus*		SBCM	Jacoby Canyon	2005	
Bushtit	*Psaltriparus minimus*		SBCM	Jacoby Canyon	2007	
Bushtit	*Psaltriparus minimus*		SBCM	Jacoby Canyon	2002	
bushtit	*Psaltriparus minimus*		SBNF Surveys	Mitsubishi @ Claim 9	June 2011	
bushtit	*Psaltriparus minimus*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
cactus wren	*Campylorhynchus brunneicapillus*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
cactus wren	*Campylorhynchus brunneicapillus*		Myers 2005	Cushenbury Spring	12/17/2005	
California quail	*Callipepla californica*		Myers 2005	Cushenbury Spring	12/17/2005	
California Thrasher	*Toxostoma redivivum*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
California Thrasher	*Toxostoma redivivum*	Breeding likely	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
California Thrasher	*Toxostoma redivivum*		Myers 2005	Cushenbury Spring	12/17/2005	
California Thrasher	*Toxostoma redivivum*		SBCM	Jacoby Canyon	2002	
California towhee	*Pipilo fuscus*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Calliope Hummingbird	*Stellula calliope*		SBCM	Jacoby Canyon	2006	Watchlist
Calliope Hummingbird	*Stellula calliope*		SBCM	Jacoby Canyon	2005	Watchlist
Canyon Wren	*Catherpes mexicanus*	Breeding, likely	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Canyon Wren	*Catherpes mexicanus*		Scott White Report 2012	Mitsubishi Marble Canyon Haul Road	August 2012	
Cassin's Finch	*Carpodacus cassinii*		SBCM	Jacoby Canyon	2002	
Cassin's kingbird	*Tyrannus vociferans*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Cassin's Vireo	*Vireo cassinii*		SBCM	Jacoby Canyon	2005	Watchlist
Cassin's Vireo	*Vireo cassinii*		SBCM	Jacoby Canyon	2002	Watchlist
cedar waxwing	*Bombycilla cedrorum*		Myers 2005	Cushenbury Spring	12/17/2005	
Chipping Sparrow	*Spizella passerina*		SBCM	Jacoby Canyon	2002	
Chipping Sparrow	*Spizella passerina*		SBCM	Jacoby Canyon	2007	
Chukar	*Alectoris chuckar*	Adults with multiple juveniles - 6/23/11	SBNF Surveys	Mitsubishi @ Claim 15	June 2011	Non-Native Game species
Chukar	*Alectoris chuckar*	Camera trap	SBNF Surveys	Mitsubishi @ Claim 9	June 2011	Non-Native Game species
Chukar	*Alectoris chuckar*	Camera trap	J&J Restoration	North Slope Wildlife Drinkers		non-native
Clark's nutcracker	*Nucifraga columbiana*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Clark's nutcracker	*Nucifraga columbiana*	Camera trap	J&J Restoration	North Slope Wildlife Drinkers		
cliff swallow	*Hirundo pyrrhonota*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
common poorwill	*Pahalaenoptilus nuttallii*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
common raven	*Corvus corax*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
common raven	*Corvus corax*		Myers 2005	Cushenbury Spring	12/17/2005	
Common Raven	*Corvus corax*		SBCM	Jacoby Canyon	2006	
Common Raven	*Corvus corax*		SBCM	Jacoby Canyon	2002	
Common Raven	*Corvus corax*		SBCM	Jacoby Canyon	2005	
Common Raven	*Corvus corax*		SBCM	Jacoby Canyon	2007	
Common Raven	*Corvus corax*		SBCM	Jacoby Canyon	2008	
common raven	*Corvus corax*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	June 2011	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
common raven	*Corvus corax*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
Common raven	*Corvus corax*		Scott White Report 2010	South Quarry @ Mitsubishi	2010	
Common raven	*Corvus corax*		Scott White Report 2012	Mitsubishi Marble Canyon Haul Road	August 2012	
common raven	*Corvus corax*	Camera trap	J&J Restoration	North Slope Wildlife Drinkers		
Common raven	*Corvus corax*		MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
common snipe	*Gallinago gallinago*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
common yellowthroat	*Geothlypis trichas*		Myers 2005	Cushenbury Spring	12/17/2005	Watchlist
Cooper's hawk	*Accipiter cooperii*		CNDDB	Crystal Creek @ 5000'	4/10/1988	Watchlist
Cooper's Hawk	*Accipiter cooperii*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Cooper's hawk	*Accipiter cooperii*	Courtship	McKernan 1993 (SBNF GIS)	Cushenbury Spring	1993	Watchlist
Cooper's Hawk	*Accipiter cooperii*		SBCM	Jacoby Canyon	2007	Watchlist
Cooper's Hawk	*Accipiter cooperii*		SBCM	Jacoby Canyon	2005	Watchlist
Cooper's Hawk	*Accipiter cooperii*		SBCM	Jacoby Canyon	2002	Watchlist
Cooper's Hawk	*Accipiter cooperii*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	June 2011	Watchlist
Costa's Hummingbird	*Calypte costae*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Costa's Hummingbird	*Calypte costae*		SBCM	Jacoby Canyon	2005	
Dark-eyed junco	*Junco hyemalis*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Dark-eyed junco	*Junco hyemalis*		Myers 2005	Cushenbury Spring	12/17/2005	
Dark-eyed Junco	*Junco hyemalis*		SBCM	Jacoby Canyon	2006	
Dark-eyed Junco	*Junco hyemalis*		SBCM	Jacoby Canyon	2005	
Dark-eyed Junco	*Junco hyemalis*		SBCM	Jacoby Canyon	2002	
Dark-eyed Junco	*Junco hyemalis*		SBCM	Jacoby Canyon	2007	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Dark-eyed Junco	*Junco hyemalis*		SBCM	Jacoby Canyon	2008	
Dark-eyed junco	*Junco hyemalis*		Scott White Report 2010	South Quarry @ Mitsubishi	2010	
downy woodpecker	*Picoides pubescens*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
dusky flycatcher	*Empidonax oberholseri*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
dusky flycatcher	*Empidonax oberholseri*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	June 2011	
European starling	*Sturnus vulgaris*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
European starling	*Sturnus vulgaris*		Myers 2005	Cushenbury Spring	12/17/2005	non-native species
Fox Sparrow	*Passerella iliaca*		SBCM	Jacoby Canyon	2006	
Gambel's quail	*Callipepla gambelii*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Golden eagle	*Aquila chrysaetos*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Golden eagle	*Aquila chrysaetos*		MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	Watchlist
Golden eagle	*Aquila chrysaetos*	Juvenile - 6/9 and 6/21/11	SBNF Surveys	Mitsubishi @ Claim 15	June 2011	Watchlist
Golden eagle	*Aquila chrysaetos*	Camera trap	J&J Restoration	North Slope Wildlife Drinkers	8/2007; 9/2007; 9/2007	watchlist
gray flycatcher	*Empidonax wrightii*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Gray vireo	*Vireo vicinior*	Courtship	McKernan 1993 (SBNF GIS)	Furnace Canyon @ 5000'	1993	Watchlist
Gray vireo	*Vireo vicinior*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	June 2011	Watchlist
Gray vireo	*Vireo vicinior*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	Watchlist
Gray vireo	*Vireo vicinior*		USFS - SBNF GIS (Garrett and Dunn 1981)	Cactus Flats @ 5800'	1981	Watchlist

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
great horned owl	*Bubo virginianus*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
great horned owl	*Bubo virginianus*	Camera trap	J&J Restoration	North Slope Wildlife Drinkers		
greater roadrunner	*Geococcyx californianus*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
greater roadrunner	*Geococcyx californianus*	Camera trap	J&J Restoration	North Slope Wildlife Drinkers		
Green-tailed Towhee	*Pipilo chlorurus*		SBCM	Jacoby Canyon	2002	
Hairy Woodpecker	*Picoides villosus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Hairy Woodpecker	*Picoides villosus*		SBCM	Jacoby Canyon	2005	
Hairy Woodpecker	*Picoides villosus*		SBCM	Jacoby Canyon	2002	
Hairy Woodpecker	*Picoides villosus*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Hammond's Flycatcher	*Empidonax hammondii*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Hammond's Flycatcher	*Empidonax hammondii*		SBCM	Jacoby Canyon	2005	
hermit thrush	*Catharus guttatus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
hermit thrush	*Catharus guttatus*		Myers 2005	Cushenbury Spring	12/17/2005	Watchlist
Hermit Warbler	*Dendroica occidentalis*		SBCM	Jacoby Canyon	2006	
Hermit Warbler	*Dendroica occidentalis*		SBCM	Jacoby Canyon	2005	
horned lark	*Eremophila alpestris*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
horned lark	*Eremophila alpestris*		Myers 2005	Cushenbury Spring	12/17/2005	Watchlist
horned lark	*Eremophila alpestris*		Lilburn 2013	Omya White Knob	5/4-6/2012; 6/14-16/2012	Watchlist
House Finch	*Carpodacus mexicanus*	Breeding, plumage	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
House Finch	*Carpodacus mexicanus*		Myers 2005	Cushenbury Spring	12/17/2005	
House Finch	*Carpodacus mexicanus*		SBCM	Jacoby Canyon	2007	
House Finch	*Carpodacus mexicanus*		SBCM	Jacoby Canyon	2008	
House Finch	*Carpodacus mexicanus*		SBCM	Jacoby Canyon	2006	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
House Finch	*Carpodacus mexicanus*		SBCM	Jacoby Canyon	2002	
House Finch	*Carpodacus mexicanus*		SBCM	Jacoby Canyon	2005	
House Finch	*Carpodacus mexicanus*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	June 2011	
House Finch	*Carpodacus mexicanus*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
house sparrow	*Passer domesticus*		Myers 2005	Cushenbury Spring	12/17/2005	non-native species
House Wren	*Troglodytes aedon*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
House Wren	*Troglodytes aedon*		Myers 2005	Cushenbury Spring	12/17/2005	
House Wren	*Troglodytes aedon*		SBCM	Jacoby Canyon	2007	
House Wren	*Troglodytes aedon*		SBCM	Jacoby Canyon	2008	
House Wren	*Troglodytes aedon*		SBCM	Jacoby Canyon	2006	
House Wren	*Troglodytes aedon*		SBCM	Jacoby Canyon	2005	
House Wren	*Troglodytes aedon*		SBCM	Jacoby Canyon	2002	
House Wren	*Troglodytes aedon*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	June 2011	
ladder-backed woodpecker	*Picoides scalaris*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
ladder-backed woodpecker	*Picoides scalaris*		Myers 2005	Cushenbury Spring	12/17/2005	
Lawrence's Goldfinch	*Carduelis lawrencei*		SBCM	Jacoby Canyon	2006	Watchlist
Lawrence's Goldfinch	*Carduelis lawrencei*		SBCM	Jacoby Canyon	2005	Watchlist
Lazuli Bunting	*Passerina amoena*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Lazuli Bunting	*Passerina amoena*		SBCM	Jacoby Canyon	2005	
least Bell's vireo	*Vireo bellii pusillus*	Courtship	McKernan 1993 (SBNF GIS)	Cushenbury Spring	1993	Threatened
LeConte's Thrasher	*Taxostoma leconti*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
LeConte's Thrasher	*Toxostoma lecontie*	Courtship	McKernan 1993 (SBNF GIS)	5 Miles east of S. Quarry Site	1993	Watchlist

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
LeConte's Thrasher	*Toxostoma lecontie*	Courtship	McKernan 1993 (SBNF GIS)	1.6 Miles east of S. Quarry Site	1993	Watchlist
Lesser Goldfinch	*Carduelis psaltria*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Lesser Goldfinch	*Carduelis psaltria*		Myers 2005	Cushenbury Spring	12/17/2005	
Lesser Goldfinch	*Carduelis psaltria*		SBCM	Jacoby Canyon	2002	
Lesser Goldfinch	*Carduelis psaltria*		SBCM	Jacoby Canyon	2005	
Lesser Goldfinch	*Carduelis psaltria*		SBCM	Jacoby Canyon	2006	
Lesser Goldfinch	*Carduelis psaltria*		SBCM	Jacoby Canyon	2008	
Lesser Goldfinch	*Carduelis psaltria*		SBCM	Jacoby Canyon	2007	
lesser nighthawk	*Chordeiles acutipennis*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
loggerhead shrike	*Lanius ludovicianus*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	watchlist
loggerhead shrike	*Lanius ludovicianus*		Myers 2005	Cushenbury Spring	12/17/2005	Watchlist
long-eared owl	*Asio otus*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
long-eared owl	*Asio otus*	Courtship	McKernan 1993 (SBNF GIS)	Cushenbury Spring	1993	Watchlist
MacGillivray's Warbler	*Oporornis tolmiei*		SBCM	Jacoby Canyon	2007	Watchlist
MacGillivray's Warbler	*Oporornis tolmiei*		SBCM	Jacoby Canyon	2006	Watchlist
marsh wren	*Cistothorus palustris*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Mountain Chickadee	*Poecile gambeli*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Mountain Chickadee	*Poecile gambeli*		SBCM	Jacoby Canyon	2002	
Mountain Chickadee	*Poecile gambeli*		SBCM	Jacoby Canyon	2005	
Mountain Chickadee	*Poecile gambeli*		SBCM	Jacoby Canyon	2006	
Mountain Chickadee	*Poecile gambeli*		SBCM	Jacoby Canyon	2007	
Mountain Chickadee	*Poecile gambeli*		SBCM	Jacoby Canyon	2008	
Mountain Chickadee	*Poecile gambeli*		SBNF Surveys	Mitsubishi @ Claim 15	June 2011	
Mountain Chickadee	*Poecile gambeli*		SBNF Surveys	Mitsubishi @ Claim 9	June 2011	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Mountain Chickadee	*Poecile gambeli*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Mountain Chickadee	*Poecile gambeli*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
Mountain Chickadee	*Poecile gambeli*	Camera trap	J&J Restoration	North Slope Wildlife Drinkers		
Mountain Quail	*Oreortyx pictus*		SBCM	Jacoby Canyon	2005	Watchlist
Mountain Quail	*Oreortyx pictus*		SBCM	Jacoby Canyon	2007	Watchlist
Mountain Quail	*Oreortyx pictus*		SBCM	Jacoby Canyon	2002	Watchlist
Mountain Quail	*Oreortyx pictus*		SBCM	Jacoby Canyon	2006	Watchlist
Mountain Quail	*Oreortyx pictus*		SBCM	Jacoby Canyon	2008	Watchlist
Mountain Quail	*Oreortyx pictus*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	Watchlist
Mourning Dove	*Zeniada macroura*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Mourning Dove	*Zenaida macroura*	Breeding, likely	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Mourning Dove	*Zeniada macroura*		Myers 2005	Cushenbury Spring	12/17/2005	
Mourning Dove	*Zeniada macroura*		SBCM	Jacoby Canyon	2002	
Mourning Dove	*Zeniada macroura*		SBCM	Jacoby Canyon	2007	
Mourning Dove	*Zeniada macroura*		SBCM	Jacoby Canyon	2006	
Mourning Dove	*Zeniada macroura*		SBCM	Jacoby Canyon	2005	
Mourning Dove	*Zeniada macroura*		SBCM	Jacoby Canyon	2008	
Mourning Dove	*Zenaida macroura*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Mourning Dove	*Zenaida macroura*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	June 2011	
Mourning Dove	*Zenaida macroura*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
Mourning Dove	*Zenaida macroura*		Scott White Report 2010	South Quarry @ Mitsubishi	2010	

Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Mourning Dove	*Zenaida macroura*	Camera trap	J&J Restoration	North Slope Wildlife Drinkers		
Nashville Warbler	*Vermivora ruficapilla*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Nashville Warbler	*Vermivora ruficapilla*		SBCM	Jacoby Canyon	2005	
Nashville Warbler	*Vermivora ruficapilla*		SBCM	Jacoby Canyon	2002	
northern flicker	*Colaptes auratus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
northern flicker	*Colaptes auratus*		Myers 2005	Cushenbury Spring	12/17/2005	
Northern Flicker	*Colaptes auratus*		SBCM	Jacoby Canyon	2008	
Northern Flicker	*Colaptes auratus*		SBCM	Jacoby Canyon	2002	
Northern Flicker	*Colaptes auratus*		SBCM	Jacoby Canyon	2005	
Northern Flicker	*Colaptes auratus*		SBCM	Jacoby Canyon	2006	
Northern Flicker	*Colaptes auratus*		SBCM	Jacoby Canyon	2007	
northern harrier	*Circus cyaneus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
northern mockingbird	*Mimus polyglottos*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
northern rough-winged swallow	*Steligidopteryx serripennis*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Nuttall's Woodpecker	*Picoides nuttallii*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Nuttall's Woodpecker	*Picoides nuttallii*		Myers 2005	Cushenbury Spring	12/17/2005	Watchlist
Nuttall's Woodpecker	*Picoides nuttallii*		SBCM	Jacoby Canyon	2002	Watchlist
Nuttall's Woodpecker	*Picoides nuttallii*		SBCM	Jacoby Canyon	2007	Watchlist
Nuttall's Woodpecker	*Picoides nuttallii*		SBCM	Jacoby Canyon	2005	Watchlist
Nuttall's Woodpecker	*Picoides nuttallii*		SBCM	Jacoby Canyon	2006	Watchlist
Oak Titmouse	*Beaolophus inornatus*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Oak Titmouse	*Baeolophus inornatus*	breeding (observed nest)	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Oak Titmouse	*Beaolophus inornatus*		Myers 2005	Cushenbury Spring	12/17/2005	
Oak Titmouse	*Baeolophus inornatus*		SBCM	Jacoby Canyon	2006	
Oak Titmouse	*Baeolophus inornatus*		SBCM	Jacoby Canyon	2005	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Oak Titmouse	*Baeolophus inornatus*		SBCM	Jacoby Canyon	2002	
Oak Titmouse	*Baeolophus inornatus*		SBNF Surveys	S. Quarry Drill Sites	Oct-08	
Olive-sided Flycatcher	*Contopus cooperi*		SBCM	Jacoby Canyon	2002	
Olive-sided Flycatcher	*Contopus cooperi*		SBCM	Jacoby Canyon	2005	
Olive-sided Flycatcher	*Contopus cooperi*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Orange-crowned Warbler	*Vermivora celata*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Orange-crowned Warbler	*Vermivora celata*		SBCM	Jacoby Canyon	2007	
Orange-crowned Warbler	*Vermivora celata*		SBCM	Jacoby Canyon	2002	
Orange-crowned Warbler	*Vermivora celata*		SBCM	Jacoby Canyon	2005	
Osprey	*Pandion haliaetus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Pacific-slope Flycatcher	*Empidonax difficilis*		SBCM	Jacoby Canyon	2007	
Pacific-slope Flycatcher	*Empidonax difficilis*		SBCM	Jacoby Canyon	2002	
Pacific-slope Flycatcher	*Empidonax difficilis*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
phainopepla	*Phainopepla nitens*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
phainopepla	*Phainopepla nitens*		Myers 2005	Cushenbury Spring	12/17/2005	
Pinyon jay	*Gymnorhinus cyanocephalus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Pinyon jay	*Gymnorhinus cyanocephalus*		Scott White Report 2010	South Quarry @ Mitsubishi	2010	Watchlist
Pinyon jay		Camera trap	J&J Restoration	North Slope Wildlife Drinkers		watchlist
Plumbeous Vireo	*Vireo plumbeus*		SBCM	Jacoby Canyon	2002	Watchlist
Plumbeous Vireo	*Vireo plumbeus*		SBCM	Jacoby Canyon	2005	Watchlist
Prairie falcon	*Falco mexicanus*		MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	Watchlist
Prairie falcon	*Falco mexicanus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Prairie falcon	*Falco mexicanus*	Courtship	McKernan 1993 (SBNF GIS)	Deep Canyon @ 4600'	1993	Watchlist
Purple Finch	*Carpodacus purpureus*		SBCM	Jacoby Canyon	2005	
Pygmy Nuthatch	*Sitta pygmaea*		SBCM	Jacoby Canyon	2007	
Pygmy Nuthatch	*Sitta pygmaea*		SBCM	Jacoby Canyon	2002	
Red-breasted Sapsucker	*Sphyrapicus ruber*		Myers 2005	Cushenbury Spring	12/17/2005	
Red-breasted Sapsucker	*Sphyrapicus ruber*		SBCM	Jacoby Canyon	2007	
Red-breasted Sapsucker	*Sphyrapicus ruber*		SBCM	Jacoby Canyon	2006	
red-naped sapsucker	*Sphyrapicus nuchalis*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
red-naped sapsucker	*Sphyrapicus nuchalis*		Myers 2005	Cushenbury Spring	12/17/2005	
Red-shouldered Hawk	*Buteo lineatus*		SBCM	Jacoby Canyon	2002	
Red-tailed Hawk	*Buteo jamaicensis*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Red-tailed hawk	*Buteo jamaicensis*		MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Red-tailed Hawk	*Buteo jamaicensis*		Myers 2005	Cushenbury Spring	12/17/2005	
Red-tailed Hawk	*Buteo jamaicensis*		SBCM	Jacoby Canyon	2007	
Red-tailed Hawk	*Buteo jamaicensis*		SBCM	Jacoby Canyon	2002	
Red-tailed Hawk	*Buteo jamaicensis*		SBCM	Jacoby Canyon	2006	
Red-tailed Hawk	*Buteo jamaicensis*		SBCM	Jacoby Canyon	2005	
Red-tailed Hawk	*Buteo jamaicensis*	Multiple	SBNF Surveys	Mitsubishi @ Claim 15	June 2011	
Red-tailed Hawk	*Buteo jamaicensis*		SBNF Surveys	Mitsubishi @ Claim 16a	June 2011	
Red-tailed Hawk	*Buteo jamaicensis*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Red-tailed Hawk	*Buteo jamaicensis*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
Red-tailed hawk	*Buteo jamaicensis*		Scott White Report 2012	Mitsubishi Marble Canyon Haul Road	August 2012	
red-winged blackbird	*Agelaius phoeniceus*		Myers 2005	Cushenbury Spring	12/17/2005	
rock pigeon	*Columbia livia*		Myers 2005	Cushenbury Spring	12/17/2005	non-native species

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Rock Wren	*Salpinctes obsoletus*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Rock Wren	*Salpinctes obsoletus*		Myers 2005	Cushenbury Spring	12/17/2005	
Rock Wren	*Salpinctes obsoletus*		SBCM	Jacoby Canyon	2005	
Rock Wren	*Salpinctes obsoletus*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
Rock Wren	*Salpinctes obsoletus*		Lilburn 2013	Omya White Knob	5/4-6/2012; 6/14-16/2012	
Ruby-crowned Kinglet	*Regulus calendula*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Ruby-crowned Kinglet	*Regulus calendula*	Breeding, foraging	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Ruby-crowned Kinglet	*Regulus calendula*		Myers 2005	Cushenbury Spring	12/17/2005	
Rufous Hummingbird	*Selasphorus rufus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Rufous Hummingbird	*Selasphorus rufus*		SBCM	Jacoby Canyon	2002	
sage sparrow	*Amphispiza belli*	Not likely *A.b.belli* due to range	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Say's phoebe	*Sayornis saya*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Say's phoebe	*Sayornis saya*		Myers 2005	Cushenbury Spring	12/17/2005	
Say's phoebe	*Sayornis saya*		Lilburn 2013	Omya White Knob	5/4-6/2012; 6/14-16/2012	
Scott’s Oriole	*Icteris parisorum*		MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Scott's Oriole	*Icterus parisorum*		SBCM	Jacoby Canyon	2002	
Scott's Oriole	*Icterus parisorum*		SBCM	Jacoby Canyon	2005	
Scrub jay	*Aphelocoma coerulescens*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Scrub jay	*Aphelocoma coerulescens*	Camera trap	J&J Restoration	North Slope Wildlife Drinkers		
Sharp-shinned hawk	*Accipiter stiatus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Solitary Vireo	*Vireo solitarius*	Old name - either Cassin's or plumbeous	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Solitary Vireo	*Vireo solitarius*	Old name - either Cassin's or plumbeous	SBCM	Jacoby Canyon	2007	Watchlist
Song Sparrow	*Melospiza melodia*		Myers 2005	Cushenbury Spring	12/17/2005	MIS
Song Sparrow	*Melospiza melodia*		SBCM	Jacoby Canyon	2008	
Song Sparrow	*Melospiza melodia*		SBCM	Jacoby Canyon	2007	
Song Sparrow	*Melospiza melodia*		SBCM	Jacoby Canyon	2006	
Southwestern willow flycacter	*Empidonax trailii extimus*	breeding	USFS - SBNF records	Jacoby Canyon	several years	Endangered
Southwestern Willow Flycatcher	*Empidonax trailii extimus*		SBCM	Jacoby Canyon	2007	Endangered
Southwestern Willow Flycatcher	*Empidonax trailii extimus*		SBCM	Jacoby Canyon	2002	Endangered
Southwestern Willow Flycatcher	*Empidonax traillii*		SBCM	Jacoby Canyon	2006	Endangered
Southwestern Willow Flycatcher	*Empidonax traillii*		SBCM	Jacoby Canyon	2005	Endangered
Southwestern Willow Flycatcher	*Empidonax traillii*		SBCM	Jacoby Canyon	2002	Endangered
Southwestern Willow Flycatcher	*Wilsonia pusilla*		SBCM	Jacoby Canyon	2005	Watchlist
Southwestern Willow Flycatcher	*Wilsonia pusilla*		SBCM	Jacoby Canyon	2002	Watchlist
Spotted Owl	*Strix occidentalis occidentalis*	breeding	USFS - SBNF records	Upper Marble Cyn, Deep Cyn, Silver Creek, Dry Creek	several years	Sensitive
Spotted Towhee	*Pipilo maculatus*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Spotted Towhee	*Pipilo maculatus*	Breeding, likely	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Spotted Towhee	*Pipilo maculatus*		Myers 2005	Cushenbury Spring	12/17/2005	
Spotted Towhee	*Pipilo maculatus*		SBCM	Jacoby Canyon	2005	
Spotted Towhee	*Pipilo maculatus*		SBCM	Jacoby Canyon	2008	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Spotted Towhee	*Pipilo maculatus*		SBCM	Jacoby Canyon	2007	
Spotted Towhee	*Pipilo maculatus*		SBCM	Jacoby Canyon	2002	
Spotted Towhee	*Pipilo maculatus*		SBCM	Jacoby Canyon	2006	
Spotted Towhee	*Pipilo maculatus*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	June 2011	
Steller's Jay	*Cyanocitta stelleri*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Steller's Jay	*Cyanocitta stelleri*		SBCM	Jacoby Canyon	2007	
Steller's Jay	*Cyanocitta stelleri*		SBCM	Jacoby Canyon	2008	
Steller's Jay	*Cyanocitta stelleri*		SBCM	Jacoby Canyon	2002	
Steller's Jay	*Cyanocitta stelleri*		SBCM	Jacoby Canyon	2005	
Steller's Jay	*Cyanocitta stelleri*		SBCM	Jacoby Canyon	2006	
Summer tanager	*Piranga rubra*		CNDDB	Cushenbury Spring	7/13/1987	
Swainson's Hawk	*Buteo swainsoni*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Swainson's Thrush	*Catharus ustulatus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Swainson's Thrush	*Catharus ustulatus*		SBCM	Jacoby Canyon	2002	Watchlist
Townsend's Solitaire	*Myadestes townsendi*		SBCM	Jacoby Canyon	2002	
tree swallow	*Tachycineta bicolor*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
tri-colored blackbird	*Agelaius tricolor*		Myers 2005	Cushenbury Spring	12/17/2005	watchlist
Turkey vulture	*Cathartes aura*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Turkey vulture	*Cathartes aura*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	Watchlist
Vaux's swift	*Chaetura vauxi*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Verdin	*Auriparus flaviceps*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Verdin	*Auriparus flaviceps*	Breeding, foraging	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Verdin	*Auriparus flaviceps*		Myers 2005	Cushenbury Spring	12/17/2005	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Violet-green Swallow	*Tachycineta thalassina*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Violet-green Swallow	*Tachycineta thalassina*		SBCM	Jacoby Canyon	2008	
Violet-green Swallow	*Tachycineta thalassina*		SBCM	Jacoby Canyon	2002	
Violet-green Swallow	*Tachycineta thalassina*		SBCM	Jacoby Canyon	2006	
Violet-green Swallow	*Tachycineta thalassina*		SBCM	Jacoby Canyon	2005	
Violet-green Swallow	*Tachycineta thalassina*		SBCM	Jacoby Canyon	2007	
Violet-green Swallow	*Tachycineta thalassina*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Virginia's Warbler	*Vermivora virginiae*		SBCM	Jacoby Canyon	2002	Watchlist
Warbling Vireo	*Vireo gilvus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Warbling Vireo	*Vireo gilvus*		SBCM	Jacoby Canyon	2002	Watchlist
Warbling Vireo	*Vireo gilvus*		SBCM	Jacoby Canyon	2005	Watchlist
Western Bluebird	*Sialia mexicana*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Western Bluebird	*Sialia mexicana*		Myers 2005	Cushenbury Spring	12/17/2005	
Western Bluebird	*Sialia mexicana*		SBCM	Jacoby Canyon	2006	
Western Bluebird	*Sialia mexicana*		SBCM	Jacoby Canyon	2007	
Western Bluebird	*Sialia mexicana*		SBCM	Jacoby Canyon	2005	
Western Bluebird	*Sialia mexicana*		SBCM	Jacoby Canyon	2002	
Western Bluebird	*Sialia mexicana*		SBCM	Jacoby Canyon	2008	
Western Bluebird	*Sialia mexicana*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Western Bluebird	*Sialia mexicana*	Camera trap	J&J Restoration	North Slope Wildlife Drinkers		
Western Kingbird	*Tyrannus verticalis*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Western Kingbird	*Tyrannus verticalis*		SBCM	Jacoby Canyon	2008	
western screech owl	*Otus kennicottii*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Western scrub jay	*Aphelocoma californica*	Breeding, carrying food	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Western scrub jay	*Aphelocoma californica*		Myers 2005	Cushenbury Spring	12/17/2005	
Western scrub jay	*Aphelocoma californica*		SBNF Surveys	Mitsubishi @ Claim 15	June 2011	
Western scrub jay	*Aphelocoma californica*		SBNF Surveys	Mitsubishi @ Claim 16a	June 2011	
Western scrub jay	*Aphelocoma californica*		SBNF Surveys	Mitsubishi @ Claim 9	June 2011	
Western scrub jay	*Aphelocoma californica*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Western scrub jay	*Aphelocoma californica*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	June 2011	
Western scrub jay	*Aphelocoma californica*		Scott White Report 2012	Mitsubishi Marble Canyon Haul Road	August 2012	
Western Scrub-Jay	*Aphelocoma californica*		SBCM	Jacoby Canyon	2005	
Western Scrub-Jay	*Aphelocoma californica*		SBCM	Jacoby Canyon	2002	
Western Scrub-Jay	*Aphelocoma californica*		SBCM	Jacoby Canyon	2006	
Western Scrub-Jay	*Aphelocoma californica*		SBCM	Jacoby Canyon	2007	
Western Scrub-Jay	*Aphelocoma californica*		SBCM	Jacoby Canyon	2008	
Western tanager	*Piranga ludoviciana*		MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Western Tanager	*Piranga ludoviciana*		SBCM	Jacoby Canyon	2008	
Western Tanager	*Piranga ludoviciana*		SBCM	Jacoby Canyon	2007	
Western Tanager	*Piranga ludoviciana*		SBCM	Jacoby Canyon	2005	
Western Tanager	*Piranga ludoviciana*		SBCM	Jacoby Canyon	2002	
Western Wood Peewee	*Cantopus sordidulus*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Western Wood Peewee	*Contopus sordidulus*		SBCM	Jacoby Canyon	2006	
Western Wood Peewee	*Contopus sordidulus*		SBCM	Jacoby Canyon	2002	
Western Wood Peewee	*Contopus sordidulus*		SBCM	Jacoby Canyon	2008	
Western Wood Peewee	*Contopus sordidulus*		SBCM	Jacoby Canyon	2005	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Western Wood Peewee	*Contopus sordidulus*		SBCM	Jacoby Canyon	2007	
Western Wood Peewee	*Contopus sordidulus*	Breeding, territory defense	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Western-type Flycatcher	*Empidonax ssp.*		SBCM	Jacoby Canyon	2007	
Western-type Flycatcher	*Empidonax ssp.*		SBCM	Jacoby Canyon	2005	
White-breasted Nuthatch	*Sitta carolinensis*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
White-breasted Nuthatch	*Sitta carolinensis*		SBCM	Jacoby Canyon	2005	
White-breasted Nuthatch	*Sitta carolinensis*		SBCM	Jacoby Canyon	2007	
White-breasted Nuthatch	*Sitta carolinensis*		SBCM	Jacoby Canyon	2002	
White-breasted Nuthatch	*Sitta carolinensis*		SBCM	Jacoby Canyon	2008	
White-breasted Nuthatch	*Sitta carolinensis*		SBCM	Jacoby Canyon	2006	
White-breasted Nuthatch	*Sitta carolinensis*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	June 2011	
white-crowned sparrow	*Zonotrichia leucophrys*		Myers 2005	Cushenbury Spring	12/17/2005	
White-headed Woodpecker	*Picoides albolarvatus*		SBCM	Jacoby Canyon	2006	Watchlist
White-throated Swift	*Aeronautes saxatalis*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
White-throated Swift	*Aeronautes saxatalis*		MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
White-throated swift	*Aeronautes saxatalis*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	
White-throated swift	*Aeronautes saxatalis*		Scott White Report 2010	South Quarry @ Mitsubishi	2010	
White-throated Swift	*Aeronautes saxatalis*		Scott White Report 2012	Mitsubishi Marble Canyon Haul Road	August 2012	
willow flycatcher	*Empidonax traillii*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	watchlist/Endangered

