Biological Assessment and Evaluation for the La Sal Mines Complex, San Juan County, Utah

Prepared for

Moab Ranger District
Manti-La Sal National Forest

and

Moab Field Office
Bureau of Land Management

On behalf of

Denison Mines (USA) Corp

Prepared by

SWCA Environmental Consultants

October 2011

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EXECUTIVE SUMMARY

Denison Mines (USA) Corp. (Denison) contracted SWCA Environmental Consultants (SWCA) to complete a biological assessment and evaluation (BAE) for the La Sal Mines Complex, which is located on land regulated by the U.S. Bureau of Land Management (BLM) and the U.S. Forest Service (USFS) in San Juan County, Utah. This BAE has been prepared to disclose and analyze impacts associated with the approval of a Plan of Operations Amendment (POA) for the La Sal Mines Complex, as proposed by Denison, on federally listed threatened, endangered, candidate, and petitioned species, as well as discuss impacts on special status species listed by federal land management agencies.

Habitat suitability and impact determinations for special status species were based on a qualitative comparison between the habitat requirements of each species and habitats found in the project area. The current geographic and elevational ranges of each species were also taken into consideration. Fourteen federally listed species are addressed in this BAE. Ten of these are listed by the U.S. Fish and Wildlife Service (USFWS) as threatened or endangered and are therefore protected under the authority of the Endangered Species Act (ESA). Of the remaining species, two are listed as candidate for listing, and two are currently petitioned for listing. These species currently receive no statutory protection under the ESA. Fifteen species are listed as sensitive by the USFS, six of which have the potential to occur in the project area. Seventeen wildlife species are listed as sensitive by the BLM, 16 of which are also considered sensitive by the State of Utah. Of these species, eight have the potential to be in the project area. The BLM also lists 12 plant species as sensitive, one of which has potential to occur in the project area. Additionally, Management Indicator Species for the Manti La-Sal National Forest are discussed.

At this time, no federally listed species are known to occur in the project area, and the proposed project will have no effect on federally listed, candidate, or petitioned species. The proposed project may impact individuals but is not likely to result in a trend toward federal listing or loss of viability of six species listed by the USFS, eight wildlife species listed by the BLM and the State of Utah, and one plant species listed by the BLM. The lead permitting agencies, the BLM and USFS, have the authority and final decision regarding what effect this project will have on any federally or state-listed species and whether to require species-specific surveys for any protected species.

1.0 INTRODUCTION

SWCA Environmental Consultants (SWCA) has prepared this biological assessment and evaluation (BAE) on behalf of Denison Mines (USA) Corp. (Denison). Denison is proposing modification of operations at the La Sal Mines Complex and three phases of uranium mining exploration on approximately 52 acres of land regulated by the U.S. Bureau of Land Management (BLM) and 47 acres of land regulated by the U.S. Forest Service (USFS) in San Juan County, Utah (Figure 1). Phase 1 of the project will occur from 2011 (existing approved operations) through 2013. Phase 2 will occur from 2014 through 2018. Phase 3 will occur from 2019 through 2030. The expansion of the Pandora Mine, and the three phases of mining exploration activities, comprise the "proposed action" described in the Plan of Operations Amendment (POA), as was submitted by Denison to the BLM and USFS in December 2010 (Denison 2010).

1.1 BACKGROUND INFORMATION

The La Sal Mines Complex is a group of four existing underground uranium mines operated by Denison. The mines are located north of the town of La Sal, in San Juan County, Utah. Denison mines uranium-bearing rock from a network of underground tunnels and rooms, and hauls this rock to the surface. The ore is then hauled off-site for mineral processing to a mill located near Blanding, Utah. The La Sal Mines Complex has been in operation since the 1970s with intervening periods of decreased or increased uranium production in relation to changing economic conditions.

Although mining is conducted 800 to 1,000 feet below the surface, some surface disturbance is incident to uranium production. This surface disturbance includes:

- ventilation shafts, which are vertical bore holes that allow air to enter or exhaust from the underground tunnels;
- portals that provide for transportation into and out of the mine via mine shafts (vertical tunnels) and mine adits (sub-horizontal tunnels);
- buildings and other ancillary infrastructure necessary to support the underground mines; and
- development rock storage areas, which contain rock that must be excavated to reach ore within the underground mine.

The La Sal Mines are located on federal lands managed by BLM or USFS, state lands managed by the Utah State Institutional Trust Lands Administration, and on private lands. BLM and USFS are responsible for management of federal lands under their jurisdiction, and uranium mining activities occurring on those lands must be permitted in accordance with BLM regulations at 36 Code of Federal Regulations (CFR) 3809 and 28 CFR 228 Subpart A. Previously approved plans of operations are in place for the existing mines.

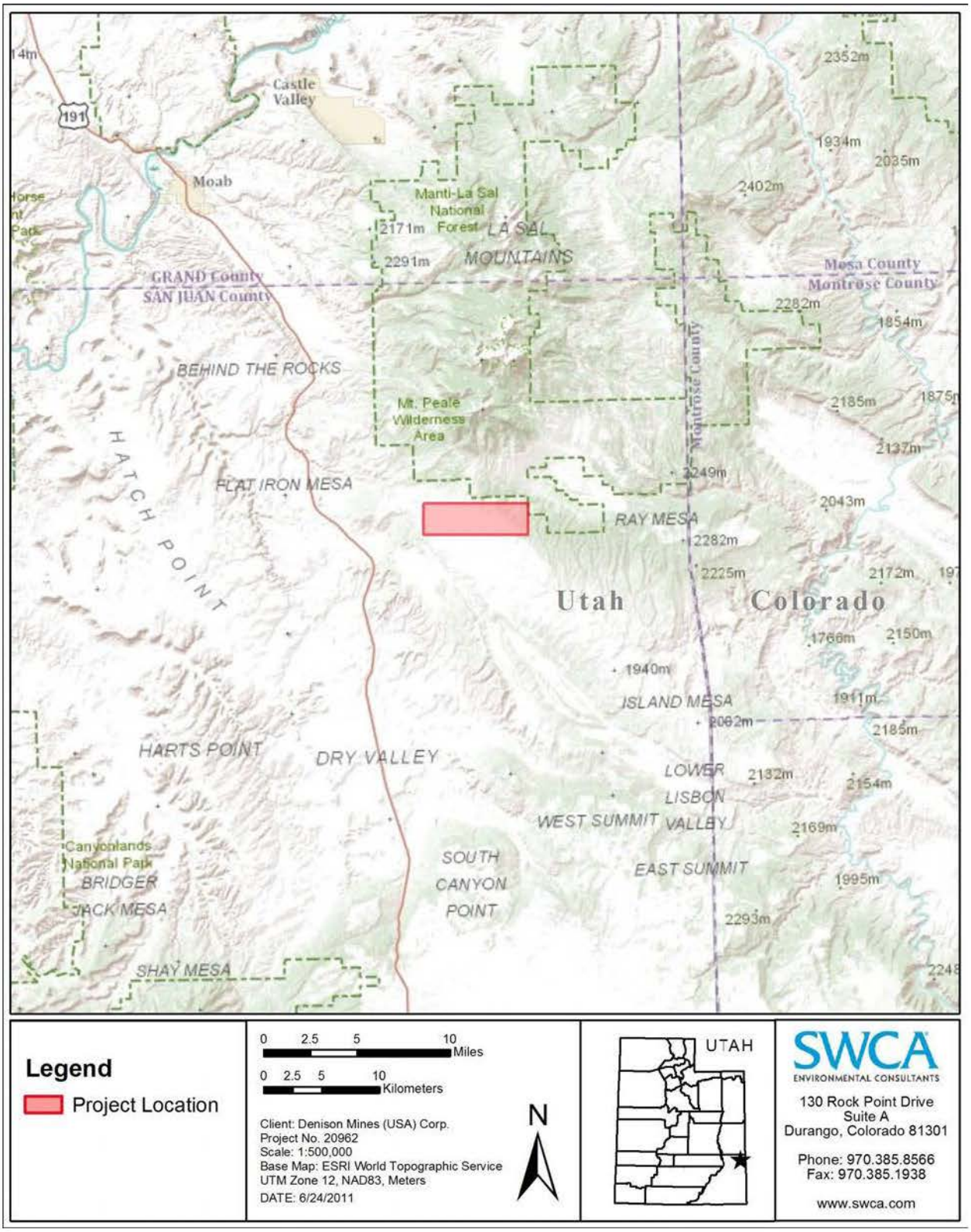

Figure 1. General location of the project area.

1.2 PROJECT LOCATION

The project area is located in San Juan County, Utah, south of the La Sal Mountains, east of Flat Iron Mesa, and west of Ray Mesa (see Figure 1). The location of the project area can be found on U.S. Geological Survey (USGS) 7.5-minute quadrangles La Sal East, Utah (1987), and La Sal West, Utah (1987). The legal description is Township (T) 28 South (S), Range (R) 24 East (E) and R25E, and T29S, R24E and R25E (Figure 2). The elevational range for the project area is approximately 6,400 to 7,625 feet above mean sea level (amsl).

1.3 SCOPE OF WORK

The scope of work for this BAE includes:

- review of the U.S. Fish and Wildlife Service (USFWS) species list for San Juan County;
- review of the BLM Moab Field Office's Sensitive Fish and Wildlife Species List and BLM Sensitive Plant Species List for San Juan County;
- review of the USFS Region 4 sensitive species list for the Moab District of the Manti-La Sal National Forest;
- review of Management Indicator Species (MIS) for Manti-La Sal National Forest from the USFS Moab District;
- review of species potentially occurring near the project area that are protected under Utah state laws;
- review of species potentially occurring near the project area that are protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA); and
- evaluation of the potential for the species listed in this report to occur in the project area.

1.4 PROPOSED ACTION

The proposed action would authorize the following activities on public lands managed by the BLM and USFS at the La Sal Mines Complex.

- Modification of surface facilitates at the Pandora Mine.
- Temporary construction of drilling sites and access trails for exploration drilling.
- Installation of ventilation holes to provide for inflow and exhaust of air to support underground mining.
- Compilation and modification of activities previously approved by two existing BLM Plans of Operations, one USFS Plan of Operations, and associated amendments into one Plan of Operations that will address the entire La Sal Mines Complex.

The proposed action is summarized in the following sections, and detailed information is presented in the proposed POA and associated attachments (Denison 2010).

1.5 PANDORA MINE EXPANSION

The proposed POA includes expansion of an existing development rock area (DRA) at the Pandora Mine. This proposed expansion includes approximately 6.5 acres of additional land at the Pandora Mine. Following the completion of mine operations, the DRA would be reclaimed in place by re-grading the rock, providing for permanent surface water drainage control, placing topsoil, and revegetating.

1.6 PHASES 1 THROUGH 3

Drilling sites and access roads are planned to support ongoing exploration and development drilling activities. These activities are necessary to define the extent of uranium ore bodies at the La Sal Mines Complex. This process is integral to the overall mining process, and is expected to be ongoing from 2011 through 2030. The drilling process requires access for a truck-mounted drill rig and ancillary support vehicles, and construction of temporary drill sites. This is only necessary for the time that is required to drill and then plug the bore hole. Therefore, reclamation of disturbance caused by drilling activities is proposed to be conducted seasonally after drilling operations cease in an area. This will limit the disturbance to BLM and USFS surface resources that would be present at any given time.

Up to 24 vent holes are proposed to be installed between 2011 through 2030 as required by the ongoing mining operations. These holes are vertical shafts approximately 6 feet in diameter, which extend from the surface into the underground workings. The surface openings into the ventilation shafts will be secured with metal protective structures during mining operations. Ventilation shafts will be reclaimed after mining ceases at the La Sal complex, by backfilling the shafts and sealing the surface opening.

1.6.1 Phase 1 (2011 through 2013)

Exploration drilling and installation of vent holes during Phase 1 would be conducted in an area of current mining, located northeast of the Pandora Mine surface facilities (approximately in a portion of the NE¼ of Section 6 and portion of the N½ of Section 5, T29S, R25E, Salt Lake Base Meridian, San Juan County, Utah) and an area west of the Beaver Shaft Mine (approximately in a portion of the NW¼ of Section 3 and portions of the NE¼ and NW¼ of Section 4, T29S, R24E, and portions of the SW¼ and SE¼ of Section 33, portions of the NE¼ SW¼, and the SE¼ of Section 34, T28S, R24E, Salt Lake Base Meridian, San Juan County, Utah) as shown in Figure 2. Mining would occur in these areas starting in 2011 (existing approved operations) through the end of 2013.

Anticipated disturbances within the area include an estimated 24 vent holes, estimated as seven in the area northeast of the Pandora Mine surface facilities and 17 in the area west of the Beaver Shaft Mine. Of these vents, it is likely that four would be on BLM land, six would be on USFS land, and the remaining 14 (west of Beaver Shaft Mine) would be on private land. Exploration drilling in the Phase 1 area would include up to approximately 200 exploration holes per year for a period of four years.

Although these are forward-looking estimates that could be modified based on future market conditions and other factors, assumptions regarding future disturbed areas are provided in Table 1.

Table 1. Phase 1 Disturbed Area Estimates

Type of Disturbance	Area
BLM land vents (4)*	4.0 acres
USFS land vents (6)*	6.0 acres
Private land vents (14)*	14.0 acres
BLM exploration drilling (20% of total drill holes per year)†	10.2 acres
USFS exploration drilling (25% of total drill holes per year)†	12.8 acres
Private land exploration drilling (55% of total drill holes per year)†	28.0 acres
Total Disturbance	**75.0 acres**
Total BLM Disturbance (including Pandora Mine Expansion)	**20.7 acres**
Total USFS Disturbance	**18.8 acres**

* Typical disturbance from vent holes include 0.25 acre per vent hole, and approximately 0.75 acre per vent hole for new roads.

† Disturbance for exploration drilling is accounted on a biennial basis with the assumption that reclamation would be complete in that time frame. An estimated surface disturbance area for each drill hole is 30 × 40 feet (less than 0.1 acre). Temporary exploration roads are estimated to be approximately 0.1 acre per drill hole based on historical operations.

1.6.2 Phase 2 (2014 through 2018)

Planned Phase 2 activities would be located north of the Pandora Mine surface facilities (approximately in the S½ of Section 36, T28S, R24E, and portions of the NE¼ and SE¼ of Section 31, T28S, R25E) and an area west of the Beaver Shaft Mine (in the N½ of Section 5, T29S, R24E; and in the S½ of Section 32, T28N, R24E, Salt Lake Base Meridian, San Juan County, Utah) as shown in Figure 2. Mining could occur in these areas starting in 2014 and could extend through the end of 2018.