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Wilson's warbler	*Wilsonia pusilla*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Wrentit	*Chamaea fasciata*	Breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Wrentit	*Chamaea fasciata*		SBCM	Jacoby Canyon	2002	
Yellow warbler	*Dendroica petechia*	breeding	Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	Watchlist
Yellow warbler	*Dendroica petechia*	Courtship	McKernan 1993 (SBNF GIS)	Cushenbury Spring	1993	Watchlist
Yellow Warbler	*Dendroica petechia*		SBCM	Jacoby Canyon	2007	Watchlist
Yellow-breasted chat	*Icteria virens*		CNDDB	Cushenbury Spring	7/13/1987	Watchlist
Yellow-breasted chat	*Icteria virens*	Courtship	McKernan 1993 (SBNF GIS)	Cushenbury Spring	1993	Watchlist
Yellow-rumped Warbler	*Dendroica coronata*		Kielhold 1993	Cushenbury Spring	Summer/Fall 1993	
Yellow-rumped Warbler	*Dendroica coronata*		Myers 2005	Cushenbury Spring	12/17/2005	
Yellow-rumped Warbler	*Dendroica coronata*		SBCM	Jacoby Canyon	2006	
Mammals						
American Deer Mouse	*Peromyscus maniculatus gambelii*		SBCM	Cactus Flats-Joshua Tree	2006	
American Deer Mouse	*Peromyscus maniculatus gambelii*		SBCM	Cactus Flats-Joshua Tree	2006	
American Deer Mouse	*Peromyscus maniculatus gambelii*		SBCM	Cactus Flats-Pinyon	2006	
American Deer Mouse	*Peromyscus maniculatus gambelii*		SBCM	Cactus Flats-Pinyon	2006	
Big Brown Bat	*Eptesicus fuscus*		SBCM	Cactus Flats	8/31/2006	
Big Brown Bat	*Eptesicus fuscus*		SBCM	Cactus Flats	8/31/2006	
Big Brown Bat	*Eptesicus fuscus*		SBCM	Cactus Flats	9/26/2006	
Big Brown Bat	*Eptesicus fuscus*		SBCM	Big Bear Disposal Area	9/26/2006	
Big brown bat	*Eptesicus fuscus*		USFS - SBNF GIS	Wright Mine @7000'	1996	
Big brown bat	*Eptesicus fuscus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
black bear	*Ursus americanus*	Camera trap	J&J Restoration	North Slope Drinkers		
Black-tailed Jackrabbit	*Lepus californicus*		SBCM	Jacoby Canyon	2007	
Black-tailed Jackrabbit	*Lepus californicus*		SBNF Surveys	Mitsubishi @ Claim 16a	June 2011	
Black-tailed Jackrabbit	*Lepus californicus*	scat	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
Black-tailed Jackrabbit	*Lepus californicus*	scat and tracks	SBNF Surveys	Mitsubishi @ S. Quarry Drill Sites	Oct-08	
Black-tailed Jackrabbit	*Lepus californicus*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Black-tailed Jackrabbit	*Lepus californicus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Black-tailed Jackrabbit	*Lepus californicus*	Camera trap	J&J Restoration	North Slope Drinkers		
Bobcat	*Lynx rufus*		SBCM	Jacoby Canyon	2007	
Bobcat	*Lynx rufus*	camera	SBNF Surveys	Mitsubishi @ Claim 9	June 2011	
Bobcat	*Lynx rufus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Bobcat	*Lynx rufus*	Camera trap	J&J Restoration	North Slope Drinkers		
Brazilian Free-tailed Bat	*Tadarida brasiliensis*		SBCM	Cactus Flats	8/17/2006	
Brazilian Free-tailed Bat	*Tadarida brasiliensis*		SBCM	Cactus Flats	8/31/2006	
Brazilian Free-tailed Bat	*Tadarida brasiliensis*		SBCM	Big Bear Disposal Area	9/26/2006	
Brazilian Free-tailed Bat	*Tadarida brasiliensis*		SBCM	Jacoby Canyon	6/13/2006	
Brazilian Free-tailed Bat	*Tadarida brasiliensis*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Brush Mouse	*Peromyscus boylii rowleyi*		SBCM	Cactus Flats-Joshua Tree	2006	
Brush Mouse	*Peromyscus boylii rowleyi*		SBCM	Cactus Flats-Joshua Tree	2006	
Brush Mouse	*Peromyscus boylii rowleyi*		SBCM	Cactus Flats-Pinyon	2006	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
burro	*Equus asinus*	tracks, scat	Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
cactus mouse	*Peromyscus eremicus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
California (Dusky) Chipmunk	*Tamias obscurus*		MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
California Ground Squirrel	*Spermophilus beecheyi*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
California Ground Squirrel	*Spermophilus beecheyi*		SBCM	Jacoby Canyon	2006	
California Ground Squirrel	*Spermophilus beecheyi*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
California Ground Squirrel	*Spermophilus beecheyi*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
California Ground Squirrel	*Spermophilus beecheyi*	Camera trap	J&J Restoration	North Slope Drinkers		
California Myotis	*Myotis californicus*		SBCM	Cactus Flats	8/31/2006	
California Myotis	*Myotis californicus*		SBCM	Jacoby Canyon	6/13/2006	
California Myotis	*Myotis californicus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
California pocket mouse	*Chaetodipus californicus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
California vole	*Microtus californicus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Coyote	*Canis latrans*		SBCM	Jacoby Canyon	2006	
coyote	*Canis latrans*	tracks, scat	Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
coyote	*Canis latrans*	Camera trap	J&J Restoration	North Slope Drinkers		
Coyote	*Canis latrans*	scat	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	
deer mouse	*Peromyscus maniculatus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Desert cottontail	*Sylvilagus audobonii*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Desert cottontail	*Sylvilagus audobonii*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Desert cottontail	*Sylvilagus audobonii*	Camera trap	J&J Restoration	North Slope Drinkers		
desert pocket mouse	*Chaetodipus penicillatus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Desert wood rat	*Neotoma lepida*		Scott White Report 2010	South Quarry @ Mitsubishi	2010	Watchlist
Desert wood rat	*Neotoma lepida*		Scott White Report 2012	Mitsubishi @ Marble Canyon Haul Road	August 2012	Watchlist
Desert Woodrat	*Neotoma lepida*		MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	Watchlist
Desert Woodrat	*Neotoma lepida*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	Watchlist
desert woodrat	*Neotoma lepida*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	watchlist
Desert Woodrat	*Neotoma lepida intermedia*		SBCM	Cactus Flats-Joshua Tree	2006	Watchlist
Desert Woodrat	*Neotoma lepida intermedia*		SBCM	Cactus Flats-Pinyon	2006	Watchlist
Dulzura/Pacific Kangaroo Rat	*Dipodomys simulans/agilis*		SBCM	Cactus Flats-Pinyon	2006	
dusky-footed woodrat	*Neotoma fuscipes*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
feral dogs	*Canis lupus familiaris*	Camera trap	J&J Restoration	North Slope Drinkers		non-native
Fringed Myotis	*Myotis thysanoides*		SBCM	Cactus Flats	8/17/2006	Watchlist
Fringed Myotis	*Myotis thysanoides*		SBCM	Cactus Flats	8/17/2006	Watchlist
Fringed Myotis	*Myotis thysanoides*		SBCM	Cactus Flats	8/31/2006	Watchlist
Fringed Myotis	*Myotis thysanoides*		SBCM	Cactus Flats	8/31/2006	Watchlist
Fringed Myotis	*Myotis thysanoides*		SBCM	Jacoby Canyon	6/13/2006	Watchlist
Fringed Myotis	*Myotis thysanoides*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	Watchlist
Gray fox	*Urocyon cinereoargenteus*		SBNF Surveys	Mitsubishi @ Claim 15	June 2011	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Gray fox	*Urocyon cinereoargenteus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
gray fox	*Urocyon cinereoargenteus*	Camera trap	J&J Restoration	North Slope Drinkers		
house cat		Camera trap	J&J Restoration	North Slope Drinkers		non-native
Little Brown Myotis	*Myotis lucifugus*		SBCM	Cactus Flats	8/17/2006	Watchlist
Little Brown Myotis	*Myotis lucifugus*		SBCM	Cactus Flats	8/31/2006	Watchlist
Little Brown Myotis	*Myotis lucifugus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	Watchlist
little pocket mouse	*Perognathus longimembris*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
little Pocket Mouse	*Perognathus longimembris longimembris*	SBCM records incorrectly have P. l. brevinasus	SBCM	Cactus Flats-Joshua Tree	2006	
little Pocket Mouse	*Perognathus longimembris longimembris*	SBCM records incorrectly have P. l. brevinasus	SBCM	Cactus Flats-Pinyon	2006	
Long-eared myotis	*Myotis evotis*		CNDDB	Wright Mine @7000'	8/17/1998	Watchlist
Long-eared Myotis	*Myotis evotis*		SBCM	Jacoby Canyon	6/13/2006	Watchlist
Long-legged myotis	*Myotis volans*		CNDDB	Wright Mine @7000'	8/17/1998	Watchlist
Long-legged Myotis	*Myotis volans*		SBCM	Cactus Flats	8/17/2006	Watchlist
Long-legged Myotis	*Myotis volans*		SBCM	Cactus Flats	8/31/2006	Watchlist
Long-legged Myotis	*Myotis volans*		SBCM	Cactus Flats	8/31/2006	Watchlist
Long-legged Myotis	*Myotis volans*		SBCM	Jacoby Canyon	6/13/2006	Watchlist
Long-legged myotis	*Myotis volans*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	Watchlist
long-tailed pocket mouse	*Perognathus formusus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Merriam's chipmunk	*Tamias merriami*		Scott White Report 2010	South Quarry @ Mitsubishi	2010	
Merriam's Chipmunk	*Tamias merriami*		SBCM	Cactus Flats-Joshua Tree	2006	
Merriam's Chipmunk	*Tamias merriami*		SBCM	Jacoby Canyon	2005	
Merriam's Chipmunk	*Tamias merriami*		SBCM	Jacoby Canyon	2008	

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Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Merriam's Chipmunk	*Tamias merriami*		SBCM	Jacoby Canyon	2007	
Merriam's Chipmunk	*Tamias merriami*		SBCM	Jacoby Canyon	2006	
Merriam's Chipmunk	*Tamias merriami*		Scott White Report 2012	Mitsubishi @ Marble Canyon Haul Road	August 2012	
Merriam's Chipmunk	*Tamias merriami*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Merriam's Chipmunk	*Tamias merriami*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	
Merriam's kangaroo rat	*Dipodomys merriami*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
mountain lion	*Puma concolor*	Camera trap	J&J Restoration	North Slope Drinkers		MIS; watchlist
Mule Deer	*Odocoileus hemionus*		SBCM	Jacoby Canyon	2006	MIS
Mule Deer	*Odocoileus hemionus*		SBCM	Jacoby Canyon	2005	MIS
Mule deer	*Odocoileus hemionus*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	MIS
mule deer	*Odocoileus hemionus*	tracks	SBNF Surveys	Mitsubishi @ Claim 16a	June 2011	MIS
mule deer	*Odocoileus hemionus*	antler shed	SBNF Surveys	Mitsubishi @ Claim 9	June 2011	MIS
Mule Deer	*Odocoileus hemionus*	scat	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	MIS
Mule Deer	*Odocoileus hemionus*		Scott White Report 2012	Mitsubishi @ Marble Canyon Haul Road	August 2012	MIS
Mule Deer	*Odocoileus hemionus*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	MIS
Mule Deer	*Odocoileus hemionus*		SBNF Surveys	OMYA Butterfield 3 and Sentinel ~7800'	July 2011	MIS
Mule Deer	*Odocoileus hemionus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	MIS

Appendix A: Floral and Faunal Compendium – Mitsubishi South Quarry Expansion

Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Mule Deer	*Odocoileus hemionus*	Camera trap	J&J Restoration	North Slope Drinkers		MIS
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	Camera trap	J&J Restoration	North Slope Drinkers		watchlist
Nelson's bighorn sheep	*Ovis canadensis nelsoni*		Scott White Report 2000	West Quarry @ Mitsubishi	2000	Watchlist
Nelson's bighorn sheep	*Ovis canadensis nelsoni*		Scott White Report 2010	South Quarry @ Mitsubishi	2010	Watchlist
Nelson's bighorn sheep	*Ovis canadensis nelsoni*		Scott White Report 2012	Mitsubishi @ Marble Canyon Haul Road	August 2012	Watchlist
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	scat and tracks	SBNF Surveys	Mitsubishi @ S. Quarry Drill Sites	Oct-08	Watchlist
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	scat and tracks	SBNF Surveys	Mitsubishi @ 17a and 17b	Oct-08	Watchlist
Nelson's Bighorn Sheep	*Ovis canadensis nelsoni*	scat	MacKay and Thomas 2008	Lower Marble Canyon @ Mitsubishi	May-08	Watchlist
Pallid bat	*Antrozous pallidus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	Sensitive, CSC
Pallid San Diego Pocket Mouse	*Chaetodipus fallax pallidus*		CNDDB	Silver Creek @4300'	9/22/1954	Watchlist
Pinyon Mouse	*Peromyscus truei*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Pinyon Mouse	*Peromyscus truei chlorus*		SBCM	Cactus Flats-Joshua Tree	2006	
pocketed free-tailed bat	*Tadarida fermorosacca*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	Watchlist, CSC
raccoon	*Procyon lotor*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
raccoon	*Procyon lotor*	Camera trap	J&J Restoration	North Slope Drinkers		
Red fox		Camera trap	J&J Restoration	North Slope Drinkers		
ringtail	*Bassariscus astutus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	sensitive
ringtail	*Vulpes vulpes*	Camera trap	J&J Restoration	North Slope Drinkers		watchlist

Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
San Diego Pocket Mouse	*Chaetodipus fallax*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
San Diego Pocket Mouse	*Chaetodipus fallax pallidus*		CNDDB	Lone Valley	2002	Watchlist
San Diego Pocket Mouse	*Chaetodipus fallax pallidus*		SBCM	Cactus Flats-Joshua Tree	2006	Watchlist
San Diego Pocket Mouse	*Chaetodipus fallax pallidus*		SBCM	Cactus Flats-Pinyon	2006	Watchlist
southern grasshopper mouse	*Onychomys torrdus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	Sensitive
southern pocket gopher	*Thomomys umbrinus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
spiny pocket mouse	*Chaetodipus spinatus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Spotted Bat	*Euderma maculatum*		SBCM	Cactus Flats	8/31/2006	Watchlist
striped skunk	*Mephitis mephitis*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Townsend's big-eared bat	*Corynorhinus townsendii*		CNDDB	Wright Mine @7000'	8/17/1998	Sensitive
Townsend's big-eared bat	*Corynorhinus townsendii*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	Sensitive, CSC
Western Bonneted Bat	*Eumops perotis*		SBCM	Cactus Flats	9/26/2006	Watchlist
Western Bonneted Bat	*Eumops perotis*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	Watchlist, CSC
western gray squirrel	*Sciurus griseus*	Camera trap	J&J Restoration	North Slope Drinkers		
Western Gray Squirrel	*Sciurus griseus*		SBCM	Jacoby Canyon	2005	
Western Gray Squirrel	*Sciurus griseus*		SBCM	Jacoby Canyon	2006	
Western Gray Squirrel	*Sciurus griseus*		SBCM	Jacoby Canyon	2008	
Western Harvest Mouse	*Reithrodontomys megalotis*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Western Harvest Mouse	*Reithrodontomys megalotis longicaudus*		SBCM	Cactus Flats-Joshua Tree	2006	
Western Pipistrelle	*Pipistrellus hesperus*		SBCM	Cactus Flats	8/17/2006	
Western Pipistrelle	*Pipistrellus hesperus*		SBCM	Cactus Flats	8/17/2006	
Western Pipistrelle	*Pipistrellus hesperus*		SBCM	Cactus Flats	8/31/2006	

Appendix A: Floral and Faunal Compendium – Mitsubishi South Quarry Expansion

Wildlife Species Known from the North Slope Area of the San Bernardino Mountains						
Common Name	**Scientific Name**	**Notes**	**Source**	**Location**	**Dates**	**Status**
Western Pipistrelle	*Pipistrellus hesperus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
Western Small-footed Myotis	*Myotis ciliolabrum*		SBCM	Cactus Flats	8/17/2006	Watchlist
Western Small-footed Myotis	*Myotis ciliolabrum*		SBCM	Cactus Flats	8/17/2006	Watchlist
Western Small-footed Myotis	*Myotis ciliolabrum*		SBCM	Cactus Flats	8/31/2006	Watchlist
Western Small-footed Myotis	*Myotis ciliolabrum*		SBCM	Cactus Flats	8/31/2006	Watchlist
Western Small-footed Myotis	*Myotis ciliolabrum*		SBCM	Cactus Flats	9/26/2006	Watchlist
Western Small-footed Myotis	*Myotis ciliolabrum*		SBCM	Big Bear Disposal Area	9/26/2006	Watchlist
Western Small-footed Myotis	*Myotis ciliolabrum*		SBCM	Jacoby Canyon	6/13/2006	Watchlist
White-tailed Antelope Squirrel	*Ammospermophilus leucurus leucurus*		SBCM	Cactus Flats-Joshua Tree	2006	
White-tailed Antelope Squirrel	*Ammospermophilus leucurus leucurus*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	
wild burros	*Equus asinus asinus*	Camera trap	J&J Restoration	North Slope Drinkers		Federally protected
Woodrat	*Neotoma sp.*	Camera trap	J&J Restoration	North Slope Drinkers		
Yuma myotis	*Myotis yumanensis*		Kiehlold 1993	Cushenbury Springs	Summer/Fall 1992	Watchlist

APPENDIX B: Management Direction

1.0 APPLICABLE LAWS, REGULATIONS, AND STANDARDS - FEDERAL

1.1 Federal Endangered Species Act

Pursuant to Section 7 of the Federal Endangered Species Act (ESA), any federal agency undertaking a federal action that may affect a species listed or proposed as threatened or endangered under the ESA must consult with USFWS. In addition, any federal agency undertaking a federal action that may result in adverse modification of Critical Habitat for a federally-listed species must consult with USFWS.

The Endangered Species Act contains protection for all species federally-listed as endangered or threatened:

- *Federal agencies shall seek to conserve endangered species and threatened species and shall, in consultation with U.S. Fish and Wildlife Service, utilize their authorities in furthering the purposes of the Endangered Species Act by carrying out programs for the conservation of endangered and threatened species.*
- *Regulations for species that are proposed for listing as endangered or threatened are included in the Endangered Species Act*
- *Federal agencies shall confer with U.S. Fish and Wildlife Service on any agency action that is likely to jeopardize the continued existence of any species proposed to be listed.*

1.2 Migratory Bird Treaty Act and Bald and Golden Eagle Protection Acts and Related Strategic Plans and Executive Orders

1.2.1 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (50 CFR. Section 10.13) and the Bald and Golden Eagle Protection Act of 1940 (16 USC 668-668d) implement treaties between the United States and other nations to protect migratory birds. The MBTA prohibits activities such as hunting, pursuing, capturing, killing, selling and shipping of the birds, any of their parts, eggs, and nests unless expressly authorized in the regulation or by permit.

1.2.2 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from “taking” bald eagles, including their parts, nests, or eggs. The Act provides criminal and civil penalties for persons who “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof.” The Act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.”

“Disturb” is defined as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

In addition to immediate effects, this definition also covers effects that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.

After the de-listing of bald eagles, USFWS finalized permit regulations to authorize limited take of bald eagles in 2009 (FR74, 175) under the Bald and Golden Eagle Protection Act.

<u>1.2.3 National Bald Eagle Management Guidelines</u>

The most recent guideline document is the National Bald Eagle Management Guidelines (**USFWS 2007**). The Guidelines include general recommendations for land management practices that will benefit bald eagles. The USFWS strongly encourages adherence to these guidelines to ensure that bald and golden eagle populations will continue to be sustained. Some of the applicable guidelines include (see the Guidelines document for more details):

- To avoid disturbing nesting bald eagles, we recommend (1) keeping a distance between the activity and the nest (distance buffers), (2) maintaining preferably forested (or natural) areas between the activity and around nest trees (landscape buffers), and (3) avoiding certain activities during the breeding season. The buffer areas serve to minimize visual and auditory effects associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest trees and provide for alternative or replacement nest trees.
- Avoid clear cutting or removal of overstory trees within 330 feet of the nest at any time.
- Avoid timber harvesting operations, including road construction and chain saw and yarding operations, during the breeding season within 660 feet of the nest. The distance may be decreased to 330 feet around alternate nests within a particular territory, including nests that were attended during the current breeding season but not used to raise young, after eggs laid in another nest within the territory have hatched.
- Selective thinning and other silviculture management practices designed to conserve or enhance habitat, including prescribed burning close to the nest tree, should be undertaken outside the breeding season. Precautions such as raking leaves and woody debris from around the nest tree should be taken to prevent crown fire or fire climbing the nest tree. If it is determined that a burn during the breeding season would be beneficial, then, to ensure that no take or disturbance will occur, these activities should be conducted only when neither adult eagles nor young are present at the nest tree (*i.e.*, at the beginning of, or end of, the breeding season, either before the particular nest is active or after the young have fledged from that nest). Appropriate Federal and state biologists should be consulted before any prescribed burning is conducted during the breeding season.
- Avoid construction of log transfer facilities and in-water log storage areas within 330 feet of the nest.
- Except for authorized biologists trained in survey techniques, avoid operating aircraft within 1,000 feet of the nest during the breeding season, except where eagles have demonstrated tolerance for such activity.

APPENDIX B: Management Direction

<u>1.2.4 Related Guidance and Executive Orders</u>

In late 2008, a *Memorandum of Understanding between the USDA Forest Service and the US Fish and Wildlife Service to Promote the Conservation of Migratory Birds* (MOU) was signed. The intent of the MOU is to strengthen migratory bird conservation through enhanced collaboration and cooperation between the Forest Service and the Fish and Wildlife Service as well as other federal, state, tribal and local governments. Within the National Forests, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales and ensuring that bird conservation is addressed when planning for land management activities. The MOU covers implementation of the Migratory Bird Treaty Act (MBTA) of 1918 (50 C.F.R. Section 10.13) and the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668-668d).

Under the National Forest Management Act (NFMA), the Forest Service is directed to "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives." (P.L. 94-588, Sec 6 (g) (3) (B)). The January 2000 USDA Forest Service (FS) Landbird Conservation Strategic Plan, followed by Executive Order 13186 in 2001, in addition to the Partners in Flight (PIF) specific habitat Conservation Plans for birds and the January 2004 PIF North American Landbird Conservation Plan all reference goals and objectives for integrating bird conservation into forest management and planning.

The Migratory Bird Executive Order (Jan, 11, 2001) and the 2008 Memorandum of Understanding between the Forest Service and USFWS provide further direction, as follows:

> Within the NEPA process, the Forest Service will evaluate the effects of agency actions on migratory birds, focusing first on species management concern along with their priority habitats and key risk factors. To the extent practicable:
>
> a) Evaluate and balance long-term benefits of projects against any short- or long-term adverse effects when analyzing, disclosing, and mitigating the effects of actions.
> b) Pursue opportunities to restore or enhance the composition, structure, and juxtaposition of migratory bird habitats in the project area.
> c) Consider approaches, to the extent practicable, for identifying and minimizing take that is incidental to otherwise lawful activities, including such approaches as:
>   - Altering the season of activities to minimize disturbances during the breeding season;
>   - Retaining snags for nesting structures where snags are under-represented;
>   - Retaining the integrity of breeding sites, especially those with long histories of use; and,
>   - Giving due consideration to key wintering areas, migration routes, and stop-overs.

The Riparian BCP (CALPif 2004) includes conservation recommendations to 1) protect and restore riparian areas with intact adjacent uplands; ensure patch size, configuration and connectivity of riparian habitats; and restore and manage riparian forests to promote structural diversity and volume of the understory. The proposed action includes the use of riparian stream management zones, no-treat buffers and BMPs to ensure the continued health of the riparian habitat. Over the long term, treatments in the uplands should reduce the risk of stand-replacing fire, and loss of riparian vegetation.

APPENDIX B: Management Direction

The Coniferous Forest BCP (CALPif 2002) identifies problems as 1) loss of old-growth forests; 2) fire suppression, 3) fragmentation, and 4) elimination of snags. Fire suppression has resulted in decreased structural diversity, often producing a dense homogeneous forest with closed canopy and little shrub cover. Birds that use open forests and shrub understories are declining. The proposed action will open up stands and result in increased shrub understory.

1.3 Clean Water Act

Pursuant to Section 404 of the Clean Water Act, the Army Corps of Engineers (ACOE) regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined at 33 CFR Part 328 and includes (1) all navigable waters (including all waters subject to the ebb and flow of the tide), (2) all interstate waters and wetlands, (3) all impoundments of waters mentioned above, (4) all tributaries to waters mentioned above, (5) the territorial seas, and (6) all wetlands adjacent to waters mentioned above.

Wetlands are defined at 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support...a prevalence of vegetation typically adapted for life in saturated soil conditions." A recent U.S. Supreme Court decision ("SWANCC", 2001) has determined that Corps jurisdiction may not necessarily extend to intrastate waters and wetlands where the only federal nexus is potential use by migratory birds. The project area is located within the Santa Ana River watershed, an intrastate waterway tributary to the Pacific Ocean, which is a navigable water subject to Corps jurisdiction because of the existing connection to interstate commerce.

Issuance of a Section 404 Permit to discharge dredged or fill material into jurisdictional waters is considered a federal action and cannot be undertaken by the Corps if the permitted actions could adversely affect federally-listed (or proposed) endangered or threatened species**.**

1.4 National Forest Management Act

The National Forest Management Act of 1976 and its implementing regulations (CFR 219) state that: *fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area* (Sec 219.19)". Sec 219.19 also calls for the use of management indicator species to *indicate the effects of management activities*. In addition, the Secretary of Agriculture's policy on fish and wildlife (Department Regulation 9500-4) directs the Forest Service to avoid actions *"which may cause a species to become threatened or endangered".*

1.5 Forest Service Manual – Invasive Species Managment

Forest Service Manual direction for Invasive Species Management is contained in a new manual section, FSM 2900, effective December 5, 2011. This direction sets forth National Forest System policy, responsibilities, and direction for the prevention, detection, control, and restoration of effects from aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens). This new chapter replaces FSM 2080 (Noxious Weed Management). Some of the policy direction found in FSM 2900 is excerpted below:

a. Initiate, coordinate, and sustain actions to prevent, control, and eliminate priority infestations of invasive species in aquatic and terrestrial areas of the National Forest System using an integrated pest management approach, and collaborate with stakeholders to implement cooperative invasive species management activities in accordance with law and policy.

b. When applicable, invasive species management actions and standards should be incorporated into resource management plans at the forest level, and in programmatic environmental planning and assessment documents at the regional or national levels.

c. Determine the vectors, environmental factors, and pathways that favor the establishment and spread of invasive species in aquatic and terrestrial areas the National Forest System, and design management practices to reduce or mitigate the risk for introduction or spread of invasive species in those areas.

d. Determine the risk of introducing, establishing, or spreading invasive species associated with any proposed action, as an integral component of project planning and analysis, and where necessary provide for alternatives or mitigation measures to reduce or eliminate that risk prior to project approval.

e. Ensure that all Forest Service management activities are designed to minimize or eliminate the possibility of establishment or spread of invasive species on the National Forest System, or to adjacent areas. Integrate visitor use strategies with invasive species management activities on aquatic and terrestrial areas of the National Forest System. At no time are invasive species to be promoted or used in site restoration or re-vegetation work, watershed rehabilitation projects, planted for bio-fuels production, or other management activities on national forests and grasslands.

f. Use contract and permit clauses to require that the activities of contractors and permittees are conducted to prevent and control the introduction, establishment, and spread of aquatic and terrestrial invasive species. For example, where determined to be appropriate, use agreement clauses to require contractors or permittees to meet Forest Service-approved vehicle and equipment cleaning requirements/standards prior to using the vehicle or equipment in the National Forest System.

g. Make every effort to prevent the accidental spread of invasive species carried by contaminated vehicles, equipment, personnel, or materials (including plants, wood, plant/wood products, water, soil, rock, sand, gravel, mulch, seeds, grain, hay, straw, or other materials).
   a) Establish and implement standards and requirements for vehicle and equipment cleaning to prevent the accidental spread of aquatic and terrestrial invasive species on the National Forest System or to adjacent areas.
   b) Make every effort to ensure that all materials used on the National Forest System are free of invasive species and/or noxious weeds (including free of reproductive/propagative material such as seeds, roots, stems, flowers, leaves, larva, eggs, veligers, and so forth).

8. Where States have legislative authority to certify materials as weed-free (or invasive-free) and have an active State program to make those State-certified materials available to the public, forest officers shall develop rules restricting the possession, use, and transport of those

materials unless proof exists that they have been State-certified as weed-free (or invasive-free), as provided in 36 CFR 261 and Departmental Regulation 1512-1.

9. Monitor all management activities for potential spread or establishment of invasive species in aquatic and terrestrial areas of the National Forest System.
10. Manage invasive species in aquatic and terrestrial areas of the National Forest System using an integrated pest management approach to achieve the goals and objectives identified in Forest Land and Resource Management plans, and other Forest Service planning documents, and other plans developed in cooperation with external partners for the management of natural or cultural resources.
11. Integrate invasive species management funding broadly across a variety of National Forest System programs, while associating the funding with the specific aquatic or terrestrial invasive species that is being prioritized for management, as well as the purpose and need of the project or program objective.
12. Develop and utilize site-based and species-based risk assessments to prioritize the management of invasive species infestations in aquatic and terrestrial areas of the National Forest System. Where appropriate, use a structured decision-making process and adaptive management or similar strategies to help identify and prioritize invasive species management approaches and actions.
13. Comply with the Forest Service performance accountability system requirements for invasive species management to ensure efficient use of limited resources at all levels of the Agency and to provide information for adapting management actions to meet changing program needs and priorities. When appropriate, utilize a structured decision making process to address invasive species management problems in changing conditions, uncertainty, or when information is limited.
14. Establish and maintain a national record keeping database system for the collection and reporting of information related to invasive species infestations and management activities, including invasive species management performance, associated with the National Forest System. Require all information associated with the National Forest System invasive species management (including inventories, surveys, and treatments) to be collected, recorded, and reported consistent with national program protocols, rules, and standards.
15. Where appropriate, integrate invasive species management activities, such as inventory, survey, treatment, prevention, monitoring, and so forth, into the National Forest System management programs. Use inventory and treatment information to help set priorities and select integrated management actions to address new or expanding invasive species infestations in aquatic and terrestrial areas of the National Forest System.
16. Assist and promote cooperative efforts with internal and external partners, including private, State, tribal, and local entities, research organizations, and international groups to collaboratively address priority invasive species issues affecting the National Forest System.
17. Coordinate as needed with Forest Service Research and Development and State and Private Forestry programs, other agencies included under the National Invasive Species Council, and

external partners to identify priority/high-risk invasive species that threaten aquatic and terrestrial areas of the National Forest System. Encourage applied research to develop techniques and technology to reduce invasive species impacts to the National Forest System.

18. As appropriate, collaborate and coordinate with adjacent landowners and other stakeholders to improve invasive species management effectiveness across the landscape. Encourage cooperative partnerships to address invasive species threats within a broad geographical area.

1.6 San Bernardino National Forest Land and Resource Management Plan

The revised San Bernardino National Forest Land Management Plan (LMP) (Forest Service 2005) contains direction on management of issues and resources within the Forest boundaries. The LMP direction for wildlife, plant, and restoration management is included in both Part 2 and Part 3 of the LMP. The LMP contains program strategies and tactics (Part 2, Appendix B, pp. 121 – 160), “place-specific standards” (Part 2, pages 100-101), and Design Criteria (Part 3).

Appendix M (Part 3) of the LMP includes detailed management direction to prevent the spread and introduction of noxious weeds.