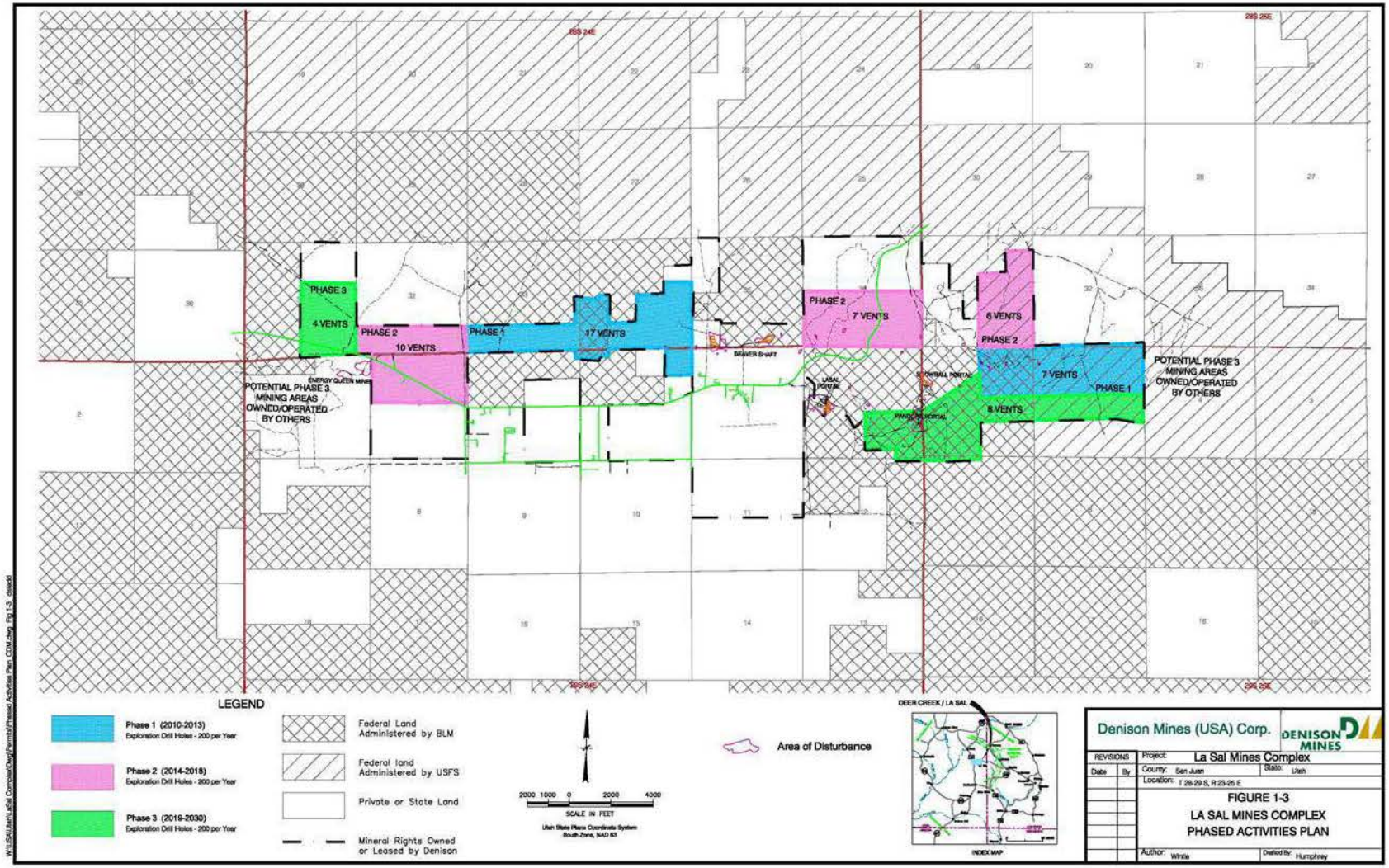

Figure 2. Project location map.

Anticipated disturbances include an estimated 23 vent holes, estimated as 13 in the area north of the Pandora Mine surface facilities and 10 in the area west of the Beaver Shaft Mine. Of these vents, it is likely that six would be on USFS land, four would be on State of Utah School and Institutional Trust Lands Administration (SITLA)-managed land, and the remaining 13 would be on private land. Exploration drilling in the Phase 2 area would include up to approximately 200 exploration holes per year for a period of five years.

As these are only estimates that could be based on future market conditions and other factors, assumptions are made regarding future disturbed areas and are provided in Table 2.

Table 2. Phase 2 Disturbed Area Estimates

Type of Disturbance	Area
USFS land vents (6)*	6.0 acres
SITLA land vents (4)*	4.0 acres
Private land vents (13)*	13.0 acres
USFS exploration drilling (25% of total drill holes per year)†	12.8 acres
SITLA exploration drilling (20% of total drill holes per year)†	10.2 acres
Private land exploration drilling (55% of total drill holes per year)†	28.0 acres
Total Disturbance	**74.0 acres**
Total BLM Disturbance	**0 acre**
Total USFS Disturbance	**18.8 acres**

* Typical disturbance from vent holes include 0.25 acre per vent hole, and approximately 0.75 acre per vent hole for new roads.

† Disturbance for exploration drilling is accounted on a biennial basis with the assumption that reclamation would be complete in that time frame. An estimated surface disturbance area for each drill hole is 30 × 40 feet (less than 0.1 acre). Temporary exploration roads are estimated to be approximately 0.1 acre per drill hole based on historical operations.

1.6.3 Phase 3 (2019 through 2030)

Planned Phase 3 activities are projected to be located south and east of Pandora Mine surface facilities (approximately in a portion of the S¼ of Section 1, T29S, R24E and portions of Sections 5 and 6, T29S, R25E, Salt Lake Base Meridian, San Juan County, Utah) as shown in Figure 2. Properties owned/operated by others could conceivably be mined in areas east of this Planned Phase 3 area; however, Denison does not currently control these properties. Phase 3 also includes an area to the far west of the Beaver Shaft Mine, where a new shaft on private land called the Redd Block IV shaft would be constructed (approximately in the SE¼ and a portion of the NE¼ of Section 31, T28S, R24E, Salt Lake Base Meridian, San Juan County, Utah). Properties owned/operated by others could conceivably be mined in areas west of this Planned Phase 3 area; however, these mining areas are currently owned or operated by others. Mining could occur in these areas starting in 2019 and could extend through 2030.

Anticipated disturbances include an estimated 12 vent holes, estimated as eight in the vicinity of the Pandora Mine surface facilities and four in the area west of the Beaver Shaft Mine. Of these vents, it is likely that six would be on BLM land, two would be on USFS-managed land, and the remaining four would be on private land. Exploration drilling in the Phase 3 area would include up to approximately 200 exploration holes per year for a period of 11 years.

As these are only estimates that could be modified based on future economic conditions and other factors, assumptions regarding future disturbed areas are provided in Table 3.

Table 3. Phase 3 Disturbed Area Estimates

Type of Disturbance	Area
BLM Land Vents (6)*	6.0 acres
USFS Land Vents (2)*	2.0 acres
Private Land Vents (4)*	4.0 acres
BLM Exploration Drilling (50% of total drill holes per year)†	25.5 acres
USFS Exploration Drilling (15% of total drill holes per year)†	7.7 acres
Private Land Exploration Drilling (35% of total drill holes per year)†	17.9 acres
Total Disturbance	**63.1 acres**
Total BLM Disturbance	**31.5 acres**
Total USFS Disturbance	**9.7 acres**

* Typical disturbance from vent holes include 0.25 acre per vent hole, and approximately 0.75 acre per vent hole for new roads.

† Disturbance for exploration drilling is accounted on a biennial basis with the assumption that reclamation would be complete in that time frame. An estimated surface disturbance area for each drill hole is 30 × 40 feet (less than 0.1 acre). Temporary exploration roads are estimated to be approximately 0.1 acre per drill hole based on historical operations.

2.0 METHODS

The information for this BAE was obtained by way of desktop review. BLM and USFS personnel were contacted directly to obtain the most recent information regarding sensitive species. Vegetation cover types have been mapped by the Southwest Regional Gap Analysis Program (SWReGAP). Surface water within the project area was mapped using the National Hydrography Dataset (USGS 2011). Soil information was obtained from the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) Soil Conservation Service Web Soil Survey.

2.1 SPECIES IDENTIFICATION

Only species listed as threatened or endangered by the USFWS are afforded protection under the Endangered Species Act (ESA). The federally listed endangered, threatened, candidate, and petitioned species for San Juan County, Utah, evaluated in this BAE were based on the data available at the USFWS website (USFWS 2011a). The USFS Region 4 sensitive species list for San Juan County and the Manti-La Sal National Forest MIS list were reviewed, and Barb Smith of the Moab Ranger District was consulted to evaluate the potential for occurrence of sensitive species and MIS. The BLM Sensitive Fish and Wildlife Species List (2010) for San Juan County was reviewed, and Pamela Riddle of the Moab Field Office was consulted to evaluate the potential for occurrence of sensitive species in the project area. Additionally, the BLM Sensitive Plant Species List (2011) for Utah was reviewed for San Juan County.

The potential for occurrence within the project area of the species addressed in this BAE was based on 1) existing information on distribution, and 2) qualitative comparisons of the habitat requirements of each species with vegetation communities or landscape features in the project area. Possible impacts to these species were evaluated based on reasonably foreseeable project-related activities.

2.2 SPECIES EVALUATION

The potential for occurrence of each species was summarized according to the categories listed below. Because not all species are accommodated precisely by a given category (i.e., category definitions may be too restrictive), an expanded rationale for each category assignment is provided. Potential for occurrence categories are listed below.

- *Known to occur*—the species has been documented in the project area by a reliable observer.
- *May occur*—the project area is within the species' currently known range, and vegetation communities, and soils, resemble those known to be used by the species.
- *Unlikely to occur*—the project area is within the species' currently known range, but vegetation communities, soils, etc., do not resemble those known to be used by the species, or the project area is clearly outside the species' currently known range.

Those species listed by the USFWS were assigned to one of three categories of possible effect, following USFWS recommendations. Because species listed by the BLM, the USFS, and the State of Utah are not protected under the authority of the ESA, effects determinations for these species do not follow USFWS recommendations. The effects determinations recommended by USFWS include:

- *May affect, is likely to adversely affect*—the project is likely to adversely affect a species if 1) the species is known to occur in the project area, and 2) project activities would disturb areas or habitat elements known to be used by the species or would directly affect an individual;
- *May affect, is not likely to adversely affect*—the project is not likely to adversely affect a species if 1) the species may occur but its presence has not been documented, and 2) project activities would not result in disturbance to areas or habitat elements known to be used by the species; and
- *No effect*—the project will have no effect on a species if 1) the species is considered unlikely to occur (range, vegetation, etc., are inappropriate), and 2) the species or its sign was not observed during surveys of the project area.

Because species not listed as threatened or endangered are not protected under the authority of the ESA, impact determinations for these species do not follow USFWS recommendations. Instead, the impact determinations for any species not protected under the ESA[1] are as follows:

- *No impact*—the project will have no impact on a species if 1) the species is considered unlikely to occur (range, vegetation, etc., are inappropriate), and 2) the species or its sign was not observed during surveys of the project area;
- *Beneficial impact*—the project is likely to benefit the species, whether it is currently present or not, by creating or enhancing habitat elements known to be used by the species;
- *May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability*—the project is not likely to adversely impact a species if 1) the species may occur but its presence has not been documented, and 2) project activities would not result in disturbance to areas or habitat elements known to be used by the species; and
- *May impact individuals and is likely to result in a trend toward federal listing or loss of viability*—the project is likely to adversely impact a species if 1) the species is known to occur in the project area, and 2) project activities would disturb areas or habitat elements known to be used by the species or would directly affect an individual.

[1] This includes the sensitive species listed by the BLM and USFS, and wildlife species of concern listed by the State of Utah.

3.0 RESULTS

3.1 SURFACE AND GROUND WATER

Surface water within the project area was mapped using the National Hydrography Dataset (USGS 2011). A description of the surface and ground water in the project area is included in this BAE in order to assess if habitat requirements for listed species are present in the project area and any impacts that may affect those species. The La Sal Mines Complex is located in the Dolores River and Colorado River watersheds. The mines straddle the watershed boundary between the Dolores and Colorado rivers, with the Pandora and Snowball mines in the Dolores River watershed and the La Sal and Beaver Shaft mines in the Colorado River watershed (Denison 2010: Appendix N). Ephemeral streams cross all three phases of the project, but there are no perennial streams in the project area. There are three small intermittent stock ponds in the western portion of the project area (USGS 2011). Please see Appendix A, Figures A1 and A2.

Currently, water used in mining operations is obtained from a nearby well. Approximately 2,000 to 4,000 gallons of water would be required during the drilling process for each proposed vent hole. Additional water would be required for exploration drilling, dust control, and other mining operations. It is unlikely that this water withdrawal would affect area springs or flow in the Dolores or Colorado rivers.

Surface water discharges from the La Sal Mines Complex are permitted under an Industrial Stormwater permit for construction activities as required by the Clean Water Act and associated state and federal water pollution control laws. A Stormwater Pollution Prevention Plan for the La Sal Mines Complex is in place at the mines, and stormwater pollution control facilities are in place and operating at the mines (Denison 2010).

3.2 SOILS

A description of the soils in the project area is included in this BAE in order to assess if habitat requirements for listed species are present in the project area and any impacts that may affect those species. The proposed disturbed areas of the phased mineral exploration include many major soil map units as determined by the NRCS Soil Conservation Service (NRCS 2011). Phase 1 operations may occur within 11 soil map units, Phase 2 operations may occur within six soil map units, and Phase 3 operations may occur within 10 soil map units. The exact locations of vent holes will be variable, as they are heavily dependent on the specific location and geometry of ore delineated underground.

The following sections below briefly outline the various soil types that may be affected during each phase of the project.

3.2.1 Phase 1 Amendments (2011 through 2013)

The soil types listed in Table 4 were identified to occur in areas where proposed vent holes may be placed during future mine development activities.

Table 4. Soil Types in Phase 1 of the Project Area

Map Unit Name (Map Unit)	Setting/Slope	Parent Material	Depth to Restrictive Layer
Canyonlands Area, Utah – Parts of Grand County and San Juan County (UT633)			
Bond-Rizno fine sandy loams (#14)	Structural benches/ 3%–15%	Eolian deposits derived from sandstone	10 to 20 inches
	Cuestas/3%–15%	Eolian deposits over residuum weathered from sandstone and shale	4 to 20 inches
Falcon fine sandy loam (#24)	Cuestas, structural benches/8%–15%	Residuum weathered from sandstone	10 to 20 inches
Sedillo very stony fine sandy loam (#78)	Alluvial fans/3%–8%	Alluvium derived from igneous and sedimentary rock and/or colluviums derived from igneous and sedimentary rock	More than 80 inches
Shalako-Anasazi-Rock outcrop (#79)	Cuestas/3%–15%	Residuum weathered from sandstone	10 to 20 inches
	Cuestas/3%–15%	Eolian deposits derived from sandstone	20 to 40 inches
	Ledges on cuestas	—	—
Tukuhnik loam (# 96)	Cuestas, structural benches/3%–10%	Alluvium derived from sandstone and siltstone and/or shale	40 to 60 inches
Ustic Torriorthents-Ustollic Calciothids (#100)	Landslides on escarpments/10%–60%	Colluvium derived from sandstone and shale	20 to 79 inches
	Escarpments/10%–40%	Colluvium derived from sandstone and shale	20 to 79 inches
Ustic Torriorthents-Ustollic Haplargids (#101)	Landslides on escarpments/10%–60%	Colluvium derived from sandstone and shale	20 to 79 inches
	Landslides on escarpments/10%–40%	Colluvium derived from sandstone	20 to 79 inches
Waas very fine sandy loam (#102)	Alluvial fans, cuestas, structural benches/ 2%–8%	Eolian deposits derived from sandstone	More than 80 inches
San Juan Area, Utah (UT639)			
Montvale very rocky very fine sandy loam (MvG)	Plateaus/2%–25%	Eolian deposits derived from sandstone over colluviums and/or residuum weathered from sandstone	10 to 20 inches
Scorup very fine sandy loam (SnC)	Fan remnants, stream terraces/2%–6%	Alluvium derived from igneous rock	40 to 60 inches
Scorup cobbly very fine sandy loam (SnGC)	Stream terraces, fan remnants/2%–25%	Alluvium derived from igneous rock	40 to 60 inches

3.2.2 Phase 2 Amendments (2014 through 2018)

The soil types listed in Table 5 were identified to occur in areas where proposed vent holes may be placed during future mine development activities.