There is also management direction in the Place descriptions. These are located in Part 2 of the SBNF Plan beginning on page 41. There are 15 “places” on the SBNF.

Forest Goals and Desired Conditions

The San Bernardino National Forest (SBNF) Land Management Plan (LMP) includes forest goals and desired conditions for resources, strategic management direction, and standard design features that provide guidance for designing actions and activities during Project planning. The LMP includes several goals applicable to this Project:

- *Goal 4.1a* - Administer Minerals and Energy Resource Development while protecting ecosystem health (LMP, Part 1, page 38). The desired condition is that approved minerals and energy developments are managed to facilitate production of mineral and energy resources while minimizing adverse effects to surface and groundwater resources and protecting or enhancing ecosystem health and scenic values.

- *Goal 5.1* - Improve watershed conditions through cooperative management. The desired condition is that national forest watersheds are healthy, dynamic and resilient, and are capable of responding to natural and human caused disturbances while maintaining the integrity of their biological and physical processes.

  Watersheds, streams, groundwater recharge areas, springs, wetlands, and aquifers are managed to assure the sustainability of high quantity and quality water. Where new or re-authorized water extraction or diversion is allowed, those facilities should be located to avoid long-term adverse effects to National Forest water and riparian resources. The Forest Service has acquired and maintains water rights where necessary to support resource management and healthy forest conditions. Forest management activities are planned and implemented in a manner that minimizes the risk to forest ecosystems from hazardous materials.

Additional desired conditions are that geologic resources are managed to protect, preserve and interpret unique resources and values, and to improve management of activities that affect watershed condition and ecosystem health. Geologic hazards are identified, analyzed and managed to reduce risks and impacts where there is a threat to human life, natural resources, or financial investment.

- *Goal 6.2* - Provide ecological conditions to sustain viable populations of native and desired nonnative species. The desired condition is that habitats for federally listed species are conserved, and listed species are recovered or are moving toward recovery. Habitats for sensitive species and other species of concern are managed to prevent downward trends in populations or habitat capability, and to prevent federal listing. Flow regimes in streams that provide habitat for threatened, endangered, proposed, candidate, and/or sensitive aquatic and riparian-dependent species are sufficient to allow the species to persist and complete all phases of their life cycles.

  Habitat conditions sustain healthy populations of native and desired nonnative fish and game species. Wildlife habitat functions are maintained or improved, including primary feeding areas, winter ranges, breeding areas, birthing areas, rearing areas, migration corridors, and landscape linkages.

1.7 Forest Service California Spotted Owl Management Policies

Forest Service Pacific Southwest Region policy (USDA Forest Service 1984) is to protect all identified spotted owl territories (the area within a 1.5-mile radius of each nest).

The current direction for managing California spotted owls on the SBNF is contained in the Conservation Strategy for California Spotted Owls (USDA Forest Service 2004), as incorporated by reference in the SBNF LMP (USDA Forest Service 2005). The Conservation Strategy established guidelines for spotted owl habitat protection within territories, calling for establishment of "owl management areas" within a 1.5-mile radius of nest sites for each pair on the Forest. These areas are broken down into a 300-acre "protected activity centers (PACs)" which encompass nesting/roosting habitat, and an additional 300-acre area "home range core (HRC)" which primarily contains foraging habitat.

The Conservation Strategy provides for avoidance of disturbance to nesting owls by using a Limited Operating Period for management activities within 1/4 mile of nests which would be disruptive to spotted owls. The nesting season is normally from February 1st to August 15th. Disruptive activities within 1/4 mile of nest trees will be avoided. When authorized, those activities will be restricted to daylight hours.

The Conservation Strategy also contains specific guidelines for vegetation and fuels management efforts within NSs (30-60 acres around the nest trees), PACs, and HRCs.

1.8 Carbonate Habitat Management Strategy

In 2003, the Carbonate Habitat Management Strategy (CHMS) was developed by the USFS and U.S. Bureau of Land Management (BLM) in collaboration with a working group consisting of mining interests, private landowners, and conservation groups to address effects to five federally listed plants associated with carbonate habitats. The CHMS, which covers about 160,000 acres (called the Carbonate Habitat Management Area), has three main objectives:

- Economic: regulatory certainty for mining activities, protection of the viability of mining, and streamlining and cost reduction of the permitting process
- Conservation: maintenance and management of geomorphic and ecological processes of the landscape and placement of habitat blocks to maintain the carbonate plants, to avoid jeopardy (per Section 7 of the federal ESA) and adverse modification or destruction of critical habitat, to contribute to recovery, and to avoid future listings
- Regulatory: streamlining of permitting, California Environmental Quality Act (CEQA) review, and County of San Bernardino implementation of the California Surface Mining Reclamation Act, as well as allowing BLM and USFS to comply with certain court-ordered stipulations stemming from lawsuits.

The CHMS includes delineation of an initial habitat reserve, designation of conservation units within the Carbonate Habitat Management Area whereby loss and conservation of habitat values can be objectively measured, and contribution by federal agencies and mining interests to reserve assembly through various mechanisms (*e.g*., dedication of existing unclaimed federal land, purchase of private land or land with mining claims, land exchanges, or conservation banking). Implementation of the CHMS has been incorporated by the Forest Service into the SBNF LMP. The Forest Service and BLM prepared a Biological Assessment for the CHMS, which analyzed the effects of implementing the CHMS. Subsequently, the USFWS issued a Biological Opinion concluding that implementation of the CHMS would not jeopardize the listed species or adversely modify designated Critical Habitat.

1.9 Raptor Conservation Strategy

The SBNF is in the process of developing a final Raptor Conservation Strategy (RCS) for the San Bernardino Mountains North Slope in coordination with three North Slope Mining Companies (MCC, Omya, and Specialty Minerals), the USFWS, and the CDFW. The SBNF and mining companies are cooperatively participating in the monitoring of nesting special-status raptors on the North Slope. The objective of the RCS is to provide consistent management actions, processes, and management tools across the affected mining companies on the North Slope.

The RCS is expected to be a dynamic document, which will be updated as new species information becomes available through the monitoring efforts. The intent of the RCS is to ensure compliance with Federal and State laws, provide guidelines for reducing the likelihood of "take" of a Federally- or State-protected species, provide direction for incidental take authorization, and describe an adaptive management approach that provides protection of nests while continuing the mining operations and other activities.

1.10 Bighorn Sheep Management Strategy

APPENDIX B: Management Direction

A North Slope Bighorn Sheep Management Strategy is being developed by the CDFW and the Forest Service in coordination with three North Slope mining companies (MCC, Omya, and Specialty Minerals). The conservation strategy will include the following:

- Guidelines/thresholds for population status that would trigger augmentation of the herd;
- A strategy/guidelines for developing water sources to respond to drought years;
- Herd monitoring methodology and objectives;
- Avoidance measures to minimize effects on bighorn sheep;
- A requirement that participating mining companies will be a partner in the Bighorn Sheep Management Plan and will help support the long-term management goals of maintaining a sustainable population of bighorn sheep on the North Slope; and
- An endowment supported by the participating mining companies to finance the conservation strategy.

2.0 APPLICABLE LAWS, REGULATIONS, AND STANDARDS - CALIFORNIA

2.1 California Fish and Game Code

Pursuant to Section 2080 *et seq.* of the Fish and Game Code, a California ESA (CESA) permit must be obtained to authorize incidental "take" of plants or animals listed under CESA. The California Fish and Game Code also includes the category of fully-protected species, which may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock, or through the Natural Community Conservation Plan process. Revisions to the Fish and Game Code, effective January 1998, may require that the CDFW issue a separate CEQA document for the issuance of an incidental take permit under Section 2081 of CESA (2081permit) unless the project CEQA document addresses all project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of a 2081 permit.

Sections 3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of all active bird nests or eggs, raptors and other migratory non-game birds (as listed under the federal MBTA).

Pursuant to Section 1600 *et seq.* of the Fish and Game Code, the CDFW may require a Lake or Streambed Alteration Agreement prior to any activity that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of a river, stream or lake, or use material from a streambed. CDFW defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." CDFW's definition of "lake" includes "natural lakes or man-made reservoirs."

In addition to the bed and banks of a stream, CDFW jurisdiction includes riparian or wetland vegetation associated with a stream. CDFW's issuance of a Lake or Streambed Alteration Agreement for a project that is subject to CEQA will require CEQA compliance actions by CDFW as a responsible agency. CDFW as a responsible agency under CEQA may consider the lead agency's Negative Declaration or Environmental Impact Report for the project.

APPENDIX B: Management Direction

The Native Plant Protection Act (Fish and Game Code Sections 1900-1913) prohibits the taking, possessing, or sale within the State of any plants with a State designation of rare, threatened, or endangered (as defined by the CDFW). An exception in the act allows landowners, under specified circumstances, to take listed plant species, provided that the landowner first notifies the CDFW and give the agency at least 10 days to retrieve the plants before they are plowed under or otherwise destroyed. Project impacts to these species are generally not considered significant unless the species are known to have a high potential to occur within the area of disturbance associated with the ground-disturbing activity.

2.2 California Native Plant Society Rare Plant Inventory

The California Native Plant Society (CNPS) is a statewide nonprofit organization that has developed and managed the CNPS Rare Plant Program (Program) since 1968. The purpose of the Program is to develop current, accurate information on the distribution, ecology, and conservation status of California's rare and endangered plants, and to use this information to promote science-based plant conservation in California. The CNPS maintains the Inventory of Rare and Endangered Plants in California, which tracks the conservation status of hundreds of plant species. The Program operates under a MOU with the CDFW. The MOU outlines broad cooperation in rare plant assessment and protection, and formalizes cooperative ventures such as data sharing and production of complementary information sources for rare plants. As part of the Program, CNPS has developed the Rare Plant Ranking System, with six Rare Plant Ranks and three Threat Ranks.

The Rare Plant Ranks include:

- *California Rare Plant Rank 1A: Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere*. All of the plants constituting California Rare Plant Rank 1A meet the definitions of Sections 2062 and 2067 (California ESA) of the California Department of Fish and Game Code, and are eligible for state listing. Should these taxa be rediscovered, they must be fully considered during preparation of environmental documents relating to CEQA;

- *California Rare Plant Rank 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere*. Plants with a California Rare Plant Rank of 1B are rare throughout their range with the majority of them endemic to California. Rare Plant Rank 1B plants constitute the majority of taxa in the CNPS Inventory, with more than 1,000 plants assigned to this category of rarity. All of the plants constituting California Rare Plant Rank 1B meet the definitions of Sections 2062 and 2067 (California ESA) of the California Department of Fish and Game Code, and are eligible for state listing. They must be fully considered during preparation of environmental documents relating to CEQA.

- *California Rare Plant Rank 2A: Plants Presumed Extirpated in California, But More Common Elsewhere.* The plant taxa of California Rare Plant Rank 2A are presumed extirpated because they have not been observed or documented in California for many years. This list includes only those plant taxa that are presumed extirpated in California, but more common elsewhere in their range. All of the plants on List 2A meet the definitions of Sections 2062 and 2067 (California ESA) of the California Department of Fish and Game

Code, and are eligible for state listing. Should these taxa be rediscovered, they must be fully considered during preparation of environmental documents relating to CEQA.

- *California Rare Plant Rank 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere.* Except for being common beyond the boundaries of California, plants with a California Rare Plant Rank of 2B would have been ranked 1B. From the federal perspective, plants common in other states or countries are not eligible for consideration under the provisions of the ESA. All of the plants constituting California Rare Plant Rank 2B meet the definitions of Sections 2062 and 2067 (California ESA) of the California Department of Fish and Game Code, and are eligible for state listing. They must be fully considered during preparation of environmental documents relating to CEQA.

- *California Rare Plant Rank 3: Plants About Which More Information is Needed - A Review List.* The plants that comprise California Rare Plant Rank 3 lack the necessary information to assign them to one of the other ranks or to reject them. All of the plants constituting California Rare Plant Rank 3 meet the definitions of Sections 2062 and 2067 (California ESA) of the California Department of Fish and Game Code, and are eligible for state listing. Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.California Rare Plant Rank 4: Plants of Limited Distribution - A Watch List. The plants in this category are of limited distribution or infrequent throughout a broader area in California. While these plants are not "rare" from a statewide perspective, they are uncommon enough that their status should be monitored regularly. Some of the plants constituting California Rare Plant Rank 4 meet the definitions of Sections 2062 and 2067 (California ESA) of the California Department of Fish and Game Code, but few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and CNPS strongly recommends that California Rare Plant Rank 4 plants be evaluated for consideration during preparation of environmental documents relating to CEQA.

The CNPS Threat Rank is an extension added onto the California Rare Plant Rank and designates the level of threats by a 1 to 3 ranking with 1 being the most threatened and 3 being the least threatened. A Threat Rank is present for all California Rare Plant Rank 1B, 2B, 4, and the majority of California Rare Plant Rank 3 species. California Rare Plant Rank 4 plants are seldom assigned a Threat Rank of 0.1, as they generally have large enough populations to not have significant threats to their continued existence in California; however, certain conditions exist to make the plant a species of concern and hence be assigned a California Rare Plant Rank. In addition, all California Rare Plant Rank 1A and 2A (presumed extirpated in California), and some California Rare Plant Rank 3 (need more information) plants, which lack threat information, do not have a Threat Rank extension. Threat ranks are as follows:

0.1 Seriously threatened in California (over 80 percent of occurrences threatened / high degree and immediacy of threat).

0.2 Moderately threatened in California (20 to 80 percent occurrences threatened / moderate degree and immediacy of threat).
0.3 Not very threatened in California (less than 20 percent of occurrences threatened / low degree and immediacy of threat or no current threats known).

3.0 APPLICABLE LAWS, REGULATIONS, AND STANDARDS - LOCAL

3.1 San Bernardino County General Plan Conservation Element

The County of San Bernardino General Plan Conservation Element (County of San Bernardino 2007) establishes policies to conserve important natural resources. One role of the Conservation Element is to establish policies that reconcile conflicting demands on those resources.

The goals and policies of the Conservation Element that apply to biological resources are:
GOAL CO 2. The County will maintain and enhance biological diversity and healthy ecosystems throughout the County.

- POLICY CO 2.1: The County will coordinate with state and federal agencies and departments to ensure that their programs to preserve rare and endangered species and protect areas of special habitat value, as well as conserve populations and habitats of commonly occurring species, are reflected in reviews and approvals of development programs.
- POLICY CO 2.2: Provide a balanced approach to resource protection and recreational use of the natural environment.
- POLICY CO 2.3: In addition to conditions of approval that may be required for specific future development proposals, the County shall establish long-term comprehensive plans for the County's role in the protection of native species because preservation and conservation of biological resources are statewide, Regional, and local issues that directly affect development rights. The conditions of approval of any land use application approved with the BR overlay district shall incorporate the mitigation measures identified in the report required by Section 82.13.030 (Application Requirements), to protect and preserve the habitats of the identified plants and/or animals.
- POLICY CO 2.4: All discretionary approvals requiring mitigation measures for impacts to biological resources will include the condition that the mitigation measures be monitored and modified, if necessary, unless a finding is made that such monitoring is not feasible.

3.2 San Bernardino County Desert Native Plant Protection Ordinance

The San Bernardino Desert Native Plant Protection regulations restrict the removal or harvesting of specified desert native plants.
The following desert native plants are included if they have stems two inches or greater in diameter or are six feet or greater in height or are of a size otherwise specified in the ordinance:

- smoketree (*Dalea spinosa*);
- all species of mesquites (*Prosopis* sp.);
- all species of the family *Agavaceae* including century plants, nolinas, yuccas;
- creosote rings ten feet or greater in diameter;
- all Joshua trees; and any part (living or dead) of desert ironwood (*Olneya tesota*) or species of the genus *Cercidium*.

NORTH SLOPE

RAPTOR CONSERVATION STRATEGY

July 2019

Prepared by: Robin Eliason, Mountaintop District, San Bernardino National Forest and Joel E. Pagel (U.S. Fish and Wildlife Service). Input from Omya, Inc., Mitsubishi Cement Corporation, and California Department of Fish and Wildlife staff

NORTH SLOPE RAPTOR CONSERVATION STRATEGY

INTRODUCTION

Strategy: The San Bernardino National Forest (SBNF) has developed this Raptor Conservation Strategy (RCS) for the San Bernardino Mountain's North Slope in coordination with the mining companies, U.S. Fish and Wildlife Service (USFWS), and California Department of Fish and Wildlife (CDFW).