Table 5. Soil Types in Phase 2 of the Project Area

Map Unit Name (Map Unit)	Setting/Slope	Parent Material	Depth to Restrictive Layer
Canyonlands Area, Utah – Parts of Grand County and San Juan County (UT633)			
Bond-Rizno fine sandy loams (#14)	Structural benches/ 3%–15%	Eolian deposits derived from sandstone	10 to 20 inches
	Cuestas/3%–15%	Eolian deposits over residuum weathered from sandstone and shale	4 to 20 inches
Falcon fine sandy loam (#24)	Cuestas, structural benches/8%–15%	Residuum weathered from sandstone	10 to 20 inches
Ustic Torriorthents-Ustollic Haplargids (#101)	Landslides on escarpments/10%–60%	Colluvium derived from sandstone and shale	20 to 79 inches
	Landslides on escarpments/10%–40%	Colluvium derived from sandstone	20 to 79 inches
Waas very fine sandy loam (#102)	Alluvial fans, cuestas, structural benches/ 2%–8%	Eolian deposits derived from sandstone	More than 80 inches
San Juan Area, Utah (UT639)			
Scorup very fine sandy loam (SnC)	Fan remnants, stream terraces/2%–6%	Alluvium derived from igneous rock	40 to 60 inches
Scorup cobbly very fine sandy loam (SnGC)	Stream terraces, fan remnants/2%–25%	Alluvium derived from igneous rock	40 to 60 inches

3.2.3 Phase 3 Amendments (2019 through 2030)

The following soil types listed in Table 6 were identified to occur in areas where proposed vent holes may be placed during future mine development activities.

Table 6. Soil Types in Phase 3 of the Project Area

Map Unit Name (Map Unit)	Setting/Slope	Parent Material	Depth to Restrictive Layer
Canyonlands Area, Utah – Parts of Grand and San Juan Counties (UT633)			
Barnum loam (#3)	Alluvial flats/0 to 3%	Alluvium derived from sandstone	More than 80 inches
Bond-Rizno fine sandy loams (#14)	Structural benches/ 3%–15%	Eolian deposits derived from sandstone	10 to 20 inches
	Cuestas/3%–15%	Eolian deposits over residuum weathered from sandstone and shale	4 to 20 inches
Cahona fine sandy loam (#19)	Cuestas, structural benches/2%–8%	Eolian derived from sandstone	More than 80 inches
Rock outcrop-Rizno Complex (#74)	Cliffs on cuestas, ledges on cuestas, escarpments on cuestas	—	—
	Structural benches, hogbacks, escarpments on cuestas/3%–15%	Eolian deposits over residuum weathered from sandstone and shale	4 to 20 inches
Shalako-Anasazi-Rock outcrop (#79)	Cuestas/3%–15%	Residuum weathered from sandstone	10 to 20 inches
	Cuestas/3%–15%	Eolian deposits derived from sandstone	20 to 40 inches
	Ledges on cuestas	—	—
Ustic Torriorthents-Ustollic Calciothids (#100)	Landslides on escarpments/10%–60%	Colluvium derived from sandstone and shale	20 to 79 inches
	Escarpments/10%–40%	Colluvium derived from sandstone and shale	20 to 79 inches
Ustic Torriorthents-Ustollic Haplargids (#101)	Landslides on escarpments/10%–60%	Colluvium derived from sandstone and shale	20 to 79 inches
	Landslides on escarpments/10%–40%	Colluvium derived from sandstone	20 to 79 inches
San Juan Area, Utah (UT639)			
Monticello very fine sandy loam (MnDL)	Plateaus/2%–10%	Eolian deposits derived from sandstone	More than 80 inches

Map Unit Name (Map Unit)	Setting/Slope	Parent Material	Depth to Restrictive Layer
Canyonlands Area, Utah – Parts of Grand and San Juan Counties (UT633)			
Montvale very rocky very fine sandy loam (MvG)	Plateaus/2%–25%	Eolian deposits derived from sandstone over colluviums and/or residuum weathered from sandstone	10 to 20 inches
Scorup very fine sandy loam (SnC)	Fan remnants, stream terraces/2%–6%	Alluvium derived from igneous rock	40 to 60 inches
Scorup cobbly very fine sandy loam (SnGC)	Stream terraces, fan remnants/2%–25%	Alluvium derived from igneous rock	40 to 60 inches

3.3 VEGETATION

The vegetation within the project area varies with topography, elevation, and geology. Twelve vegetation cover types exist within the project area, according to SWReGAP data (USGS 2004). The eastern portion of the project area is primarily composed of piñon-juniper woodland (Colorado Plateau Piñon-Juniper Woodland). The western portion is primarily composed of sagebrush (Inter-Mountain Basins Big Sagebrush Shrubland) (USGS 2004). Descriptions of all the vegetation cover types found within the project area are listed below. These descriptions were derived from the SWReGAP definitions of each vegetation cover type (USGS 2004). These cover types have not been ground-truthed and may differ from actual vegetation within the project area.

3.3.1 Agriculture

This vegetation cover type is an aggregation of the Pasture/Hay cover type and the Cultivated Crops cover type. The Pasture/Hay cover type is defined as areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle, where pasture/hay vegetation accounts for greater than 20% of total vegetation. The Cultivated Crops cover type is defined as areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards, where crop vegetation accounts for greater than 20% of total vegetation.

3.3.2 Colorado Plateau Mixed Bedrock Canyon and Tableland

The distribution of this ecological system is centered on the Colorado Plateau where it comprises barren and sparsely vegetated landscapes (generally <10% plant cover) of steep cliff faces, narrow canyons, and open tablelands of predominantly sedimentary rocks, such as sandstone, shale, and limestone. Some eroding shale layers similar to Inter-Mountain Basins Shale Badland may be interbedded between the harder rocks. The vegetation is characterized by very open tree canopy or scattered trees and shrubs with a sparse herbaceous layer. Common species include two-needle piñon (*Pinus edulis*), Ponderosa pine (*Pinus ponderosa*),

Juniper (*Juniperus* spp.), littleleaf mountain mahogany (*Cercocarpus intricatus*), and other short-shrub and herbaceous species, utilizing moisture from cracks and pockets where soil accumulates.

3.3.3 Colorado Plateau Piñon-Juniper Shrubland

This ecological system is characteristic of the rocky mesatops and slopes on the Colorado Plateau and Western Slope of Colorado, but these stunted tree shrublands may extend farther upslope along the low-elevation margins of taller piñon-juniper woodlands. This vegetation cover type is drier than Colorado Plateau Piñon-Juniper Woodland. Substrates are shallow/rocky and shaley soils at lower elevations (3,900–6500 feet amsl). Sparse examples of the system grade into Colorado Plateau Mixed Bedrock Canyon and Tableland. The vegetation is dominated by dwarfed (usually <10 feet tall) piñon pine (*Pinus edulis*) and/or Utah juniper (*Juniperus osteosperma*) trees forming extensive tall shrublands in the region along low-elevation margins of piñon-juniper woodlands. Other shrubs, if present, may include black sagebrush (*Artemisia nova*), Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), or blackbrush (*Coleogyne ramosissima*). Herbaceous layers are sparse to moderately dense and typically composed of xeric graminoids.

3.3.4 Colorado Plateau Piñon-Juniper Woodland

This ecological system occurs in dry mountains and foothills of the Colorado Plateau region including the Western Slope of Colorado to the Wasatch Range, south to the Mogollon Rim of Arizona and east into the northwestern corner of New Mexico. It is typically found at lower elevations ranging from 4,900 to 8,000 feet amsl. These woodlands occur on warm, dry sites on mountain slopes, mesas, plateaus, and ridges. Severe climatic events occurring during the growing season, such as frosts and drought, are thought to limit the distribution of piñon-juniper woodlands to relatively narrow altitudinal belts on mountainsides. Soils supporting this system vary in texture ranging from stony, cobbly, gravelly sandy loams to clay loam or clay. Piñon pine and/or Utah juniper dominate the tree canopy. In the southern portion of the Colorado Plateau in northern Arizona and northwestern New Mexico, one-seed juniper (*Juniperus monosperma*) and hybrids of juniper may dominate or codominate the tree canopy. Rocky Mountain juniper (*Juniperus scopulorum*) may codominate or replace Utah juniper at higher elevations. Understory layers are variable and may be dominated by shrubs, graminoids, or be absent. Associated species include greenleaf manzanita (*Arctostaphylos patula*), big sagebrush (*Artemisia tridentata*), littleleaf mountain mahogany, mountain mahogany (*Cercocarpus montanus*), blackbrush, Stansbury cliffrose (*Purshia stansburiana*), antelope bitterbrush (*Purshia tridentata*), Gambel oak (*Quercus gambelii*), blue grama (*Bouteloua gracilis*), James' galleta (*Pleuraphis jamesii*), or muttongrass (*Poa fendleriana*). This system occurs at higher elevations than Great Basin Piñon-Juniper Woodland and Colorado Plateau shrubland systems where sympatric.

3.3.5 Developed, Medium–High Intensity

Developed, Medium Intensity includes areas with a mixture of constructed materials and vegetation. Impervious surface accounts for 50% to 79% of the total cover. These areas most commonly include single-family housing units. Developed, High Intensity includes highly

developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses, and commercial/industrial areas. Impervious surfaces account for 80% to 100% of the total cover.

3.3.6 Inter-Mountain Basins Big Sagebrush Shrubland

This ecological system occurs throughout much of the western United States, typically in broad basins between mountain ranges, plains, and foothills between 4,900 and 7,500 feet amsl. Soils are typically deep, well-drained and non-saline. These shrublands are dominated by basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) and/or Wyoming big sagebrush. Scattered juniper, greasewood (*Sarcobatus vermiculatus*), and saltbush (*Atriplex* spp.) may be present in some stands. Rubber rabbitbrush (*Ericameria nauseosa*), yellow rabbitbrush, antelope bitterbrush, or mountain snowberry (*Symphoricarpos oreophilus*) may codominate disturbed stands. Perennial herbaceous components typically contribute less than 25% vegetative cover. Common graminoid species include Indian ricegrass (*Achnatherum hymenoides*), blue grama (*Bouteloua gracilis*), thickspike wheatgrass (*Elymus lanceolatus*), Idaho fescue (*Festuca idahoensis*), needle and thread grass (*Hesperostipa comata*), basin wildrye (*Leymus cinereus*), James' galleta, western wheatgrass (*Pascopyrum smithii*), Sandberg bluegrass (*Poa secunda*), or bluebunch wheatgrass (*Pseudoroegneria spicata*).

3.3.7 Inter-Mountain Basins Montane Sagebrush Steppe

This ecological system includes sagebrush communities occurring at montane and subalpine elevations across the western United States from 3,250 feet amsl in eastern Oregon and Washington to over 9,750 feet amsl in the southern Rocky Mountains. Climate is cool, semi-arid to subhumid. This system primarily occurs on deep-soiled to stony flats, ridges, nearly flat ridgetops, and mountain slopes. In general this system shows an affinity for mild topography, fine soils, and some source of subsurface moisture. It is composed primarily of sagebrush (*Artemisia* spp.). Antelope bitterbrush may codominate or even dominate some stands. Other common shrubs include snowberry (*Symphoricarpos* spp.), serviceberry (*Amelanchier* spp.), rubber rabbitbrush, wild crab apple (*Peraphyllum ramosissimum*), wax currant (*Ribes cereum*), and yellow rabbitbrush. Most stands have an abundant perennial herbaceous layer (over 25% cover), but this system also includes mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) shrublands. Common graminoids include Arizona fescue (*Festuca arizonica*), Idaho fescue, needle and thread graass, muttongrass, slender wheatgrass (*Elymus trachycaulus*), California brome (*Bromus carinatus*), Sandberg bluegrass, spike fescue (*Leucopoa kingii*), tufted hairgrass (*Deschampsia caespitosa*), pinegrass (*Calamagrostis rubescens*), and bluebunch wheatgrass. In many areas, frequent wildfires maintain an open herbaceous-rich steppe condition, although at most sites, shrub cover can be unusually high for a steppe system (>40%), with the moisture providing equally high grass and forb cover.

3.3.8 Rocky Mountain Cliff and Canyon

This ecological system of barren and sparsely vegetated landscapes (generally <10% plant cover) is found from foothill to subalpine elevations on steep cliff faces, narrow canyons, and smaller rock outcrops of various igneous, sedimentary, and metamorphic bedrock types. It is located throughout the Rocky Mountains and northeastern Cascade Ranges in North America.

Also included are unstable scree and talus slopes that typically occur below cliff faces. There may be small patches of dense vegetation, but it typically includes scattered trees and/or shrubs. Characteristic trees includes species from the surrounding landscape, such as Douglas-fir (*Pseudotsuga menziesii*), ponderosa pine, limber pine (*Pinus flexilis*), quaking aspen (*Populus tremuloides*), white fir (*Abies concolor*), corkbark fir (*Abies lasiocarpa*), or two-needle piñon and juniper at lower elevations. There may be scattered shrubs present, such as species of oceanspray (*Holodiscus* sp.), gooseberry (*Ribes* sp.), ninebark (*Physocarpus* sp.), rose (*Rosa* sp.), and juniper (*Juniperus* sp.), as well as fivepetal cliffbush (*Jamesia americana*), creeping barberry (*Mahonia repens*), threeleaf sumac (*Rhus trilobata*), or alderleaf serviceberry (*Amelanchier alnifolia*). Soil development is limited, as is herbaceous cover.

3.3.9 Rocky Mountain Gambel Oak-Mixed Montane Shrubland

This ecological system occurs in the mountains, plateaus and foothills in the southern Rocky Mountains and Colorado Plateau including the Uinta and Wasatch ranges and the Mogollon Rim. These shrublands are most commonly found along dry foothills, lower mountain slopes, and at the edge of the western Great Plains from approximately 6,560 to 9,500 feet amsl in elevation, and are often situated above piñon-juniper woodlands. Substrates are variable and include soil types ranging from calcareous, heavy, fine-grained loams to sandy loams, gravelly loams, clay loams, deep alluvial sand, or coarse gravel. The vegetation is typically dominated by Gambel oak alone or codominant with Saskatoon serviceberry (*Amelanchier alnifolia*), Utah serviceberry (*Amelanchier utahensis*), big sagebrush, alderleaf mountain mahogany (*Cercocarpus montanus*), chokecherry (*Prunus virginiana*), Stansbury cliffrose, antelope bitterbrush, New Mexico locust (*Robinia neomexicana*), and snowberry. There may be inclusions of other mesic montane shrublands with Gambel oak absent or as a relatively minor component. This ecological system intergrades with the lower montane-foothills shrubland system and shares many of the same site characteristics. Density and cover of Gambel oak and serviceberry often increase after fire.

3.3.10 Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland

This is a highly variable ecological system of the montane zone of the Rocky Mountains. It occurs throughout the southern Rockies, north and west into Utah, Nevada, western Wyoming and Idaho. These are mixed-conifer forests occurring on all aspects at elevations ranging from 3,900 to 10,800 feet amsl. Rainfall averages less than 30 inches per year (15–24 inches) with summer "monsoons" during the growing season contributing substantial moisture. The composition and structure of overstory is dependent upon the temperature and moisture relationships of the site, and the successional status of the occurrence. Douglas-fir and white fir (*Abies concolor*) are most frequent, but Ponderosa pine may be present to codominant. Douglas-fir forests occupy drier sites, and Ponderosa pine is a common codominant. White fir–dominated forests occupy cooler sites, such as upper slopes at higher elevations, canyon sideslopes, ridgetops, and north- and east-facing slopes which burn somewhat infrequently. Blue spruce (*Picea pungens*) is most often found in cool, moist locations, often occurring as smaller patches within a matrix of other associations. As many as seven conifers can be found growing in the same occurrence, and there are a number of cold-deciduous shrub and graminoid species common, including Kinnikinnick (*Arctostaphylos uva-ursi*), Oregon grape (*Mahonia repens*), mountain lover (*Paxistima myrsinites*), mountain snowberry, Gambel oak,

and Arizona fescue. This system was undoubtedly characterized by a mixed severity fire regime in its "natural condition," characterized by a high degree of variability in lethality and return interval.

3.3.11 Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland

These are mixed-conifer forests of the Rocky Mountains west into the ranges of the Great Basin, occurring predominantly in cool ravines and on north-facing slopes. Elevations range from 3,900 to 10,800 feet amsl. Occurrences of this system are found on cooler and more mesic sites than Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland. Such sites include lower and middle slopes of ravines, along stream terraces, moist, concave topographic positions and north- and east-facing slopes which burn somewhat infrequently. Douglas-fir and white fir are most common canopy dominants, but Engelmann spruce (*Picea engelmannii*), blue spruce, or Ponderosa pine may be present. This system includes mixed conifer/quaking aspen stands. A number of cold-deciduous shrub species can occur. Naturally occurring fires are of variable return intervals, and mostly light, erratic, and infrequent due to the cool, moist conditions.

3.3.12 Southern Rocky Mountain Ponderosa Pine Woodland

This very widespread ecological system is most common throughout the cordillera of the Rocky Mountains, from the Greater Yellowstone region south. It is also found in the Colorado Plateau region, west into scattered locations in the Great Basin, and in the Black Hills of South Dakota and Wyoming. These woodlands occur at the lower treeline/ecotone between grassland or shrubland and more mesic coniferous forests typically in warm, dry, exposed sites. Elevations range from less than 6,200 feet amsl in northern Wyoming to 9,200 feet amsl in the New Mexico mountains. Occurrences are found on all slopes and aspects; however, moderately steep to very steep slopes or ridgetops are most common. This ecological system generally occurs on igneous, metamorphic, and sedimentary material derived soils, with characteristic features of good aeration and drainage, coarse textures, circumneutral to slightly acid pH, an abundance of mineral material, rockiness, and periods of drought during the growing season. Northern Rocky Mountain Ponderosa Pine Woodland in the eastern Cascades, Okanagan and northern Rockies regions receives winter and spring rains, and thus has a greater spring "green-up" than the drier woodlands in the central Rockies. Ponderosa pine (primarily var. *scopulorum* and var. *brachyptera*) is the predominant conifer; Douglas-fir, two-needle piñon, and Juniper may be present in the tree canopy. The understory is usually shrubby, with black sagebrush, big sagebrush, greenleaf Manzanita, kinnikinnick, alderleaf mountain mahogany, Stansbury cliffrose, antelope bitterbrush, Gambel oak, mountain snowberry, chokecherry, Saskatoon serviceberry, and rose as the common species. Bluebunch wheatgrass and species of needle and thread, needlegrass (*Achnatherum* spp.), fescue, muhly (*Muhlenbergia* spp.), and grama (*Bouteloua* spp.) are some of the common grasses. Mixed fire regimes and ground fires of variable return intervals maintain these woodlands, depending on climate, degree of soil development, and understory density.

3.4 SPECIES EVALUATION

3.4.1 Federally Listed Species

SWCA conducted research to identify threatened, endangered, candidate, and petitioned species listed by the USFWS that are known to, or have the potential to, occur in San Juan County, Utah (Table 7). Ten species are listed as threatened or endangered, two species are listed as candidate, and two species are listed as petitioned. Species accounts with habitat requirements are provided immediately following Table 7. In the professional opinion of SWCA, none of the 14 federally listed species have the potential to occur in the project area.

Table 7. USFWS Listed and Candidate Species that are Known to Occur or Have the Potential to Occur in San Juan County, Utah

Common Name *Scientific Name*	Federal Status	Potential to Occur in the Project Area	Determination of Effect
Mammals			
Black-footed ferret *Mustella nigripes*	Endangered*	Unlikely to Occur	No Effect
Birds			
California condor *Gymnogys californianus*	Endangered*	Unlikely to Occur	No Effect
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	Candidate	Unlikely to Occur	No Effect
Gunnison sage-grouse *Centrocercus minimus*	Candidate	Unlikely to Occur	No Effect
Mexican spotted owl *Strix occidentalis lucida*	Threatened	Unlikely to Occur	No Effect
Southwestern willow flycatcher *Empidonax traillii extimus*	Endangered	Unlikely to Occur	No Effect
Fish			
Colorado pikeminnow *Ptychocheilus lucius*	Endangered	Unlikely to Occur	No Effect
Razorback sucker *Xyrauchen texanus*	Endangered	Unlikely to Occur	No Effect
Humpback chub *Gila cypha*	Endangered	Unlikely to Occur	No Effect
Greenback cutthroat trout *Oncorhychus clarki stomias*	Threatened	Unlikely to Occur	No Effect
Bonytail *Gila elegans*	Endangered	Unlikely to Occur	No Effect
Amphibians			
Northern leopard frog *Rana pipiens*	Petitioned	Unlikely to Occur	No Effect
Plants			
Isley's milkvetch *Astragalus isleyi*	Petitioned	Unlikely to Occur	No Effect

Common Name ***Scientific Name***	**Federal Status**	**Potential to Occur in the Project Area**	**Determination of Effect**
Navajo sedge *Carex specuicola*	Threatened	Unlikely to Occur	No Effect

Source: USFWS (2011a)
* Experimental population, non-essential

3.4.1.1 Mammals

3.4.1.1.1 Black-footed Ferret (Mustela nigripes)

The black-footed ferret is listed as endangered by the USFWS, with non-essential experimental status given to reintroduced populations (USFWS 2011a). Black-footed ferrets are inhabitants of prairie dog towns. Individuals have been released at several sites in the western United States, including the Coyote Basin area of Uintah County, Utah, in late 1999. In addition to this reintroduced population, unconfirmed sightings of naturally occurring ferrets persist throughout eastern Utah (Utah Conservation Data Center [UCDC] 2011). Historical range for the black-footed ferret exists in San Juan County. No critical habitat rules have been published for the black-footed ferret (USFWS 2011a). It is unlikely that the black-footed ferret would occur in the project area due to its scarcity.

3.4.1.2 Birds

3.4.1.2.1 California Condor (Gymnogys californianus)

The California condor is a federally listed species, with non-essential experimental status given to re-introduced populations (USFWS 2011a). In Utah, sightings were historically rare, noted only twice by pioneers in the 1800s, but sightings of birds that were released in northern Arizona have been made almost statewide since the late 1990s (UCDC 2011). Condors are extending the length of time they spend in areas away from the release site and are ever more proficient in finding carrion. A number of birds traveled in summer 2006 to Utah to reside in the hills just outside Zion National Park. Condors prefer mountains, gorges, and hillsides, which create updrafts, thus providing favorable soaring conditions (UCDC 2011). Critical habitat has not been designated for the California condor in San Juan County (USFWS 2011a). No habitat for the California condor exists within the project area.

3.4.1.2.2 Western Yellow-billed Cuckoo (Coccyzus americanus occidentalis)

The western yellow-billed cuckoo is listed as a candidate species by the USFWS (2011a) and is protected under the MBTA. This species breeds in riparian woodlands and similar habitats at lower (2,800–5,500 feet amsl) to middle (5,000–7,500 feet amsl) elevations. Historically, cuckoos were probably common to uncommon summer residents in Utah. The current distribution of yellow-billed cuckoos in Utah is poorly understood, though they appear to be an extremely rare breeder in lowland riparian habitats statewide (Parrish et al. 1999; UCDC 2011). The greatest factors affecting the yellow-billed cuckoo have been the invasion of exotic woody plants into southwest riparian systems and the clearing of riparian woodlands for agriculture, fuel, development, and attempts at water conservation (Howe 1986). There are no dense riparian thickets in or adjacent to the project area to support this species.

3.4.1.2.3 Gunnison Sage-grouse (Centrocercus minimus)

The Gunnison sage-grouse is listed as a candidate species by the USFWS (2011a) and is protected under the MBTA. The Gunnison sage-grouse uses a variety of habitats throughout the year but the primary component necessary is sagebrush, especially big sagebrush. Sagebrush is used for hiding from predators and thermal cover as well as for food in the winter. From mid-March to early June males will display on leks, which are open areas with good visibility (for predator detection) and acoustics (for transmission of male display sounds). After mating, females will select nest sites, typically in relatively tall and dense stands of sagebrush from 600 feet to 5 miles from the leks. Nest sites also have grass and forbs that provide additional hiding cover. Females with young remain in sagebrush uplands if hiding cover is adequate and if food (succulent forbs and insects) is available. As chicks mature and vegetation in the uplands desiccates, females will move their broods to wet meadow areas that retain succulent forbs and insects through the summer. Preferred wet meadow areas also contain tall grasses for hiding and sagebrush stands at least 500 feet wide along the periphery for hiding and foraging. From mid-September into November all individuals use upland areas with 20% or greater sagebrush cover and some green forbs. As winter progresses, individuals forage in tall sagebrush in valleys and lower flat areas and roost in shorter sagebrush along ridge tops. Roosting and foraging is typically restricted to south- or west-facing slopes where snow is typically shallower and less extensive (NatureServe 2010). Sagebrush-dominated habitat does exist within the project area. However, the known distribution of Gunnison sage-grouse is not within the project area. It is unlikely that Gunnison sage-grouse would occur in the project area.

3.4.1.2.4 Mexican Spotted Owl (Strix occidentalis lucida)

The Mexican spotted owl is federally listed as threatened by the USFWS (2011a) and is protected under the MBTA. Mexican spotted owls are rare residents of southern and eastern Utah, residing in steep-walled canyons of the Colorado Plateau ecoregions and adjacent portions of the Utah Mountains ecoregion (Howe 1998). Primary Mexican spotted owl habitat consists of mixed conifer dominated by Douglas-fir, pine, or true fir (*Abies*) and pine–oak forests. Secondarily selected habitats include such features as steep, narrow canyons with cliffs and a perennial water source. The Mexican spotted owl strongly selects for contiguous forests composed of old-growth or forests that have a more complex structure than surrounding forests (Gutiérrez et al. 1995). The nearest critical habitat for the Mexican spotted owl is 7.5 miles west of the project area. No suitable habitat for this species exists in the project area.

3.4.1.2.5 Southwestern Willow Flycatcher (Empidonax traillii extimus)

The southwestern willow flycatcher is listed as endangered by the USFWS and is also protected under the MBTA (USFWS 2011a). The species is rare in southern Utah, with the Virgin River supporting most of the breeding flycatchers within the state (Sogge et al. 2003). The southwestern willow flycatcher breeds in riparian habitats along rivers, streams, and other wetlands. These habitats are typically dominated by cottonwoods (*Populus* spp.), often with an understory of small trees or tall shrubs and surface water nearby. No critical habitat for this species is designated in San Juan County (USFWS 2011a). The two nearest areas of critical habitat are along the Virgin River, which is 242 miles southwest of the project area, and along

the Rio Grande in New Mexico, which is 237 miles southeast of the project area (USFWS 2011b). No suitable habitat for the southwestern willow flycatcher exists in the project area.

3.4.1.3 Fish

3.4.1.3.1 Colorado Pikeminnow (Ptychocheilus lucius)

The Colorado pikeminnow is listed as endangered by the USFWS (2011a). It is an endemic fish species that once thrived in the Colorado River system. Dam installation and the introduction of non-native fish changed the river environment and put these fish at risk (Upper Colorado River Endangered Fish Recovery Program [UCREFRP] 2011). Critical habitat has been designated for the Colorado pikeminnow in San Juan County, 23 miles west of the project area (USFWS 2011b). No habitat for the Colorado pikeminnow exists within the project area.

3.4.1.3.2 Razorback Sucker (Xyrauchen texanus)

The razorback sucker is listed as endangered by the USFWS (2011a). It is an endemic fish species that once thrived in the Colorado River system. Dam installation and the introduction of non-native fish changed the river environment and put these fish at risk (UCREFRP 2011). Critical habitat has been designated for the razorback sucker in San Juan County, 23 miles west of the project area (USFWS 2011b). No habitat for the razorback sucker exists within the project area.

3.4.1.3.3 Humpback Chub (Gila cypha)

The humpback chub is listed as endangered by the USFWS (2011a). It lives primarily in canyons with swift currents and white water. Historically, it inhabited canyons of the Colorado River and four of its tributaries: the Green, Yampa, White, and Little Colorado rivers. Now, there are two populations near the Colorado/Utah border—one at Westwater Canyon in Utah and one in an area called Black Rocks, in Colorado (UCREFRP 2011). Flow alterations within historical habitat have changed the turbidity, temperature, and flow of the river, which has negatively impacted the species. Critical habitat has been designated for the humpback chub in San Juan County, 35 miles southwest of the project area (USFWS 2011b). No habitat for the humpback chub exists within the project area.

3.4.1.3.4 Greenback Cutthroat Trout (Oncorhynchus clarki stomias)

The greenback cutthroat trout is listed as threatened by the USFWS (2011a). This species inhabits cold-water streams and lakes with adequate stream spawning habitat present during spring. Field studies, however, have indicated that water temperatures averaging 46 degrees Fahrenheit (7.8 degrees Celsius) or below in July may have an adverse effect on greenback fry (young fish) survival and recruitment. In general, trout require different habitat types for different life stages: juvenile (protective cover and low velocity flow, as in side channels and small tributaries); spawning (riffles with clean gravels); over-winter (deep water with low velocity flow and protective cover); and adult (juxtaposition of slow water areas for resting and fast water areas for feeding, with protective cover from boulders, logs, overhanging vegetation or undercut banks). Both water quality and quantity are important. Greenbacks, like other cutthroat trout, generally require clear, cold, well-oxygenated water (USFWS 2011c). No critical habitat rules have been published for the greenback cutthroat trout (USFWS 2011a). No habitat for the greenback cutthroat trout exists within the project area.