The SBNF and the three North Slope mining companies (Mitsubishi, Omya, and Specialty Minerals) are cooperatively participating in the monitoring of nesting special status raptors on the SBNF's North Slope of the San Bernardino Mountains. "Special status" refers to species that are included on a federal or state list for species of special concern. At the time of RCS development, special status raptors known or suspected to nest on or near the North Slope include golden eagle (CDFW fully-protected species, Bald and Golden Eagle Protection Act, a CDFW Watchlist, SBNF Watchlist) and prairie falcon (CDFW Watchlist, SBNF Watchlist).

Other special status raptors that have the potential to nest include: peregrine falcon (CDFW fully-protected species, USFWS Bird of Conservation Concern, Forest Service Sensitive) and California condor (federally and state-endangered). While the RCS shall apply to all of these species, monitoring requirements (described later) will be applied to prioritize species expected or documented in the North Slope area, or subject to known population threats. Over the life of the RCS, species may be added or removed from the priority depending on new information about raptor species' populations and geographic range.

The objective of the RCS is to provide consistent objectives, management action guidance, and management tools across the affected mining companies on the North Slope. Omya, Specialty Minerals, and Mitsubishi have provided input to the development and finalization of the RCS. The RCS has been tailored for activities associated with mining activities and effects.

The RCS is expected to be a dynamic document, updated as new information and scientific understanding of the subject species become available. The RCS may be updated over time to include other raptors if concerns develop over their local population status. The strategy includes monitoring objectives, schedules, and protocols, as well as measures to avoid, minimize, rectify, and reduce (or eliminate over time) effects to raptors nesting in the North Slope from mining and National Forest land and resource management activities. The intent is to use systematic monitoring of raptor breeding and non-breeding behavior, chronology, occupancy, and reproductive success to develop and refine site- and activity- specific measures to ensure successful nesting and provide for adaptive management opportunities.

Due to the long life of the mining projects and potential for new technologies (both in raptor monitoring and mining), and the uncertainty of long-term raptor population trends, the RCS will be reviewed and updated as necessary periodically with a goal of at least every five years by the parties of the RCS (Omya, Mitsubishi, Specialty Minerals, CDFW, SBNF, and USFWS).

The intent of the RCS is to:

- Ensure compliance with state and federal laws (Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act, California Endangered Species Act, federal Endangered Species Act, California Fish and Game code, etc.)

- Provide guidelines designed to avoid take of State fully protected species and for avoiding or reducing the likelihood of “take” of all other State or Federally-protected species; and provide direction for acquiring an incidental take authorization, if necessary and legally permissible.
- Describe an adaptive management approach that provides protection of nests while continuing the mining operations and other activities. The purpose of adaptive management is to improve long-term management outcomes by recognizing where key uncertainties impede decision-making, seeking to reduce those uncertainties over time, and applying that learning to subsequent decisions (**Walters 1986**). The goal is to reduce uncertainty for mining operators and for raptor management.
- Provide continuity and a unified approach for managing nesting raptors and their habitat on the North Slope for the mine operators in the area. By taking this approach, the parties may combine efforts, reducing costs and redundancy.
- Identify conflicts in management direction (*e.g.,* helicopter surveys may be the most efficient survey method for raptor nesting but may cause disturbance to bighorn sheep) and trade-offs to ensure that management decisions are made taking those issues into account.

For the purposes of this RCS, the North Slope of the San Bernardino Mountains is described as the steep north-facing slope that rises from the Mojave Desert floor to the top of the ridge, from Grapevine Canyon road on the west to Arrastre Creek on the east. The area is roughly displayed in Figure 1.

BACKGROUND

The North Slope’s rugged terrain rises from the Mojave Desert floor. The steep slopes have an abundance of rocky pinnacles, outcrops, rock crevice formations, rock ledges, cliff potholes, and cliffs. These areas provide excellent nest sites for birds, including several cliff-nesting nocturnal and diurnal raptors such as great-horned owls, golden eagles, California condors, peregrine and prairie falcons, red-tailed hawks, and other raptors.

The vegetation on the North Slope includes 1) pinyon/juniper woodland and montane conifer forests at the rim; 2) a pinyon/juniper-desert transition zone that includes Joshua trees, pinyon pines, junipers, yuccas, and desert shrubs; and, 3) high desert vegetation at the base of the mountain slopes. All of these vegetation communities provide foraging and nesting habitat for raptors and their prey. The rugged terrain and deep canyons/drainages also have suitable foraging and nesting sites. Golden eagles are known to nest in and near the North Slope and prairie falcons are suspected nesters. Both species are known to forage in and near the North Slope.

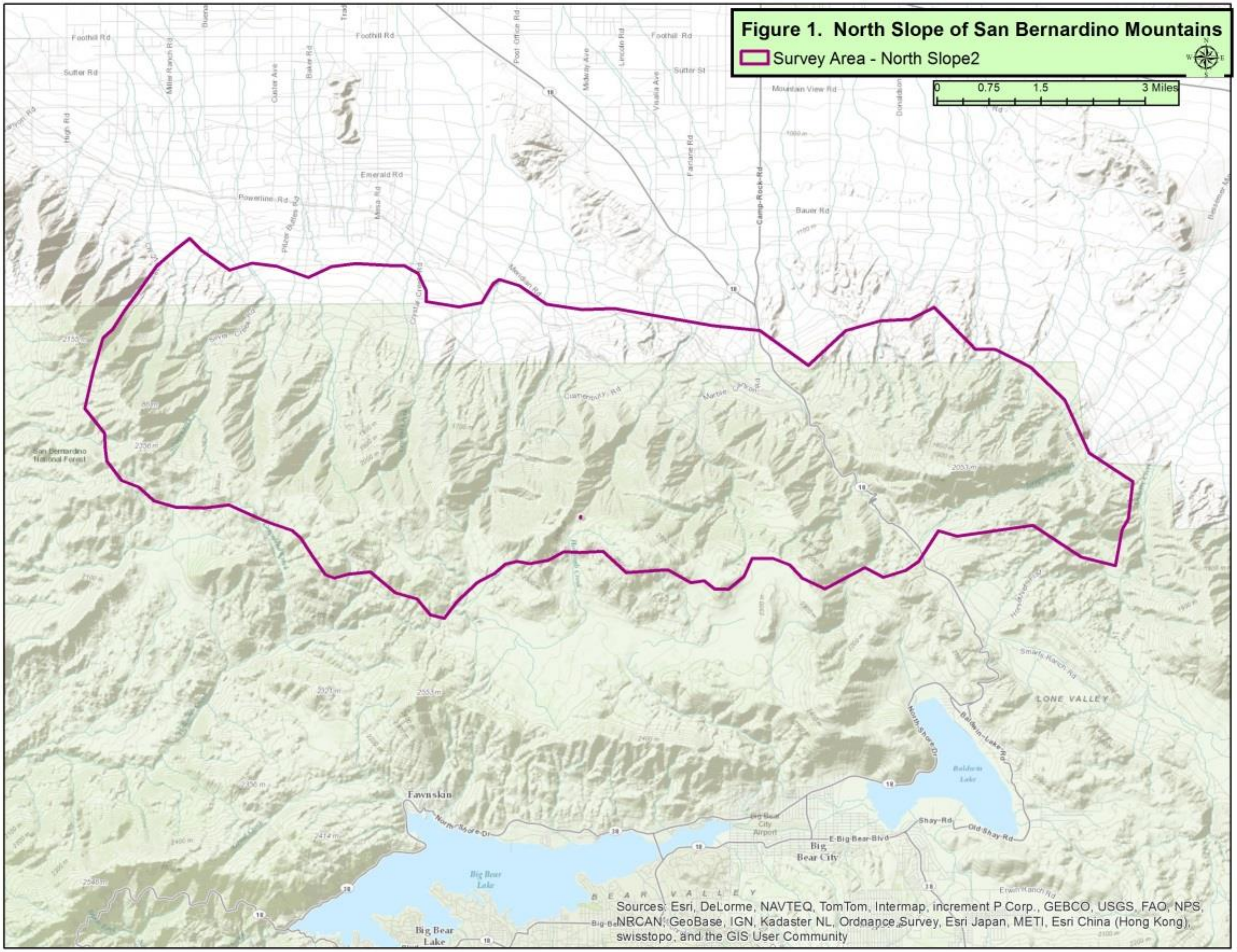
Figure 1. North Slope of San Bernardino Mountains
Survey Area - North Slope2
0 0.75 1.5 3 Miles
Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community
Fawnskin
Big Bear Lake
Big Bear City
LONE VALLEY
BEAR VALLEY
Foothill Rd
Sutter Rd
Powerline Rd
Emerald Rd
Bauer Rd
Camp Rock Rd
Mountain View Rd
North Shore Dr
Baldwin Lake Rd
Shay Rd
Old Shay Rd
E Big Bear Blvd
Erwin Ranch Rd
Smarts Ranch Rd
Meridian Rd
San Bernardino National Forest

<u>a) Golden Eagle (*Aquila chrysaetos*)</u>
The golden eagle is a SBNF Watchlist species, identified by the Forest Service as having a local viability concern, a CDFW Watchlist species, a California state fully-protected species. It is protected under the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA; Executive Order 13186), and the California Fish and Game Code.

Life History and Baseline Information: In California, golden eagles are an uncommon permanent resident and migrant throughout most of the state, except the floor of the Central Valley (**Ziener *et al.* 1990**). This species ranges from sea level to 11,500 feet (**Ziener *et al.* 1990**). It is a year-round resident in southern California (**Pagel, pers. comm. 2013, Kochert *et al.* 2002)**. Historically, golden eagles were considered more abundant in remote parts of southern California than anywhere else in the United States (**Ziener *et al.* 1990**).

Golden eagles nest primarily on cliffs in southern California but will also nest in trees (**Pagel, pers. comm. 2013)**. They build their nests on cliff ledges or in trees, typically 10-100 feet above the ground. As a species that is skittish about human intrusion, they often occupy remote mountain ranges and upland areas, often at or above tree line where vegetation is short or sometimes absent. Southern California's golden eagles generally avoid nesting in heavily-forested mountains and coastal or urban areas. They hunt for rabbits and other small mammals in nearby open habitats, such as grasslands, oak savannas, and open shrublands. Also a scavenger, golden eagles will forage on large dead animals (**Ferguson-Lees and Christie 2001, Garrett and Dunn 1981, Pagel, pers. comm. 2013, Kochert *et al.* 2002)**.

Wintering habitats in the western United States tend to include perches and native shrub-steppe vegetation types (*e.g.,* comprising *Artemisia* and similar shrubs). Habitats with these characteristics typically support substantial prey populations of black-tailed jackrabbits (*Lepus californicus*) (**Johnsgard 1990, Kochert and Steenhof 2002, Kochert *et al.* 2002**).

The golden eagle breeding season in southern California begins in early-mid December. Chicks fledge through July (**Pagel, pers. comm. 2013)**. The nest is constructed of branches, twigs, and is added to during the courtship phase of the nesting period. A nest can be quite large and may become more massive with successive use. Alternative nest sites within the breeding territory are occasionally used; a nesting territory typically consists of one to four nests, but up to 18 different nest sites per territory has been documented (**Kochert and Steenhof 2012)**. Golden eagles are known to have re-occupied nests that have been vacant for 30-40 years (**Kochert and Steenhof 2012**).

Females typically lay 1-3 eggs and incubate them for 43–45 days. The semi-altricial eaglets are brooded by the female for an additional 30 days. The young fly at about 60-70 days, remaining near the nest site for a few weeks to months (**Baicich and Harrison 1997, Zeiner *et a.* 1990, Pagel, pers. comm. 2013**). Typically, the nest is occupied for about 16 weeks total during the breeding season. Territory fidelity in adult golden eagles is high. Juvenile golden eagles disperse from their natal area. After dispersal, they live nomadically until they establish a territory during the fall of their first year (**Pagel, pers. comm. 2013)**.

In California, golden eagles are resident year-round; however, eagles that nest outside the state also visit California during migration and winter, and nomadic subadults and adult "floater" (*i.e.,* unmated or non-territorial) eagles may travel between California and other regions . Eagles may move altitudinally and latitudinally seasonally and/or in response to changing weather conditions; they may also move upslope after the breeding season (**Ziener *et al.* 1990, Katzner *et al.* 2012, Pagel 2013, pers. comm.**).

Golden eagles will occasionally hunt from an exposed perch, flying directly toward prey, or will hunt from soaring or low ground-level flights (**Ziener *et al.* 1990, Kochert *et al.* 2002**). Golden eagles eat primarily lagomorphs and rodents, but they will also take other mammals, reptiles, carrion, and birds (**Johnsgard 1990, Dunne *et al.* 1988**). Studies of golden eagle diet indicate that mammals often comprise 82 percent of the diet, supplemented by birds at 12.6 percent, with the remainder consisting of reptiles and fish (**Ziener *et al.* 1990**).

During the breeding season, golden eagles are highly territorial, and monogamous pairs may occupy a territory repeatedly over their life span. Territorial boundaries are well defined and vigorously defended. Golden eagles tend to nest on the periphery of an adjacent eagle's territory. Territorial size is dependent on food resources available (**Pagel, pers. comm. 2013)** and varies in S. California (**Katzner *et al.* 2012)**. Outside the breeding season, the eagles disperse widely and do not maintain territories.

***Population Status and Threats – Golden Eagle*:** Threats to golden eagles include powerlines (electrocutions and collisions), contaminants (*e.g.,* lead poisoning from scavenging on carcasses containing spent lead ammunition, secondary poisoning from rodenticides, etc.), intentional shooting/poaching, incidental trapping in furbearer traps, drowning in stock-tanks, vehicle collisions, habitat loss, collisions with other structures including large-scale non-renewable and renewable energy developments, and disturbance to nest sites (**Kochert *et al.* 2002, USFWS 2010, DeLong 2004, Ruddock and Whitfield 2007**). Another threat is poaching due to black market demand (**Pagel, pers. comm. 2013**).

Near National Forest System lands in southern California, golden eagles are affected by private land development and rapid urbanization that encroaches on key foraging areas. There appears to be abundant nesting habitat on public land, but in many places the highest quality foraging areas are on private land. (**Source: USFS Forest Plan 2006**)

Increased recreational activity, particularly rock climbing and hiking, in the vicinity of cliff nests is also a problem in some areas and can cause golden eagles to abandon nest sites. Mining activities on the North Slope of the San Bernardino Mountains may also be a threat to golden eagles if mining results in disturbance to nesting cliffs. (**Source: USFS Forest Plan 2006, USFWS 2010**)

Mortality of golden eagles as a result of wind turbine collisions has been high (79 between 1997 and 2012 in 10 states) (**Pagel *et al*. 2013)**. Large-scale solar panel projects result in losses of large acreages of foraging habitat for golden eagles. Within the foreseeable future, a number of new renewable energy projects are expected to come online in California's deserts, as suggested by the number of applications for renewable energy projects (http://www.energy.ca.gov/siting/solar/; http://www.blm.gov/ca/st/en /prog/energy/wind.html). Those combined with existing developments and other threats to golden eagles contribute to the concern for the golden eagle population in the western U.S. Given the current situation for golden eagles, there are concerns about cumulative effects for this species due to multiple threats (**Pagel, pers. comm. 2013**).

Occurrence on the North Slope – Golden Eagle: Golden eagles are known to nest on and near the North Slope. Four nesting territories, each with several nest structures, have been identified on the North Slope. Additional territories are known from farther to the southeast, west, and north.

The North Slope supports suitable foraging habitat and there are a number of records for observed golden eagles in the North Slope area (**Kielhold 1993, MacKay and Thomas 2008, SBNF records**), including using wildlife drinkers at the mines.

Take – Golden Eagle: The Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668c), enacted in 1940, and amended in 1962, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald and golden eagles, including their parts, nests, or eggs. Under the Eagle Act, “take” is defined as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest or disturb.” “Disturb” is defined in regulations as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.” (50 C.F.R. § 22.3.)

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment (Federal Register 74 (175): 46835-46879 9/11/09).

The regulation set forth in 50 CFR § 22.26 provides for issuance of permits to take golden eagles where the taking is associated with but not the purpose of the activity and cannot practicably be avoided. Most take authorized under this section will be in the form of disturbance; however, permits may authorize non-purposeful take that may result in mortality.

The regulation at 50 CFR § 22.27 establishes permits for removing eagle nests where: (1) necessary to alleviate a safety emergency to people or eagles; (2) necessary to ensure public health and safety; (3) the nest prevents the use of a human-engineered structure; or (4) the activity or mitigation for the activity will provide a net benefit to eagles. Only inactive nests may be taken, except in the case of safety emergencies. Inactive nests are defined by the continuous absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days leading up to the time of take. (Source: http://www.fws.gov/migratorybirds/BaldAndGoldenEagleManagement.htm)

b) California Condor (*Gymnogyps californianus)*

The California condor is both federally and state listed as Endangered. Critical Habitat has been designated (1976) but none is present on the North Slope. A Recovery Plan exists for this species.