3.4.1.3.5 Bonytail (Gila elegans)

The bonytail is listed as endangered by the USFWS (2011a).The bonytail is a rare fish originally native to the Colorado River system. The near extinction of the bonytail can be traced to flow regulation, habitat loss/alteration, and competition with/predation by exotic fishes. Efforts to re-establish the species are underway (UCDC 2011). Critical habitat has been designated for the humpback chub in San Juan County, 35 miles southwest of the project area. No habitat for the bonytail exists within the project area.

3.4.1.4 Amphibians

3.4.1.4.1 Northern Leopard Frog (Rana pipiens)

The northern leopard frog is currently petitioned to be listed as threatened by the USFWS (2011a). It is found throughout much of southern Canada, as well as in the northern Rocky Mountain and Intermountain areas of the United States. The northern leopard frog is fairly common in Utah, but some reports indicate that its numbers may be declining. This frog occurs in a variety of aquatic habitats, particularly near cattails and other aquatic vegetation, but it may be found foraging relatively far from water. During cold winter months, this species is inactive, and takes cover underwater or in damp burrows. Females lay eggs in the spring, typically on vegetation just below the surface of the water in areas exposed to sunlight. Adult northern leopard frogs eat a variety of small invertebrates, whereas tadpoles of the species generally eat algae, organic debris, and small invertebrates (UCDC 2011). Critical habitat has not been designated for the northern leopard frog (USFWS 2011a). The UCDC (2011) maps “substantial value” and “high value” habitat in the general vicinity of the project area. However, there is little surface water in the project area, so it is unlikely that the northern leopard frog will occur in the project area. See Appendix A for the surface water map.

3.4.1.5 Plants

3.4.1.5.1 Isley’s Milkvetch (Astragalus isleyi)

Isely’s milkvetch is currently petitioned to be listed as threatened by the USFWS (2011a). It is a narrowly restricted Utah endemic that occurs at few sites along the west slope of the La Sal Mountains near the border of San Juan and Grand counties. It is a perennial herb with an evident, characteristically red stem and large white flowers that bloom from (March) April to mid-May. Isely’s milkvetch grows on silty, sandy to gravelly clay slopes of seleniferous and gypsiferous soils, on substrates weathered from the Morrison, Paradox, or Mancos shale formations. It grows in piñon-juniper and desert shrub communities, at elevations ranging from 4,950 to 6,600 feet amsl (NatureServe 2011; UCDC 2011). There are several pockets of the Morrison formation within the project area. However, the known occurrences of Isley’s milkvetch are not near the project area, and the project area only narrowly overlaps its elevational range. Therefore, it is unlikely that Isley’s milkvetch will occur in the project area.

3.4.1.5.2 Navajo Sedge (Carex specuicola)

The Navajo sedge is listed as threatened by the USFWS (2011a). This plant occurs in the canyons of Kane and San Juan counties, Utah, and in immediately adjacent Coconino County, Arizona. A member of the sedge family, this species is a loosely tufted perennial, 10 to 16 inches tall, with grass-like leaves that droop downward. Its flowers, seen in late June and July, are arranged in spikes, two to four spikes per stem. Navajo sedge is restricted to seep, spring,

and hanging garden habitats in Navajo Sandstone, at elevations ranging from 3,800 to 6,000 feet amsl. Sheep grazing and groundwater pumping are the major threats to the species (UCDC 2011). No suitable habitat for the Navajo sedge exists within the project area due to its elevational range being below the elevation of the project area, and the lack of hanging garden habitat.

3.4.2 USFS Special Status Species

3.4.2.1 USFS Sensitive Species

The USFS Intermountain Region has identified 15 wildlife and plant species with sensitive species status. The species listed in Table 8 may occur on the Moab District of the Manti-La Sal National Forest.

Table 8. USFS Sensitive Species

Common Name ***Scientific Name***	**Habitat Associations**	**Potential to Occur in the Project Area**	**Determination of Effect**
Abajo peak draba *Draba abajoensis*	On steep rocks or under overhangs in the La Sal and Abajo mountains.	Unlikely to occur. The project area is not in the La Sal or Abajo mountains.	No impact.
Bald eagle *Haliaeetus leucocephalus*	Forages mainly in rivers and large lakes; in open country, typically close to water; nests in tall trees or cliffs.	May occur – this species is known to winter in the area from La Sal to Lisbon.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.
Bighorn sheep *Ovis canadensis*	Prefers rock outcrop habitats, preferably areas of low visibility in steep terrain.	Unlikely to occur. The project area is not in steep, rocky terrain suitable for bighorn sheep.	No impact.
Canyonlands lomatium *Lomatium latilobum*	Occurs in association with Entrada sandstone in piñon/juniper and desert shrub communities.	Unlikely to occur. Soil types in the project area do not meet the requirements for this species.	No impact.
Colorado River cutthroat and greenback trout *Oncorhynchus clarki pleuriticus* and *O. c. stomiua*	Now naturally occur only in isolated high-elevation headwater streams that drain into the upper Colorado River.	Unlikely to occur. Aquatic habitat suitable for these species does not occur in the project area.	No impact.
Flammulated owl *Otus flammeolus*	Common raptor in montane pine forests (especially ponderosa pine forests) in the western United States.	May occur. Ponderosa pine habitat is scattered throughout the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.

Common Name ***Scientific Name***	**Habitat Associations**	**Potential to Occur in the Project Area**	**Determination of Effect**
Greater sage-grouse *Centrocercus urophasianus*	Uses sagebrush-grassland habitats and nests on the ground.	Unlikely to occur. Suitable habitat for this species does not occur in the project area.	No impact.
Isely's milkvvetch *Astragalus iselyi*	West slope of the La Sal Mountains.	Unlikely to occur. The project area is outside of the known range for this species.	No impact.
La Sal daisy *Erigeron mancus*	Alpine endemic to the La Sal Mountains.	Unlikely to occur. The project area is not in alpine habitat in the La Sal mountains.	No impact.
Northern goshawk *Accipiter gentilis*	Prefers mature mountain forest and riparian zone habitats.	May occur. Suitable habitat for this species occurs in the project area. An active northern goshawk territory has been mapped in the Pine Ridge area of the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.
Peregrine falcon *Falco peregrinus anatum*	Found in a variety of habitats, mostly consisting of cliffs for nesting and open areas for foraging; also nests on buildings in urban areas.	May occur – suitable cliff faces or substantial rock outcroppings exist within the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.
Spotted bat *Euderma maculatum*	Found in dry, rough, desert terrain. Roosts are typically in rock crevices or under loose rocks or boulders.	May occur. Suitable habitat for this species occurs in the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.
Sweet-flowered rock-jasmine *Androsace chamaejasme carinata*	Mat-forming perennial species found in alpine tundra and talus communities on the top of the La Sal Mountains at elevations of 10,000 to 12,600 feet amsl.	Unlikely to occur. Alpine tundra and talus habitat does not occur in the project area.	No impact.
Three-toed woodpecker *Picoides tridactylus*	Coniferous forests with a significant percentage of dead trees.	Unlikely to occur. Suitable habitat for this species does not occur in the project area.	No impact.

Common Name ***Scientific Name***	**Habitat Associations**	**Potential to Occur in the Project Area**	**Determination of Effect**
Townsend's big-eared bat *Corynorhinus townsendii*	Roosts in abandoned mines and natural caverns.	May occur. Suitable woodland and forested areas occur within the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.

Of these species, six have the potential to occur in the project area: bald eagle (*Haliaeetus leucocephalus*), flammulated owl (*Otus flammeolus*), northern goshawk (*Accipiter gentilis*), peregrine falcon (*Falco peregrinus anatum*), spotted bat (*Euderma maculatum*), and the Townsend's big-eared bat (*Corynorhinus townsendii*).

3.4.2.2 Management Indication Species

In addition to USFS sensitive species, the Manti-La Sal National Forest recognizes MIS, which are identified in Table 9 below.

Table 9. Management Indicator Species for the Manti-La Sal National Forest

Common Name ***Scientific Name***	**Habitat Associations**	**Potential to Occur in the Project Area?**
Mule deer *Odocoileus hemionus*	All types of habitat within its range in the western half of the United States	Yes
Rocky Mountain elk *Cervus canadensis*	All types of habitat within its range in the western half of the United States	Yes
Abert's squirrel *Sciurus aberti*	Ponderosa pine	Yes
Golden eagle *Aquila chrysaetos*	Open hilly areas or with cliffs	Yes
Northern goshawk *Accipiter gentilis*	Primarily found in mature mountain forests and valley cottonwood habitats associated with riparian zones	Yes
Macroinvertebrates	All types of habitat within its range	No

3.4.2.2.1 Mule Deer (Odocoileus hemionus)

Mule deer habitat has been mapped by the Utah Division of Wildlife Resources (Appendix B:Figure B1). Crucial summer and winter habitat overlaps all three phases of the project area (UCDC 2011). Crucial habitats are those areas that wildlife depend on in order to avoid unacceptable population declines. The term 'crucial habitat' does not have any regulatory or legal meaning but it meant to better define those areas that are seasonally important to migrating animals. Tables 10, 11, and 12 quantify the acreage of mule deer habitat within

each Phase area, and provide a percentage of the total Phase area for each of the three Phases. Please also see Figure B1 in Appendix B.

Table 10. Mule Deer and Elk Habitat within Phase 1 Amendments

Species	Acreage	Percentage of Phase Area
Mule deer	927.6	100.0
Rocky Mountain elk	839.0	90.5
Total acreage	**927.6**	

Table 11. Mule Deer and Elk Habitat within Phase 2 Amendments

Species	Acreage	Percentage of Phase Area
Mule deer	970.4	100.0
Rocky Mountain elk	588.1	60.6
Total acreage	**970.4**	

Table 12. Mule Deer and Elk Habitat within Phase 3 Amendments

Species	Acreage	Percentage of Phase Area
Mule deer	738.5	100.0
Rocky Mountain Elk	223.9	30.3
Total acreage	**738.5**	

3.4.2.2.2 Rocky Mountain Elk (Cervus Canadensis)

Rocky Mountain elk habitat has been mapped by the Utah Division of Wildlife Resources. Crucial spring, fall, and winter habitat overlaps all three phases of the project area (UCDC 2011). Please see Tables 10–12 and Figure B2 in Appendix B.

3.4.2.2.3 Abert's Squirrel (Sciurus aberti)

In Utah, the species is very narrowly distributed, occurring only in the southeastern corner of the state, primarily in the Abajo Mountains and on Pine Ridge (UCDC 2011). Exact habitat location data are not provided for the Abert's squirrel by the Utah Division of Wildlife Resources. Barb Smith, of the Manti-La Sal National Forest, confirms that Abert's squirrel inhabit Pine Ridge (personal communication, June 23, 2011), which ovelaps all three phases of the project area.

3.4.2.2.4 Golden Eagle (Aquila chrysaetos) and Northern Goshawk (Accipiter gentilis)

Historical nest data were provided by the Manti-La Sal National Forest (personal communication, Barb Smith, June 9, 2011). There are three mapped golden eagle nests, and

one mapped northern goshawk nest, on Pine Ridge. This area overlaps the project area designated for Phases 1 and 3.

3.4.2.2.5 Macroinvertebrates

Aquatic macroinvertebrates live in a variety of riparian habitats where water is present. As a group, they provide a vital link in the food chain between primary producers (algae and macrophytes) and fish and amphibians. Many species are useful indicators of aquatic habitat conditions (USFS 1986, as amended). However, within the project area, there are no perennial streams. Surface water is mostly limited to ephermeral or intermittent streams. Therefore, macroinvertebrates will not likely occur in the project area.

3.4.3 BLM Sensitive Species and Utah State-Sensitive Species

Historically, the BLM in Utah based the list of wildlife species considered "sensitive" on the list developed by the State of Utah. Recently, however, the BLM has published its own list of sensitive wildlife species. However, the BLM and the State of Utah both list the same 17 wildlife species with potential to occur in the area managed by the BLM Moab Field Office, and these are analyzed together in Table 13. In addition, the BLM developed a sensitive plant species list in February 2011. These 12 species are analyzed in Table 14. Both of these lists were obtained via personal communication with Pam Riddle, wildlife biologist of the Moab Field Office on June 14, 2011.

Of these 17 BLM Sensitive Species and State of Utah wildlife species of concern, eight have the potential to occur in the La Sal Mines Complex project area. They include wintering bald eagles, big free-tailed bat, ferruginous hawk, fringed myotis, Gunnison's prairie dog, Lewis' woodpecker, spotted bat, and Townsend's big-eared bat. Although the area is not occupied by sage-grouse, it is considered suitable historical Gunnison sage-grouse habitat.

Eleven of the 12 plant species listed as sensitive by the BLM are unlikely to occur in the project area. One species, Beaman's townsendia (*Townsendia beamanii*), may occur in the project area.

Table 13. BLM Sensitive Species and Utah State-Sensitive Species for San Juan County, Utah

Common Name *Scientific Name*	Status	Habitat Associations	Potential to Occur in the Project Area	Determination of Effect
Allen's big-eared bat *Idionycteris phyllotis*	BLM: S Utah: SPC	Rocky and riparian areas in woodland and scrubland regions, roosts in caves or rock crevices in southern Utah.	Unlikely to occur. The project area is outside of the known range for this species.	No impact.
Bald eagle *Haliaeetus leucocephalus*	BLM: S Utah: SPC	Forages mainly in rivers and large lakes; in open country, typically close to water; nests in tall trees or cliffs.	May occur. This species is known to winter in the area from La Sal to Lisbon.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.
Big free-tailed bat *Nyctinomops macrotis*	BLM: S Utah: SPC	Inhabits rugged, rocky terrain and typically roost in rock crevices.	May occur. Suitable habitat exists within the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.
Bobolink *Dolichonyx oryzivorus*	BLM: S Utah: SPC	Restricted to wet meadow and flooded pasture habitats.	Unlikely to occur. Wet meadows do not occur in the project area.	No impact.
Burrowing owl *Athene cunicularia hypugaea*	BLM: S Utah: SPC	Lives in dry, open areas with no trees, short grass, and bare ground, often in association with prairie dog towns.	Unlikely to occur. The project area lacks suitable, open, short-grass habitat.	No impact.
Ferruginous hawk *Buteo regalis*	BLM: S Utah: SPC	Relies on grassland or shrub-steppe terrain and, in many parts of Utah, nests on the ecotone between these habitats and piñon-juniper woodlands.	May occur. Suitable habitat exists within the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.
Fringed myotis *Myotis thysanodes*	BLM: S Utah: SPC	Commonly roost in mine tunnels, caves, and buildings.	May occur. Suitable habitat exists within the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.

Common Name ***Scientific Name***	**Status**	**Habitat Associations**	**Potential to Occur in the Project Area**	**Determination of Effect**
Gunnison's sage-grouse *Centrocercus minimus*	BLM: CN Utah: CS	Uses sagebrush-grassland habitats and nests on the ground.	Unlikely to occur. The project area is outside of the known range for this species.	No impact.
Gunnison's prairie dog *Cynomys gunnisoni*	BLM: S	Inhabits grasslands, semidesert and montane shrublands.	May occur. Suitable habitat exists within the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.
Great Plains toad *Bufo cognatus*	BLM: S	Inhabits prairies and deserts. In addition to grasslands, it occurs in creosote bush scrub, mesquite woodlands, and desert riparian situations.	Unlikely to occur. The project area is not in suitable habitat for this species.	No impact.
Kit fox *Vulpes macrotis*	BLM: S Utah: SPC	A desert-adapted fox, it is found exclusively in arid and semi-arid landscapes with soils suitable for denning.	Unlikely to occur. The project area is not in desert habitat.	No impact.
Lewis' woodpecker *Melanerpes lewis*	BLM: S Utah: SPC	Habitat includes ponderosa pine and open riparian areas.	May occur. Suitable habitat exists within the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.
Long-billed curlew *Numenuis americanus*	BLM: S Utah: SPC	Nests in dry grasslands where sufficient cover and abundant prey exists.	Unlikely to occur. There are not abundant grasslands in the project area.	No impact.
Short-eared owl *Asio flammeus*	BLM: S Utah: SPC	Prefers open country and is ground-nesting species that occupies grasslands and tundra.	Unlikely to occur. There are not abundant grasslands and tundra in the project area.	No impact.
Spotted bat *Euderma maculatum*	BLM: S Utah: SPC	Found in dry, rough, desert terrain. Roosts are typically in rock crevices or under loose rocks or boulders.	May occur. Suitable habitat exists within the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.

Common Name *Scientific Name*	Status	Habitat Associations	Potential to Occur in the Project Area	Determination of Effect
Three-toed woodpecker *Picoides tridactylus*	BLM: S Utah: SPC	Coniferous forests with a significant percentage of dead trees.	Unlikely to occur. Suitable habitat exists within the project area.	No impact.
Townsend's big-eared bat *Corynorhinus townsendii*	BLM: S Utah: SPC	Roosts in abandoned mines and natural caverns.	May occur. Suitable habitat exists within the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.

Note: CN = BLM Candidate species; CS = Species receiving special management under a Conservation Agreement in order to preclude the need for federal listing; S = BLM Sensitive species; SPC = State of Utah wildlife species of concern

Table 14. BLM Sensitive Plant Species List for San Juan County, Utah

Common Name *Scientific Name*	Habitat Association	Potential to Occur in the Project Area	Determination of Effect
Cronquist's milkvetch *Astragalus cronquistii*	Low, sandy or gravelly ridges and sandy washes in blackbrush and salt desert shrub communities on sandstone or red sandstone of the Cutler and Morrison formations. 3935–5,000 feet amsl (NatureServe 2011).	Unlikely to occur. The elevational range for this species is below the elevation of the project area.	No impact.
Isley's milkvetch *Astragalus iselyi*	West slope of the La Sal Mountains (UCDC 2011) on seleniferous and gypsiferous soils derived from the Morrison (three locations) and Paradox (one location) formations at 5,000 to 6,600 feet amsl in piñon-juniper communities (NatureServe 2011).	Unlikely to occur. The project area is outside of the known range for this species.	No impact.
Pinnate spring-parsley *Cymopterus beckii*	A Utah endemic known from two disjunct areas approximately 75 miles removed from each other; one on the southwest slopes of the Abajo Mountains, San Juan County, and the other in Capitol Reef National Park, Wayne County. Sandy or stony crevices, ledges, and cliff bases on Navajo Sandstone in piñon-juniper, mountain brush, and ponderosa pine-manzanita conifer-oak, and Douglas-fir communities at 5,575–8,650 feet amsl (NatureServe 2011).	Unlikely to occur. The project area is outside of the known range of this species.	No impact.

Common Name ***Scientific Name***	**Habitat Association**	**Potential to Occur in the Project Area**	**Determination of Effect**
Canyonlands prairie-clover *Dalea flavescens* var. *epica*	Sandstone bedrock and sandy areas in blackbrush and mixed desert shrub communities between 4,700 and 5,000 feet amsl (Utah Rare Plant Guide [URPG] 2011).	Unlikely to occur. The elevational range for this species is below the elevation of the project area.	No impact.
Kachina daisy *Erigeron kachinensis*	Known from few sites in southeastern Utah. Low elevation seeps and hanging gardens to high elevation mesic sandstone outcrops in aspen and ponderosa pine communities, 5,250–8,200 feet amsl in saline soils (NatureServe 2011).	Unlikely to occur. The mining activities will not affect hanging gardens and sandstone outcrops.	No impact.
Bluff buckwheat *Eriogonum racemosum* var *nobile*	Known only from the type collection in San Juan County, Utah. *Atriplex-Populus* community in sand, at about 4, 250 feet amsl (URPG 2011).	Unlikely to occur. This species has only been found growing in sand, which is not a soil type found within the project area. Also, the elevational range for this species is below the elevation of the project area.	No impact.
Canyonlands lomatium *Lomatium latilobum*	On Entrada Sandstone and Navajo Sandstone, between fins and in slot canyons, in sandy soil and in crevices. Surrounding plant communities are desert shrub, piñon-juniper, or ponderosa pine-mountain brush. 4,050–7,240 feet amsl (NatureServe 2011).	Unlikely to occur. No slot canyons will be affected by the mining activities.	No impact.
Tuhyi's breadroot *Pediomelum aromaticum* var *tuhyi*	Piñon-juniper and mixed desert shrub communities on the Entrada, Kayenta, and Mossback formations, on rimrock or shallow sand, 5,600–6,500 feet amsl (URPG 2011).	Unlikely to occur. These geologic formations do not occur in the project area, and the range is slightly below the elevation of the project area.	No impact.
Alcove rockdaisy *Perityle specuicola*	Dry sites in alcoves, cliff bases, and narrow, protected canyons on Navajo Sandstone and Cedar Mesa sandstone formations, and in Permian limestone. Found within piñon-juniper, desert shrub, and hanging garden communities at 3,690–4,200 feet amsl (NatureServe 2011).	Unlikely to occur. The elevational range for this species is below the elevation of the project area.	No impact.

Common Name ***Scientific Name***	**Habitat Association**	**Potential to Occur in the Project Area**	**Determination of Effect**
Drab phacelia *Phacelia indecora*	Until 1998, known only from the type collection in Bluff, Utah, made in 1919, in a salt desert shrub community at about 4,500 feet amsl (NatureServe 2011).	Unlikely to occur. The elevational range for this species is below the elevation of the project area.	No impact.
Jane's globemallow *Sphaeralcea janeae*	Endemic to the Canyonlands section of Utah, along the Colorado and Green rivers in southwestern Grand, northwestern San Juan, and western Wayne counties. Restricted by soil type. Warm, salt, and mixed desert shrub communities on the Shinarump and Moenkopi formations and White Rim and Organ Rock members of the Cutler Formation. Frequently on sandy and gravelly soils of the weathered underlying formations, often on river benches and roadsides, from 3,940–4,600 feet amsl (NatureServe 2011).	Unlikely to occur. The elevational range for this species is below the elevation of the project area.	No impact.
Beaman's townsendia *Townsendia beamanii*	Endemic to San Juan County, found in piñon-juniper and ponderosa pine communities from 6,200–7,215 feet amsl (Welsh et al. 2008).	May occur. The elevational range and habitat associations for this species are found within the project area.	May impact individuals, but is not likely to result in a trend toward federal listing or loss of viability.

3.4.4 Summary

None of the 14 species listed by USFWS for San Juan County have the potential to occur in the project area. Six of the 15 species listed as USFS sensitive have the potential to occur in the project area. Eight of the 17 wildlife species listed as sensitive for the BLM Moab Field Office have the potential to occur in the project area, and these are also listed as species of concern by the State of Utah. Three of these species overlap between the BLM and USFS lists: bald eagle, spotted bat, and Townsend's big-eared bat. One of the 12 plant species listed as sensitive has potential to occur in the project area. All species with potential to occur in the project area are discussed further in Section 3.4.5. For the remaining listed species, the project area is either clearly beyond the known geographic or elevational range of these species, or it does not contain vegetation or landscape features known to support these species, or both.

3.4.4.1 Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

The MBTA (16 United States Code [USC] 703–712), Executive Order 121186 for migratory bird protection, and the BGEPA (16 USC 668–668d) establishes protections for migratory birds and their parts (e.g., eggs, nests, and feathers) from taking, hunting, capture, transport, sale, or purchase. Most species of birds are classified as migratory under the MBTA, except for upland game and introduced birds. Utah Partners in Flight (UPIF) has ranked those birds occurring in the Colorado Plateau physiographic region by priority of concern (Parrish et al. 2002). The following bird species are considered priority due to habitat availability surrounding the project area. Three priority species are identified by UPIF for piñon-juniper habitat: gray vireo (*Vireo vicinior*), black-throated gray warbler (*Dendroica nigrescens*), and ferruginous hawk (*Buteo regalis*). Two priority species are identified for shrub-steppe habitat: greater sage-grouse (*Centrocercus urophasianus*) and sage sparrow (*Amphispiza belli*). One priority species is identified for ponderosa pine habitat: Lewis' woodpecker (*Melanerpes lewis*). The potential exists for breeding birds protected by the MBTA to occur within the project area. In order to avoid impacts to potential nesting birds within the project area, removal of any vegetation should not take place during the breeding season (most migratory birds nest between May 15 and July 15, annually, but dates should be adjusted for the species and environmental conditions, according to regulatory agencies' determinations) or nest surveys should be conducted within a five-day window of vegetation removal to aid in nest avoidance. All vegetation removal would occur in one scheduled time frame before exploration drilling, road construction, and ventilation shaft construction commences. This would ensure that the bird surveys could be done five days prior to vegetation removal, and no nest building would occur after the survey has been completed.

The bald eagle and golden eagle are protected under the MBTA and the BGEPA. Like the MBTA, the BGEPA also prohibits the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export, or import of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit (16 USC 668(a); 50 CFR 22). "Take" includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb (16 USC 668[c]; 50 CFR 22.3). Bald eagles have been known to winter in the general vicinity of the project area. Three active golden eagle nests have been mapped in the Pine Ridge area of the project area (see Appendix B: Figure B3). Raptor management will be guided by *Best Management Practices for Raptors and Their Associated Habitats in Utah* (BLM 2006) and *Utah Field Office Guidelines for Raptor Protection from Human and Land*

Use Disturbances (Romin and Muck 2002). If construction is scheduled between the dates of January 1 and September 31, raptor surveys will be required prior to construction. Field surveys will be conducted as determined by the authorized officer of BLM or the USFS as applicable. Based on the result of the field survey, the authorized officer will determine if appropriate buffers and timing limitations are necessary. The recommendation for the bald eagle is a 1-mile spatial buffer from January 1 to August 31, annually. The recommendation for the northern goshawk is a 0.5-mile spatial buffer from March 1 to August 15, annually. The recommendation for the golden eagle is a 0.5-mile spatial buffer from January 1 to August 31, annually (BLM 2006; Romin and Muck 2002).

3.4.5 Species Descriptions and Determinations of Effect

3.4.5.1 Bald Eagle (*Haliaeetus leucocephalus*)

Habitat and Range Requirements. The bald eagle is listed as USFS sensitive, BLM sensitive, and as a State of Utah species of concern. It is also protected by the MBTA and the BGEPA. Throughout the breeding range of this species, which includes Alaska, Canada, the coastal United States, and portions of the northern United States, nests are almost always in tall trees and commonly near bodies of water where fish and waterfowl prey are available. During non-breeding periods, especially during winter, bald eagles are relatively social and roost communally in sheltered stands of trees. Wintering areas are commonly associated with open water, though other habitats may be used if food resources, such as rabbit or deer carrion, are readily available. In general, bald eagles avoid areas with nearby human activity and development (UCDC 2011).

Habitat Evaluation and Suitability. The UCDC (2011) shows wintering bald eagle habitat surrounding the project area. There is no primary breeding habitat mapped in southeast Utah. Secondary prey species, such as mule deer, are available in the project area. Construction activities may have a negative impact on the species. Construction activity could also reduce the availability of prey in the area, which would further impact the bald eagle.

Determination of Effect. This proposed project may impact individual bald eagles, but it is not likely to result in a trend toward federal listing or loss of viability. If present, impacts to this species will be limited to temporary dispersals during construction activities. Field surveys will be conducted as determined by the authorized officer of BLM or the USFS as applicable. Based on the result of the field survey, the authorized officer will determine if appropriate buffers and timing limitations are necessary.

3.4.5.2 Beaman's Townsendia (*Townsendia beamanii*)

Habitat and Range Requirements. Beaman's townsendia is listed as a BLM sensitive species. It is endemic to San Juan County, and grows in piñon-juniper and ponderosa pine communities at 6,200 to 7,215 feet amsl. It is a stemless, perennial herb that grows in loose tufts. It is in the sunflower family (Asteraceae), and has yellow disc flowers and pink to lavender ray flowers (Welsh et al. 2008). The Flora of North America states: "Taxonomic disposition of *Townsendia beamanii* is not clear; the type may have resulted from hybridization between *T. annua* and *T. incana*" (Flora of North America 2011). However, Welsh et al. (2008) does recognize Beaman's townsendia as a species.

Habitat Evaluation and Suitability. Suitable habitat for Beaman's townsendia exists within the project area. The project area is within the elevational range for this species.

Determination of Effect. This proposed project may impact individuals of Beaman's townsendia, but it is not likely to result in a trend toward federal listing or loss of viability. If present, impacts to this species could include ground disturbance during drilling, vehicular travel, and other construction activities.

3.4.5.3 Big Free-tailed Bat (*Nyctinomops macrotis*)

Habitat and Range Requirements. The big free-tailed bat is a BLM sensitive species and a State of Utah species of concern. This species is rare in Utah, occurring primarily in the southern half of the state, although individuals may rarely occur in northern Utah. The big free-tailed bat prefers rocky and woodland habitats, where roosting occurs in caves, mines, old buildings, and rock crevices. The species is typically active year-round, spending summers in temperate North America and migrating to warmer areas in North America and South America for the winter. Big free-tailed bats eat insects, primarily moths. Females may give birth to a single offspring during late spring or early summer each year (UCDC 2011).

Habitat Evaluation and Suitability. Suitable foraging habitat exists in the piñon-juniper woodland portion of the project area. The UCDC shows "Substanial Value" habitat in the vicinity of the project area.

Determination of Effect. This proposed project may impact individuals of big free-tailed bat, but it is not likely to result in a trend toward federal listing or loss of viability. Impacts may include disturbance during periods of construction and a reduction in prey species due to vegetation removal. Bats roosting in mining shafts and adits may be exposed to radon. Screening of openings may prevent bats from entering shafts and adits. The surface pits created during drilling may contain water and other drilling additives. Bats may be attracted to these pits to obtain water and insects. If the water is polluted with other drilling additives, the surface pits may adversely affect bat species. The Denison Mine Bat Policy (June, 2009) will be utilized for this project and coordinated with BLM and USFS biologists.