***Life History and Baseline Information - California Condor**:* From 100,000 to 10,000 years ago, California condor ranged widely; with the extinction of the large Pleistocene mammals, the species declined in range and numbers. Condor remains reveal that the species once ranged over much of western North America, and as far east as Florida. Until about 2,000 years ago, the species nested in west Texas, New Mexico, and Arizona. When European settlers arrived on the Pacific coast of North America in the early 1800s, California condors occurred from British Columbia to Baja California, and also occasionally ranged into the American southwest.

Historically, California condor occurred in the Coast Ranges of California from Santa Clara and San Mateo Counties south to Ventura County, and east to the western slope of the Sierra Nevada and Tehachapi Mountains. It occurred primarily from sea level to 9,000 feet and nested at 2,000-6,500 feet. Almost all of the historic nest sites used by California condors are located on the Los Padres, Angeles, and Sequoia National Forests.

California condor nesting sites are typically located in chaparral, conifer forest, or oak woodland communities. Historically, condors nested on bare ground in caves and crevices, behind rock slabs, or on large ledges or potholes on high sandstone cliffs in isolated, extremely steep, rugged areas. Cavities in giant sequoia (*Sequoiadendron giganteum*) have also been used. The nest site is often surrounded by dense brush.

The appearance of many nest sites suggests that they have been long used, perhaps for centuries, whereas other apparently suitable sites in undisturbed areas show no signs of condor use. Characteristics of condor nests include:

- entrances were large enough for the adults to fit through;
- large enough entrances for the adults to fit through;
- a ceiling height of at least 14.8 inches at the egg position;
- fairly level floors with some loose surface substrate;
- un-constricted nest site for incubating adults; and
- a nearby landing point.

Condors often return to traditional sites for perching and resting. Traditional roost sites include cliffs and large trees and snags (roost trees are often conifer snags 40-70 feet tall, often near feeding and nesting areas). Condors may remain at the roost site until midmorning, and generally return in mid- to late afternoon.

Most foraging occurs in open terrain of foothills, grasslands, potreros with chaparral areas, or oak savannah habitats. Historically, foraging also occurred on beaches and large rivers along the Pacific coast. Water is required for drinking and bathing.

California condors typically breed every other year, but can breed annually if they are not caring for dependent young. California condors usually lay a single egg between late January and early

April. The egg is incubated by both parents and hatches after approximately 56 days. Both parents share responsibilities for feeding the nestling. Feeding usually occurs daily for the first 2 months, then gradually diminishes in frequency. Juvenile condors leave the nest at 2-3 months of age, but remain in the vicinity of the nest and under their parents' care for up to a year. The California condor is non-migratory. California condors are capable of extended flights (more than 100 miles in a day).

California condors are opportunistic scavengers, feeding exclusively on the carcasses of dead animals. Typical foraging behavior includes long-distance reconnaissance flights, lengthy circling flights over a carcass, and hours of waiting at a roost or on the ground near a carcass. California condors locate food by visual rather than olfactory cues, and require fairly open areas for feeding, allowing ease in approaching and leaving a carcass. California condors typically feed only 1-3 days per week.

Seasonal foraging behavior shifts may be the result of climatic cycles or changes in food availability. California condors maintain wide-ranging foraging patterns (*i.e*., at least 2.8 to 11.6 square miles) throughout the year, an important strategy for a species that may be subjected to unpredictable food supplies.

Historically, condors probably fed on mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), pronghorn antelope (*Antilocarpa americana*), and various marine mammals. More recently, domestic livestock made up the majority of their diet.   (Source: **USFS 2006** Forest Plan Species Account)

Population Status and Threats – California Condor: The California condor has been one of the most highly endangered bird species in the world throughout its modern history. As the result of an aggressive management program, including capture of the last six individuals remaining in the wild in 1986-87, captive breeding, and reintroduction of captive progeny, the total population continues to increase from the low point in 1982-82, when only 21-22 individuals were thought to survive. The 9/30/12 California condor status report by the U.S. Fish and Wildlife Service showed a total population of 410 individuals, including 180 in captivity and 230 in the wild.

A high number of birds are still being lost to poisoning from lead ingested from carcasses, and this factor may preclude rapid recovery of the species in some areas. The ingestion of trash items, including glass fragments, china, plastic, and metal bottle tops, and non-digestible natural items such as small rocks, sticks, grass, wool, and fur, is a serious problem for condor chicks in California nests. (http://globalraptors.org/grin/SpeciesResults.asp?specID=8258)

Factors that led to California condor's century-long decline included illegal collection of adults and their eggs; poisoning by substances used to eradicate livestock predators; poisoning from ingestion of lead fragments of bullets embedded in animal carcasses; other forms of poisoning (DDT, cyanide, strychnine, compound 1080, antifreeze from car radiators); shooting; and collisions with structures such as transmission lines. In addition, the roads, cities, housing tracts, and weekend mountain retreats of modern civilization have replaced much of the open country condors need to find food. Their slow rate of reproduction and maturation undoubtedly make the California condor population as a whole more vulnerable to these threats.

Viability is a definite concern due to the extremely small population and vulnerability to many factors. Greatest among these are shooting, lead contamination, collision with overhead transmission lines and towers, trash, and general human disturbance (**USFS 2006** Forest Plan Species Account).

Rideout *et al.* (2012) documented the causes of death of free-ranging California condors between 1992 (the beginning of the reintroduction program) through 2009. Out of 76 dead condors for which the cause of death could be determined, 70% were from anthropogenic causes. Ingestion of trash was the most important cause of death for nestlings, and lead toxicosis was the most important factor for juveniles and adults. Other causes of death identified included: copper toxicosis (possibly from cattle troughs treated with copper sulfate to control algae), west Nile virus, powerline electrocution, powerline collision, ethylene glycol (antifreeze) ingestion, rattlesnake bite, predation, and gunshot. Deaths from mining-associated activities were not documented in that study.

There are many existing and ongoing threats to California condors, as described above. The risk to condors from man-made factors (trash, toxins, shooting, electrocution, and collisions) will continue and may increase in the foreseeable future as human populations in southern California grow.

Perhaps the greatest threat to condors in the foreseeable future is the expansion of renewable energy developments (solar and wind) throughout the condor range as well as in areas where condors are expected to expand as the population continues to grow. The Bureau of Land Management has seen a surge in wind energy applications. Their website has data tables and maps displaying areas with existing applications for renewable energy projects (http://www.blm.gov/ca/st/en/prog/energy/wind.html).

Occurrence on the North Slope – California Condor: California condors have been observed at several locations in the San Bernardino Mountains since 2002, including the White Mountain area of the North Slope (sighting of two condors). USFWS records of radio-tagged condors suggest that as S. California's condor population continues to grow, the areas they cover is expanding (**G. Hund, pers. comm. 2013**). Condors appear to be traveling long distances from the main population sites on the coast on a more frequent basis.

Currently, condors do not regularly forage over the San Bernardino Mountains and no nesting is known. The closest nest are approximately 120 miles away and the closest historic nest record was approximately 75 miles away (**J. Brandt, pers. comm. 2014**). Foraging likely occurs on an occasional basis and may increase in frequency as the population expands and if closer nest sites are established. The cave nesting structures that condors prefer are not present within the federal action area; however, there are likely a few suitable nesting structures on the North Slope. If condors chose to closer to the North Slope, foraging likelihood on the North Slope would increase.

Take for California Condor: The Endangered Species Act of 1973, as amended, makes it unlawful for a person to "take" a listed animal without a permit. Under the federal act, take is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct” (16 U.S.C. §1532(a)). Under federal regulations, the term “harm” is defined as “an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering” (50 C.F.R. § 17.3).

There are currently no California condor nests currently known from the North Slope. Take and disturbance to nesting California condors are considered very unlikely but the likelihood could change should nesting occur in the future. The RCS contains provisions for annual monitoring and nest monitoring and for actions if an active condor nest were found in close proximity to active mining operations.

c) American Peregrine Falcon *(Falco peregrines anatus)*

The peregrine falcon is a Forest Service Sensitive species and a CDFW “fully protected” species. It is a USFWS Bird of Conservation Concern. It has been removed from the Federal and State of California’s Endangered Species lists.

Life History and Baseline Information – Peregrine Falcon: Peregrine falcons nest almost exclusively on protected ledges of high cliffs, primarily in woodland, forest, and coastal habitats. A very small number of nests have been found on small outcrops and in trees, and a number of reintroduced pairs nest on tall buildings. Cliffs that provide ledges, potholes, or small caves (usually with an overhang), and that are relatively inaccessible to mammalian predators, are required components of nesting habitat. Nest sites usually provide a panoramic view of open country, are near water, and are associated with a local abundance of passerine, waterfowl, or shorebird prey.

The breeding season of peregrine falcon generally begins after the winter solstice and can last until August. Courtship typically involves the male provisioning the female with food. Females normally lay two-four eggs; egg-laying in California typically occurs in March-May. Both male and female incubate the eggs for 29–33 days. In California, fledging occurs in May to July when the young are 35–54 days old. Juvenile peregrine falcons begin hunting on their own and become independent 6–15 weeks after fledging.

Peregrine falcons feed almost exclusively on birds; ranging in size from hummingbirds to Aleutian Canada geese. They typically feed on highly mobile, flocking, and colonial nesting birds, such as shorebirds, waterfowl, doves, and pigeons. Peregrine falcons chase and grab their prey, or dive down on them at speeds up to 100–200 miles per hour (*i.e*., stooping). During the stoop, a peregrine falcon grasps its prey or strikes it with its talons and subsequently retrieves it on the ground. Peregrine falcons hunt during the day or at dusk. During the breeding season, adult peregrine falcons attack and chase other raptors away from the nest, especially golden eagles and other peregrine falcons that move through their territory. Adults hunt over a large area around the nest site; foraging may occur up to 12 miles from the nest.

Population Status and Threats – Peregrine Falcon*:* Bans on the use of DDT in the 1970s and a major reintroduction program led by the CDFW and Santa Cruz Predatory Bird Research Group

(SCPBRG) in California have resulted in an impressive increase in the distribution and abundance of this species over the last 30 years. The population increase has been substantial enough to warrant the taxon's delisting, in August 1999, from federal endangered status. (Source: **USFS 2006** Forest Plan Species Accounts, **Pagel 2014 pers. comm.**)

The widespread use of DDT was a primary cause of the decline in peregrine falcon populations. High levels of these pesticides and their metabolites (*i.e*., byproducts of organic decompositions) were found in the tissues of peregrine falcons, leading to thin eggshells and reproductive failure. Environmental toxins continue to be a threat. Other threats include illegal shooting, illegal falconry activities, and habitat destruction. National Forest System lands in southern California do not support a large amount of high-quality habitat for American peregrine falcon. Protecting cliff-nesting sites from human disturbance has been identified as an important conservation measure for peregrine falcons on NFS lands. (Source: **USFS 2006** Forest Plan Species Accounts, **Pagel and Jarman 1991**)

Occurrence on the North Slope – Peregrine Falcon: Peregrine falcons are not currently known to nest on the North Slope. However, the number of peregrine falcon nesting territories and distribution of them in the areas in and near the San Bernardino Mountains have increased over the past decade. After decades of no nesting in the San Bernardino Mountains or eastern San Gabriel Mountains, now at least one nest is known in each area.

The North Slope has an abundance of rocky outcrops and cliffs that are suitable peregrine falcon nest sites. With successful nesting efforts throughout its range in S. California and elsewhere, it is possible that over the life of current and future mining projects, this species could nest on the North Slope of the San Bernardino Mountains.

d) Prairie Falcon (Falco mexicanus)

Prairie falcons are a SBNF Watchlist species and a CDFW Watchlist species.

Life History and Baseline Information – Prairie Falcon: Prairie falcons inhabit shrub-steppe desert, open desert scrub, grassland, mixed shrub-grasslands, and alpine tundra. Prairie falcon habitat typically consists of dry open terrain, either hilly or level. Nests are located on cliffs, generally in arid open areas. Desert scrub and grasslands are preferred foraging habitats in southern California. This species has declined in the coastal foothills of southern California as development has affected foraging habitat availability.

The breeding season of prairie falcons generally begins after the winter solstice and can last until August. Egg-laying typically occurs in March – May with fledging between May and July. Nests are located on cliff ledges or rock outcrops in open regions. Nests are typically scrapes located 30-40 feet high on a cliff or rock outcrop; they are occasionally found as high as 400 feet. Abandoned nests built by other birds are rarely used by prairie falcons. The female incubates a single clutch; clutches usually contain four-five eggs. Incubation lasts for approximately 29-31 days.

Prairie falcons are described as more of a wanderer than a true migrant. They move seasonally, probably in response to food availability. Most of the species' southward movements occur between late August and late October, with the main return flight taking place in early March to late April.

Primary foods taken by prairie falcons include horned larks (*Eremophila alpestris*) and other small passerines, lizards, ground squirrels (*Spermophilus* spp.), and small rodents. Prairie falcons employ two main hunting strategies: one is to flush a prey item and fly along a route meant to conceal the prairie falcon until the last moment; the other is to patrol long distances close to the ground until it may surprise its quarry. Prairie falcons defend a small area around the nest site from conspecific and other intruders. However, prairie falcons forage over large, undefended areas. (Source: **USFS 2006** Forest Plan Species Account, **Pagel 2014 pers. comm.**)

Population Status and Threats – Prairie Falcon*:* The species is legally harvested in 19 states. Falconers legally take an estimated 0.2 percent of the prairie falcon population each year, making it the second most commonly harvested raptor in the United States. Because of prairie falcons' strong association with cliffs as nesting sites, they are especially susceptible to habitat loss adjacent to suitable nest structures. Prairie falcons can be adversely affected by large-scale agricultural development, especially in foraging areas with high densities of ground squirrels. Much of the prime foraging area for prairie falcons has been lost to in southern California and those losses are likely to continue with human population growth. (Source: **USFS 2006** Forest Plan Species Account)

Occurrence on North Slope – Prairie Falcon*:* Prairie falcons are known to occur on the North Slope and adjacent SBNF lands. There is a migrant prairie falcon record at Cushenbury Spring (**Kielhold 1993**). There are several records on the North Slope (SBNF records). Two of the records are of single birds between March and July. It is not known if they were migratory or breeding birds. This species was also detected at the Mitsubishi mining area in May 2008 (**MacKay and Thomas 2008**). Suitable habitat exists for foraging and nesting exists on the North Slope. Nesting is suspected but has not been confirmed.

RAPTOR MANAGEMENT

The intent of the management actions described here is to lower the risk to special status raptors as a result of mining operations through monitoring and management activities coordinated among public agencies and mining operators that have activities on National Forest System lands on the North Slope. They are intended to provide for equity and consistency between the North Slope mine operators conducting activities on the North Slope and limit the potential for loss/degradation of nesting special status raptor habitat or disturbance that could harm, harass, or result in mortality of these species. The management actions are also intended to provide a method to identify and resolve conflicts and assess trade-offs, should they arise.

These measures have been developed in conjunction with USFWS, CDFW, and the USFS.

RAPTOR MANAGEMENT MEASURES

The following Raptor Management measures will be used by the mining companies authorized to operate on National Forest lands on the North Slope of the San Bernardino Mountains. The SBNF will also participate, and will contribute subject to availability of staff and appropriated funds.

1. <u>Annual Monitoring of Nest Sites</u>

   Monitoring Objectives: The monitoring objectives are to: a) gather baseline population data; b) identify occupied territories, inactive nests, and likely nest sites; c) determine occupancy and productivity of all known raptor nests; d) conduct reconnaissance to find new nest sites; e) allow for detection of trends over time; and, f) ascertain a robust database of nesting chronology (courtship, laying/brooding, hatching, fledging). Annual monitoring of raptor nest sites on the North Slope is necessary to determine which special status raptor nesting territories are active in any given year and where they are located relative to the active mining operation areas. At the outset of the RCS, annual monitoring will focus on known and potential golden eagle nesting territories. Over the life of the RCS, species priorities may be shifted depending on new information about each special status raptor species.