3.4.5.4 Ferruginous Hawk (*Buteo regalis*)

Habitat and Range Requirements. The ferruginous hawk is a BLM sensitive species and a State of Utah Species of Concern. During breeding, flat and rolling terrain in grassland or shrub steppe is most often used. Ferruginous hawks avoid high elevations, forests, and narrow canyons, and its preferred habitat includes grasslands, agriculture lands, sagebrush/saltbush/greasewood shrub lands, and at the periphery of piñon-juniper forests. Because of a strong preference for elevated nest sites, cliffs, buttes, and creek banks are usually present. During winter, ferruginous hawks use open farmlands, grasslands, deserts, and other arid regions where lagomorphs, prairie dogs, or other major prey items are present (UCDC 2011).

Habitat Evaluation and Suitability. There is suitable nesting habitat for this hawk on hillsides, ledges, and trees within and around the project area. Suitable foraging habitat is

available within the sagebrush vegetation type within the project area. No historical nests have been mapped within the project area.

Determination of Effect. This proposed project may impact individuals of ferruginous hawk, but it is not likely to result in a trend toward federal listing or loss of viability. Impacts may include disturbance during periods of construction, and reduction in foraging area. If nest sites are discovered, the USFWS Utah Field Office recommends ceasing construction activities that cause noise or other disturbance for a 0.5-mile buffer from March 1 to August 1, annually for the ferruginous hawk (Romin and Muck 2002). Field surveys will be conducted as determined by the authorized officer of BLM or the USFS as applicable. Based on the result of the field survey, the authorized officer will determine if appropriate buffers and timing limitations are necessary.

3.4.5.5 Flammulated Owl (*Otus flammeolus*)

Habitat and Range Requirements. The flammulated owl is a USFS sensitive species. It is a common raptor in montane pine forests (especially ponderosa pine forests) in the western United States. This species migrates from its wintering grounds in central Mexico, the highlands of Central America, and coastal California to its breeding grounds across western North America. Breeding areas extend from southern British Columbia southward through the western United States, and into central Mexico. This species occurs in mountain ranges throughout Utah, but it is believed that breeding occurs primarily in southwestern and the north-central parts of the state. Individuals of this species are more likely to be heard than seen due to their small size (approximately 6 inches long) and elusive nature. The species is considered to be widespread, but loss of mature forest habitat may be having a detrimental effect on population numbers. Flammulated owls are strictly nocturnal and eat insects and other terrestrial invertebrates, such as spiders, centipedes, and scorpions. These owls often capture flying insects while in flight, but will also take prey items off trees or from the ground (UCDC 2011).

Habitat Evaluation and Suitability. There are scattered patches of ponderosa pine throughout the project area which provide suitable nesting and foraging habitat for the flammulated owl. The UCDC (2011) maps small patches of "Critical Value" habitat in the general vicinity of the project area.

Determination of Effect. This proposed project may impact individuals of flammulated owl, but it is not likely to result in a trend toward federal listing or loss of viability. The flammulated owl is not likely to breed in the project area, but foraging in ponderosa pine forests may be reduced. In addition, the surface pits created during drilling may contain water and other drilling additives. Owls may be attracted to these pits when preying on insects. If the water is polluted with other drilling additives, the surface pits may adversely affect the flammulated owl. Field surveys will be conducted as determined by the authorized officer of BLM or the USFS as applicable. Based on the result of the field survey, the authorized officer will determine if appropriate buffers and timing limitations are necessary.

3.4.5.6 Fringed Myotis (*Myotis thysanodes*)

Habitat and Range Requirements. The fringed myotis is a BLM sensitive species and a State of Utah Species of Concern. The fringed myotis is a small bat that occurs in most of the western United States, as well as in much of Mexico and part of southwestern Canada. The species is widely distributed throughout Utah, but is not very common in the state. The fringed myotis inhabits caves, mines, and buildings, most often in desert and woodland areas. Beetles are the main prey of the fringed myotis. The species commonly occurs in colonies of several hundred individuals (UCDC 2011).

Habitat Evaluation and Suitability. The UCDC (2011) maps "Substanial Value" and "High Value" habitat in the vicinity of the project area.

Determination of Effect. This proposed project may impact individuals of fringed myotis but it is not likely to result in a trend toward federal listing or loss of viability. Impacts may include disturbance during periods of construction and a reduction in prey species due to vegetation removal. Also, bats roosting in mining shafts and adits may be exposed to radon. Screening of openings may prevent bats from entering shafts and adits. The surface pits created during drilling may contain water and other drilling additives. Bats may be attracted to these pits to obtain water and insects. If the water is polluted with other drilling additives, the surface pits may adversely affect bat species. The Denison Mine Bat Policy (June, 2009) will be utilized for this project and coordinated with BLM and USFS biologists.

3.4.5.7 Gunnison's Prairie Dog (*Cynomys gunnisoni*)

Habitat and Range Requirements. The Gunnison's prairie dog is a BLM sensitive species and a State of Utah species of concern. Its range extends from central Colorado to central Arizona, including a small portion of southeastern Utah and much of the northwestern half of New Mexico. Its habitat includes high mountain valleys and plateaus at elevations of 6,000 to 12,000 feet amsl. It uses open grassland, sagebrush, and piñon-juniper woodland. Diet includes grasses, forbs, sedges, and shrubs. It lives in colonial burrows, usually on slopes or in hummocks. Colonies may consist of fewer than 50 to 100 individuals (NatureServe 2011).

Habitat Evaluation and Suitability. The Gunnison's prairie dog may use sagebrush or piñon-juniper woodland habitat in the project area. The UCDC (2011) maps "High Value" habitat in the general vicinity of the project area.

Determination of Effect. This proposed project may impact individuals of Gunnison's prairie dog, but it is not likely to result in a trend toward federal listing or loss of viability. Ground compaction from vehicular traffic and reduction of vegetation will likely be the biggest impacts to the Gunnison's prairie dog.

3.4.5.8 Lewis' Woodpecker (*Melanerpes lewis*)

Habitat and Range Requirements. The Lewis' woodpecker is a BLM sensitive species and a State of Utah species of concern. The Lewis's woodpecker is a cavity nester, excavating a hole in tall trees (often dead or blackened by fire). This species will also nest in utility poles, or stumps, but prefers ponderosa pine, cottonwood, or sycamore. The diet of this woodpecker consists of insects during the breeding season and nuts and berries during the winter. The

major breeding habitat consists of open park-like ponderosa pine forests. The Lewis's woodpecker is attracted to burned-over Douglas-fir, mixed conifer, piñon-juniper, riparian, and oak woodlands, but is also found in the fringes of pine and juniper stands, and deciduous forests, especially riparian cottonwoods. Areas with a good understory of grasses and shrubs to support insect prey populations are preferred. Dead trees and stumps are required for nesting. Wintering grounds are over a wide range of habitats, but oak woodlands are preferred (UCDC 2011).

Habitat Evaluation and Suitability. Scattered patches of ponderosa pine and piñon-juniper woodlands may provide marginal habitat for the Lewis' woodpecker in the project area. The UCDC (2011) maps small patches of primary breeding habitat in the general vicinity of the project area.

Determination of Effect. This proposed project may impact individuals of Lewis' woodpecker, but it is not likely to result in a trend toward federal listing or loss of viability. Some reduction of Lewis's woodpecker habitat and foraging potential will occur due to loss of large trees and understory vegetation in the project area.

3.4.5.9 Northern Goshawk (*Accipiter gentilis*)

Habitat and Range Requirements. The northern goshawk is a USFS sensitive species. This species breeds in much of the Northern Hemisphere, and occasionally winters outside (south) of its breeding range and occurs as a permanent resident throughout Utah, but is not common in the state. The northern goshawk prefers mature mountain forest and riparian zone habitats. Nests are constructed in trees in mature forests; often nests previously used by northern goshawks or other bird species are re-used. Northern goshawks cruise low through forest trees to hunt, and may also perch and watch for prey. Major prey items include rabbits, hares, squirrels, and birds (UCDC 2011).

Habitat Evaluation and Suitability. There are scattered patches of ponderosa pine throughout the project area which provide suitable nesting and foraging habitat for the northern goshawk. The UCDC (2011) maps small patches of primary breeding habitat in the general vicinity of the project area. One active northern goshawk nest was identified in the Pine Ridge area of the project area in 2007 (see Appendix B:Figure B3).

Determination of Effect. This proposed project may impact individuals of northern goshawk, but it is not likely to result in a trend toward federal listing or loss of viability. Removal of vegetation in forested habitat may result in reduced nesting and foraging potential for the northern goshawk in the project area. If northern goshawk nest sites are discovered, the USFWS Utah Field Office recommends ceasing construction activities that cause noise or other disturbance within a 0.5-mile spatial buffer from March 1 to August 15, annually (Romin and Muck 2002). Field surveys will be conducted as determined by the authorized officer of BLM or the USFS as applicable. Based on the result of the field survey, the authorized officer will determine if appropriate buffers and timing limitations are necessary.

3.4.5.10 Peregrine Falcon (*Falco peregrinus anatum*)

Habitat and Range Requirements. The peregrine falcon is listed as a USFS Sensitive species. Although the peregrine falcon is still rare in Utah, it has become much more abundant throughout its range in recent years due to the ban of DDT (dichlorodiphenyltrichloroethane). Birds captured in flight are the main food item for the peregrine falcon. This species utilizes a variety of habitats, but nests on high cliffs, usually in wooded or forested areas (UCDC 2011).

Habitat Evaluation and Suitability. The UCDC (2011) does not show breeding or wintering habitat in the vicinity of the project area. However, peregrine falcons may use the area for foraging.

Determination of Effect. This proposed project may impact individuals of peregrine falcon, but it is not likely to result in a trend toward federal listing or loss of viability. Removal of vegetation may result in a reduction of prey species. If peregrine falcon nest sites are discovered, the USFWS Utah Field Office recommends ceasing construction activities that cause noise or other disturbance for a 1-mile spatial buffer and a seasonal buffer of February 1 to August 31, annually (Romin and Muck 2002). Field surveys will be conducted as determined by the authorized officer of BLM or the USFS as applicable. Based on the result of the field survey, the authorized officer will determine if appropriate buffers and timing limitations are necessary.

3.4.5.11 Spotted Bat (*Euderma maculatum*)

Habitat and Range Requirements. Spotted bat is a USFS sensitive and BLM sensitive species, and a State of Utah species of concern. The spotted bat occurs throughout much of the western United States, as well as in southwestern Canada and northern and central Mexico. Spotted bats occur state-wide in Utah, but have probably never been abundant in any particular location. Current data suggest that the species may be becoming even rarer in Utah than it was in the past. Spotted bats may be found in a variety of habitats, ranging from deserts to forested mountains; they roost and hibernate in caves and rock crevices. Females generally give birth to a single young in late spring. Spotted bats eat insects, primarily moths, which are usually captured in flight. Similar to Utah's other bat species, the spotted bat is nocturnal (UCDC 2011).

Habitat Evaluation and Suitability. The project area contains piñon-juniper woodlands and rocky outcrops that may serve as potential roosting habitat for the species.

Determination of Effect. This proposed project may impact individuals of spotted bat, but it is not likely to result in a trend toward federal listing or loss of viability. Impacts may include disturbance during periods of construction and a reduction in prey species due to vegetation removal. Also, bats roosting in mining shafts and adits may be exposed to radon. Screening of openings may prevent bats from entering shafts and adits. The surface pits created during drilling may contain water and other drilling additives. Bats may be attracted to these pits to obtain water and insects. If the water is polluted with other drilling additives, the surface pits may adversely affect bat species. The Denison Mine Bat Policy (June, 2009) will be utilized for this project and coordinated with BLM and USFS biologists.

3.4.5.12 Townsend's Big-eared Bat (*Corynorhinus townsendii*)

Habitat and Range Requirements. Townsend's big-eared bat is a USFS sensitive and BLM sensitive species and a State of Utah species of concern. It occurs in western North America, from southwestern Canada to Mexico. Isolated populations of the species also occur in areas of the central and eastern United States. The species occurs state-wide in Utah at elevations below 9,000 feet amsl, although populations in Utah are thought to be declining. Townsend's big-eared bat can occur in many types of habitat, but the species is often found near forested areas. Caves, mines, and buildings are used for day roosting and winter hibernation. Consequently, human disturbances of caves and the closures of abandoned mines may constitute threats to the species. Females congregate into nursery colonies and typically give birth to one young each year. Townsend's big-eared bats eat flying insects, particularly moths, and individuals are often seen foraging near trees. The species is nocturnal, and individuals typically do not leave their roosts until well after sunset (UCDC 2011).

Habitat Evaluation and Suitability. The piñon-juniper woodlands that occur in the project area may serve as roosting habitat for the species. The UCDC (2011) maps "Limited Value" and "High Value" habitat in the vicinity of the project area.

Determination of Effect. This proposed project may impact individuals of Townsend's big-eared bat, but it is not likely to result in a trend toward federal listing or loss of viability. Impacts may include disturbance during periods of construction and a reduction in prey species due to vegetation removal. Also, bats roosting in mining shafts and adits may be exposed to radon. Screening of openings may prevent bats from entering shafts and adits. The surface pits created during drilling may contain water and other drilling additives. Bats may be attracted to these pits to obtain water and insects. If the water is polluted with other drilling additives, the surface pits may adversely affect bat species. The Denison Mine Bat Policy (June, 2009) will be utilized for this project and coordinated with BLM and USFS biologists.

4.0 RECOMMENDATIONS

Many bird species use habitats found in the project area for shelter, nesting, and foraging. It is SWCA's recommendation that construction activities take place outside of the breeding season for migratory birds and that preconstruction surveys (which mark any active nests or breeding activity) take place if any vegetation removal must occur during breeding season. Construction activities include all proposed drilling for exploration and mine construction, grading of access roads, vegetation removal, and other ground-disturbing activities associated with the POA. The ongoing placement of development rock on the DRA at Pandora Mine is not considered 'construction' for the purposes of this document. The project area is also known winter roosting habitat for many protected birds. It is recommended that monitoring for these birds take place during construction and USFWS be consulted if any roosts are located within the project area. Species-specific preconstruction surveys should also be done for the northern goshawk and golden eagle, which are USFS management indicator species. If northern goshawk or golden eagle nest sites are discovered, the USFWS Utah Field Office recommends a 0.5-mile spatial buffer from March 1 to August 15, annually, for the northern goshawk; and January 1 to August 31, annually, for the golden eagle (Romin and Muck 2002). Field surveys will be conducted as determined by the authorized officer of BLM or the USFS as applicable. Based on the result of the field survey, the authorized officer will determine if appropriate buffers and timing limitations are necessary.

Species-specific preconstruction surveys for Beaman's townsendia should be done prior to ground-disturbing activities. The BLM Moab Field Office should be consulted if populations of Beaman's townsendia are located.

Surface pits, created during drilling to contain cuttings and drilling fluids, may attract wildlife seeking water. Ingestion of such fluids may adversely affect wildlife. Mitigation measures, such as covering these pits with tarps at night, should be taken to ensure bird and wildlife species do not inadvertently consume drilling fluids.