   Monitoring Protocol/Methodology: Methodology will follow established protocols. Golden eagle reconnaissance and monitoring shall follow USFWS Interim Guidelines (Appendix A) and any future revisions to these guidelines. Surveys for other raptors, should they become recognized as RCS priorities, will follow currently-applicable USFWS protocols or accepted survey standards (**Pagel 1991** for peregrine falcons). Where protocols do not exist, the survey techniques will be approved by the USFS prior to any field work. In the future, survey methodologies should consider new survey technologies with lower likelihood of disturbing both bighorn sheep and nesting raptors.

   Because of the disturbance potential for bighorn sheep, helicopter reconnaissance and monitoring will be avoided and monitoring efforts will be ground-based. Exceptions for helicopter use will be considered based on approval from CDFW and USFWS.

   Monitoring for golden eagles will start at the beginning of the courtship period (predicted for the survey area to be early to mid-January), to ensure detection of nesting attempts and abandonment. As nest occupancy and phenology of nesting raptors on the North Slope becomes better understood, the timing of survey efforts may be adjusted.

   Survey Area: The survey area for golden eagles will be used as the survey area for all special status raptors. For golden eagles, the USFWS's guidelines include a standard survey area of ten miles from the activity for renewable energy projects. This is based on the maximum practicable distance that a golden eagle typically travels from the nest centroid for foraging. Based on knowledge of the proposed North Slope mining projects, the topography, and an understanding of golden eagle biology, the survey area for this area has been modified to include suitable nest sites within roughly 5 miles east-west of the mining operations. The survey polygon includes the North Slope area from near Terrace Springs west to Grapevine Canyon near White Mountain, from the toe of the slope to slightly south of the ridgeline (Figure 2).

   Monitoring will be focused on the previously-identified nesting territories in the survey area and would also evaluate suitable nesting habitat within the polygon to detect new or altered raptor territories.

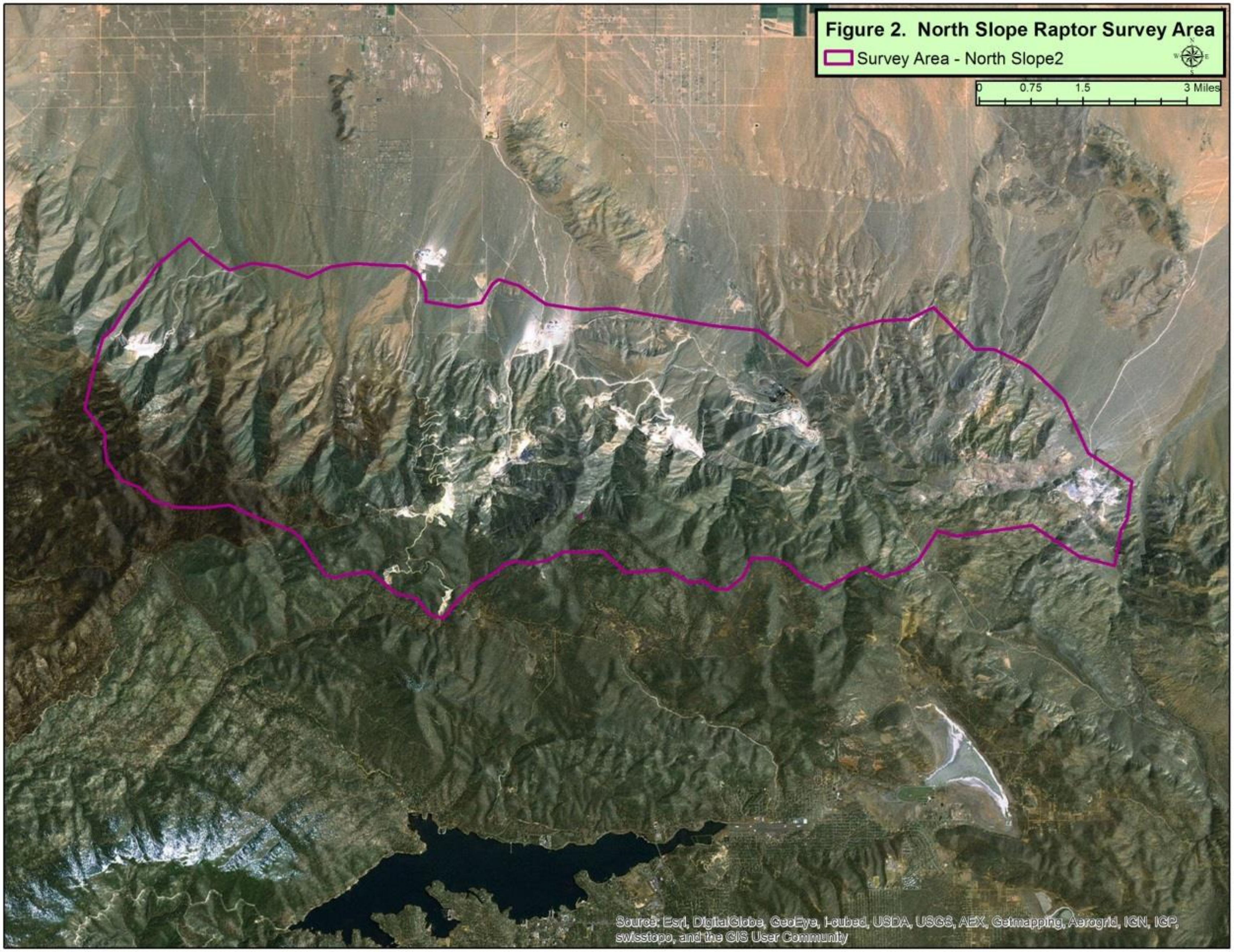
Figure 2. North Slope Raptor Survey Area
Survey Area - North Slope2
0
0.75
1.5
3 Miles
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

The Forest Service has consolidated existing data and created a map of three nesting territories on and near the North Slope within the mining area. Each of these territories has several nest structures that have been identified in previous survey efforts.

The first year of monitoring would involve surveying known nesting territories and suitable nesting habitat within the survey polygon to find any previously-undetected nest structures, validating the existing data and nest locations, and monitoring the identified territories for nesting activities (occupancy and reproductive success) in the first breeding season.

Monitoring in subsequent years would focus on the known nesting territories within the survey area and not require complete re-surveys of the entire survey area. It is expected any new nesting territories and presence of "floater" golden eagles would be detected during the monitoring of known nesting territories.

Monitoring Frequency and Duration: Monitoring of known nest sites will be conducted annually. These survey requirements would continue for the duration of active and future mining operations. After 5 years of monitoring and data gathering to establish baseline conditions, a reduction of the survey frequency will be evaluated.

Target Species: At the time of development of the RCS, the special status raptors being addressed are golden eagle, California condor, peregrine falcon, and prairie falcon. During annual surveys, observations of all of these species will be noted. If nesting or presence is suspected for California condors or peregrine falcons, nest surveys will be conducted. Prairie falcons are currently excluded from nesting surveys because the population status appears to be stable. In the future, target raptor species may change as populations decline or recover.

Notifications and Reporting: Newly-discovered nest structures and/or evidence of an occupied nest territory detected during monitoring will be reported to the Forest Service biologist via email within 48 hours of detection. Brief weekly summaries of monitoring results will also be provided to the Forest Service via email. The Forest Service will coordinate appropriate notification, as necessary, with USFWS or CDFW.

Surveyor Qualifications: Monitoring will be conducted by qualified biologists, who have verifiable prior experience, are directly knowledgeable of the species and the survey protocols, and who are approved by the Forest Service. Resumes will be submitted to the Forest Service for approval prior to hiring/contracting.

2. <u>Monitoring for Behavioral Responses to Mining Activities</u>
   Behavioral response monitoring efforts will focus on golden eagles. If nesting of California condors or peregrine falcons is detected, the monitoring would be expanded to include them. Prairie falcon nests would not be monitored (unless nest monitoring for one of the other species is occurring in the same area and the prairie falcon nest could be monitored efficiently). Over the life of the RCS, target species may be added or removed depending on population status concerns.

If an active raptor nest is located within 1.5-miles of an active blasting site, site-specific nest monitoring during the important phases (*e.g.,* egg-laying, incubation/early nestling, mid-nestling, and late nestling) of the breeding season will be conducted to assess behavioral responses and effects to nesting success. Exceptions will be considered where geographic or topographic features or blast techniques result in noise attenuation to the point that behavioral responses are not observed, or not expected to be observed.

Monitoring will be focused on detecting responses during a sampling of blast types and sizes spread out during the important phases of the nesting season (described above). Monitoring parameters will be developed by U.S. Fish and Wildlife Service in coordination with SBNF and CDFW based on site-specific and species-specific considerations, and the blast types and sizes that the companies expect to detonate. Data collected will include factors to differentiate between natural behavior unrelated to blasting and varying behavioral responses to different blast techniques or conditions (*e.g.,* type of disturbance/activity, distance to blast, type of blast, size of blasts, decibel levels, weather conditions, etc.) with pre- and post-blast monitoring.

In most situations, golden eagles appear to be sensitive to anthropogenic disturbance. As such, there is greater potential for disturbance at distance away from the nest site. The data from those monitoring efforts and disturbance responses will be used to evaluate and develop appropriate management tools (*e.g.,* blasting techniques, noise and seismic attenuators, timing of blasting, etc.).

The behavioral response data would also be used to refine the need and guidelines for future monitoring. After enough behavioral response data have been gathered to understand sensitivity of the species to various types of mining activities, the monitoring requirements will be adjusted (*e.g.,* reduce the distance that triggers monitoring) or ceased. The objective is to use a few years of monitoring data to identify any significant behavioral responses, establish management practices as needed, and shift out of monitoring.

Notifications and Reporting: Brief weekly summaries of monitoring results will also be provided to the Forest Service via email. The Forest Service will coordinate appropriate notification, as necessary, with USFWS or CDFW.

3. Coordination

The SBNF will work with other agencies (*e.g.,* USFWS, CDFW, BLM, etc.), entities (*e.g,* private companies, researchers, etc.), and contractors to minimize redundancy in survey efforts and share data, where appropriate and feasible.

If an occupied nest for a federally-protected species, a California-listed species, or a California fully-protected species is found within 1.5 miles of an active quarry operation, the SBNF will determine if additional monitoring is needed and undertake the appropriate coordination/consultation with the appropriate agencies. If required, the appropriate permit(s) will be requested from USFWS or CDFW, under the applicable law (federal or state Endangered Species Act, Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act).

The mines will cooperate in such efforts and implement the resulting measures designed to minimize or avoid "take."

STANDARD DESIGN FEATURES FOR MINING AND OTHER PROJECTS ON THE NORTH SLOPE

General

DF-1. Participate in the North Slope Raptor Conservation Strategy.

DF-2. Disturbance footprints for mine operations and development of new quarries and roads shall be limited to the greatest extent possible to the goal of minimizing impacts to adjacent habitat and sensitive biological resources.

DF-3. If wetting or soil bonding agents used for dust control appear to be attracting wildlife to the roadways (*e.g.,* by pooling or creating mineral licks), the mining operator will work with the Forest Service to develop remedies.

DF-4. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for spill of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. Spills will be cleaned up as quickly as possible.

DF-5. Mine operators will maintain facilities and grounds in a manner that minimizes any potential impacts to raptors, predators, and scavengers (*e.g*., minimize storing materials that may attract prey species, remove trash/garbage daily, etc.). All trash and food-related waste shall be secured in self-closing animal-proof containers and removed daily from mining areas and roads.

DF-6. No recreational target shooting will occur on NFS lands.

DF-7. The mine operators shall conduct wildlife/plant awareness programs for employees (including new employee orientation and annual refresher trainings). The program will address raptor nest awareness. This will include the importance of avoiding harassment/disturbance, adherence to speed limits, adherence to defined project boundaries, reporting guidelines, etc. The mine operators will solicit input from CDFW and USFS in developing the training program.

DF-8. The mine operators will avoid practices (*e.g.,* bird feeders, open trash cans, landscape plants that produce fruit, litter, etc.) that attract/enhance prey populations and opportunities for raptor hunting or scavenging near active quarries, haul roads, and processing areas. This would also help discourage the spread of non-native birds; to discourage the spread of disease and pathogens, etc.

DF-9. To reduce vehicle collision risk to raptors and other scavengers, intact animal carcasses (with the exception of bighorn sheep and deer) will be removed immediately from mine roads and mining areas. Carcasses will be moved far enough away from roads and active mining areas that scavengers would not be in danger of vehicle collision or other mining-related hazards. Bighorn sheep and deer carcasses shall be covered with a tarp and left in place until the CDFW or Forest Service biologist is notified and provides direction. As much as is feasible, care will be taken to avoid disturbing the area around the carcass to preserve predator tracks, parasites, etc.

Reclamation

The timing and planning of reclamation measures at sites away from active quarries, haul roads, and processing areas will consider improving or creating suitable foraging and nesting habitat for raptors. These measures may include:

RE-1. Phase reclamation where possible to re-establish suitable habitat for prey species in areas where mining activities have ceased.

RE-2. Where perch structures are lacking, consider construction/installation of artificial structures (*e.g.,* poles, rock piles, etc.) to enhance perching, roosting, and foraging habitat on a case-by-case basis.

RE-3. Restrict vehicle use and human activity to the extent possible in reclamation and reclaimed areas. Remove and reclaim roads where possible.

RE-4. Revegetate with local native plant species that are favorable for raptor prey species.

RE-5. During reclamation, create suitable cover for raptor prey species by considering spatial features on the landscape. Planting in groupings and mosaics and construction of brush and rock piles should be considered.

RE-6. If natural water sources are lacking in reclamation areas, evaluate the feasibility of artificial water sources (wildlife drinkers, guzzlers, catchment structures, etc.) during the reclamation period.

POSSIBLE PROTECTION MEASURES BASED ON NEED AS DETERMINED BY MONITORING RESULTS

Because this RCS is viewed as a long-term management strategy with the expectation that the mining operations may exist a century or more after approval, these measures are viewed as a tentative toolbox of possible approaches. Depending on site-specific conditions, one or more of these measures may be appropriate. Alternatively, development of new measures may be more appropriate, especially in response to changes in mining technology, changes in wildlife monitoring/management techniques, and based on a better understanding of the ecology of North Slope raptors.

PM-1. Where nest monitoring detects changes in behavior of nesting raptors that can be attributed to blasting activities, use of noise attenuation devices, species-specific Limited Operating Periods (LOPs), or alternative mining techniques will be considered for use during the breeding season. The objective is to conduct blasting while minimizing changes in nesting behavior that would be considered “take,” where feasible. See “Behavioral Response Monitoring” above for additional discussion.

PM-2. If suitable nesting habitat is degraded to the point that suitable nest sites are a limiting factor, consider construction of artificial nest platforms at suitable sites away from disturbance sources.

PM-3. Consider incorporating the creation of nest ledges (for golden eagles, etc.) or cave-like structures (for California condors) on quarry benches into ongoing and future quarry reclamation. Biologists from Forest Service, USFWS, and CDFW would provide input on optimal characteristics for these features.

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Websites with Draft Conservation Plan Guidance:

http://www.fws.gov/windenergy/docs/ECP_draft_guidance_2_10_final_clean_omb.pdf

There are a number of example "Bird and Bat Conservation Strategies" on-line that have been developed for renewable energy projects. Some examples:

- *Energy.gov*
- *Centinelasolar.com*
- *Minnesota State Conservation Strategies*
- http://www.aplic.org/APPs.php

Appendix A: Golden Eagle Monitoring Guideline Summary

Golden eagle reconnaissance and monitoring shall follow USFWS Interim Guidelines (Pagel *et al.* 2010 – Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance, USFWS Division of Migratory Birds, Washington, DC) and any future revisions to these guidelines or a currently-applicable standardized federal guidance. Monitoring for other raptors will follow currently-applicable USFWS protocols or accepted survey standards.

The ground observation survey guidelines for golden eagles are summarized here (see **Pagel *et al.* 2010** for complete guidelines):

- Observation posts for monitoring known territories will be no closer than 300 meters for extended observations, and generally no further than 700 meters, where terrain allows. Maximum observation post distance would be 1600 meters.
- To inventory and determine occupancy of cliff systems, there will be at least 2 observation periods per season. To determine fledging success, additional observations may (or may not) be necessary. Territory occupancy can be confirmed.
    - Observation periods will last at least 4 hours for known nest sites, or until territory occupancy can be confirmed.
    - Observation periods will last for at least 4 hours per 1.6 km of cliff system, based from the center point of that cliff complex.
    - Observation periods will be at least 30 days apart for monitoring efforts.
- To collect monitoring data at a known nest territory, there will be at least 2 observation periods per season.
    - Observation periods from ground observation points will last at least 4 hours for known nest sites or until nesting chronology can be confirmed per visit.
    - Observation periods will be at least 30 days apart.