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APPENDIX A

Maps of Surface Water in the Project Area

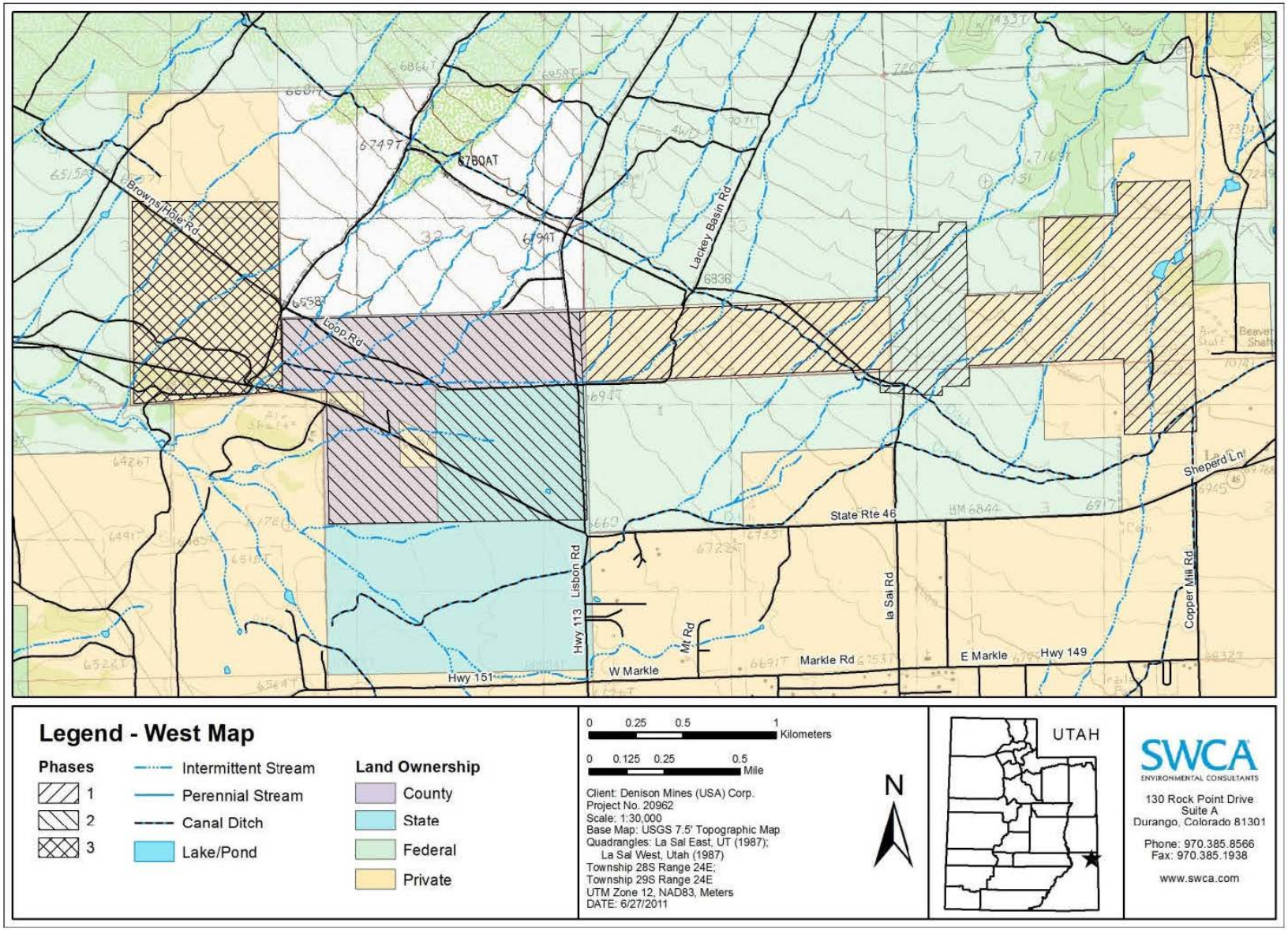


Figure A1. Surface water in the western portion of the project area.

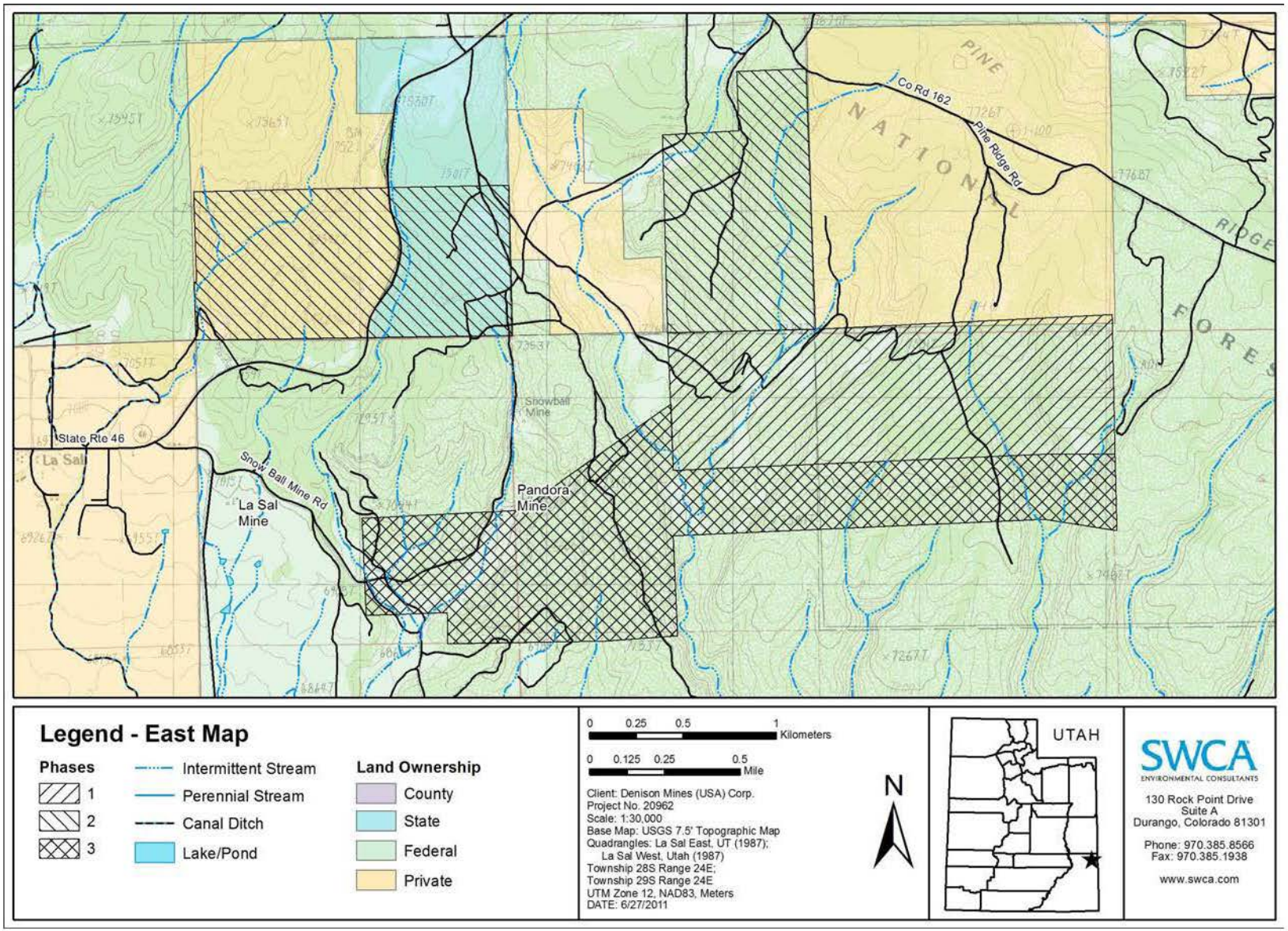


Figure A2. Surface water in the eastern portion of the project area.

APPENDIX B

Habitat Maps of Management Indicator Species

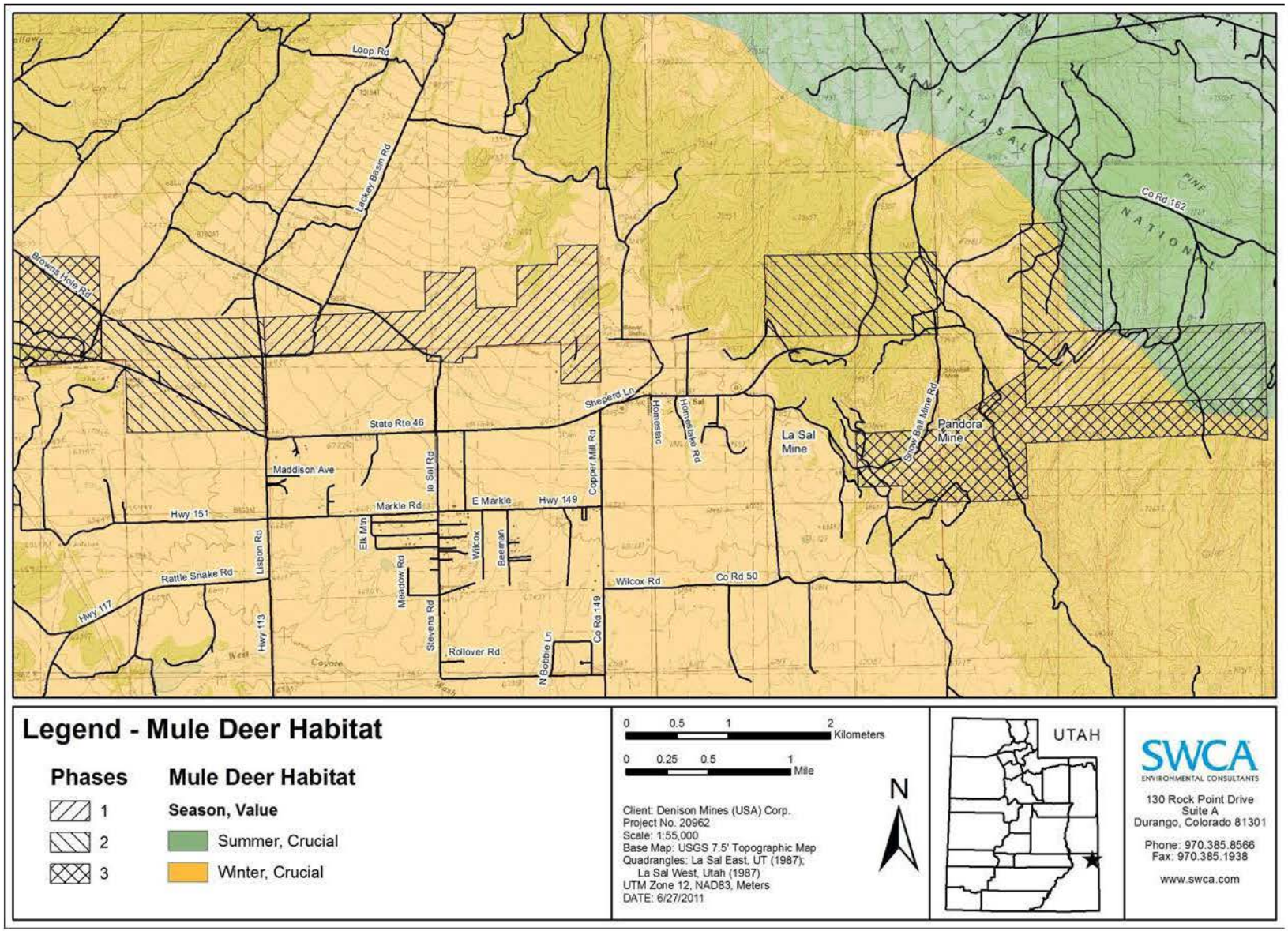


Figure B1. Mule deer habitat in the project area.

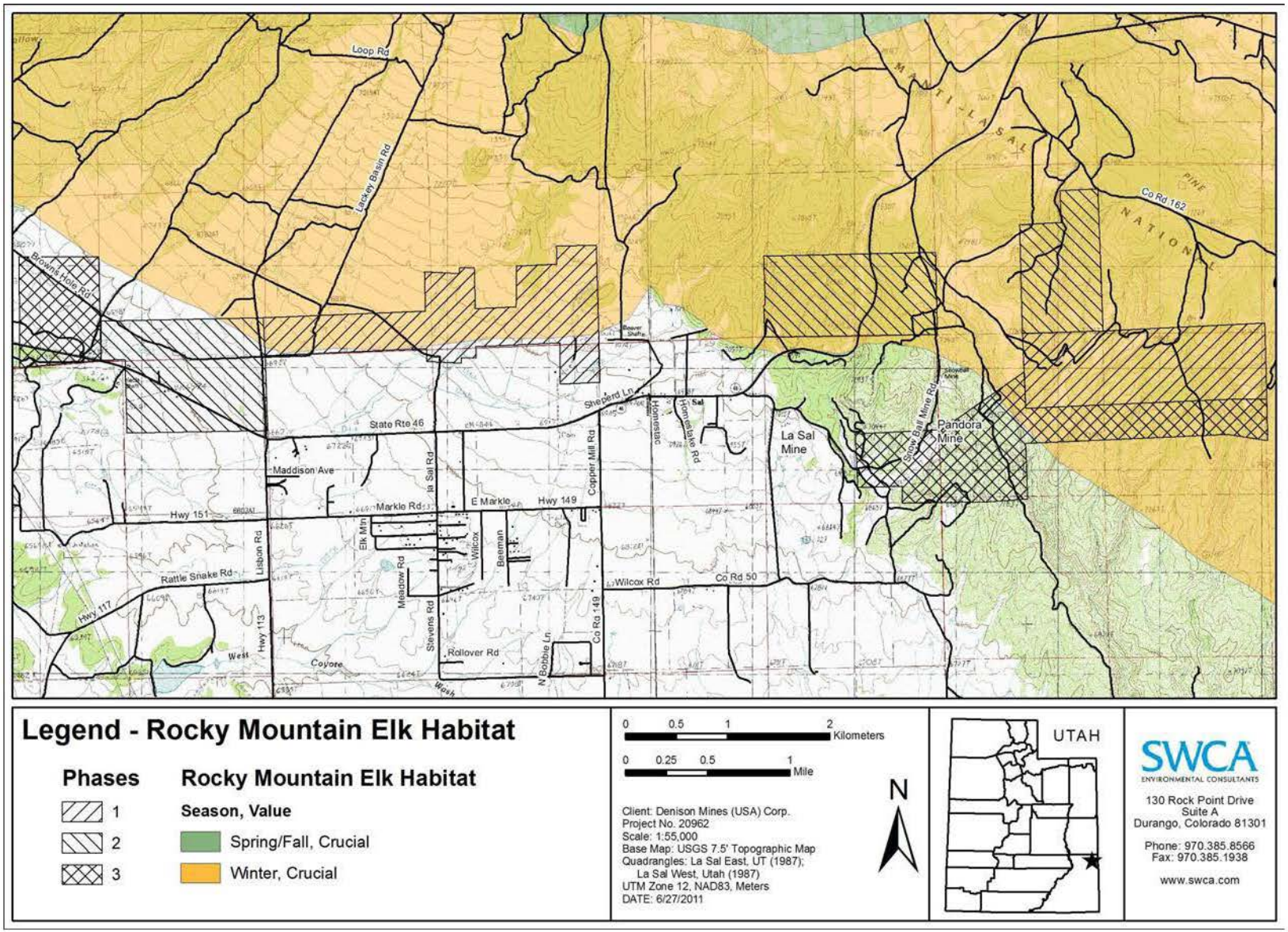
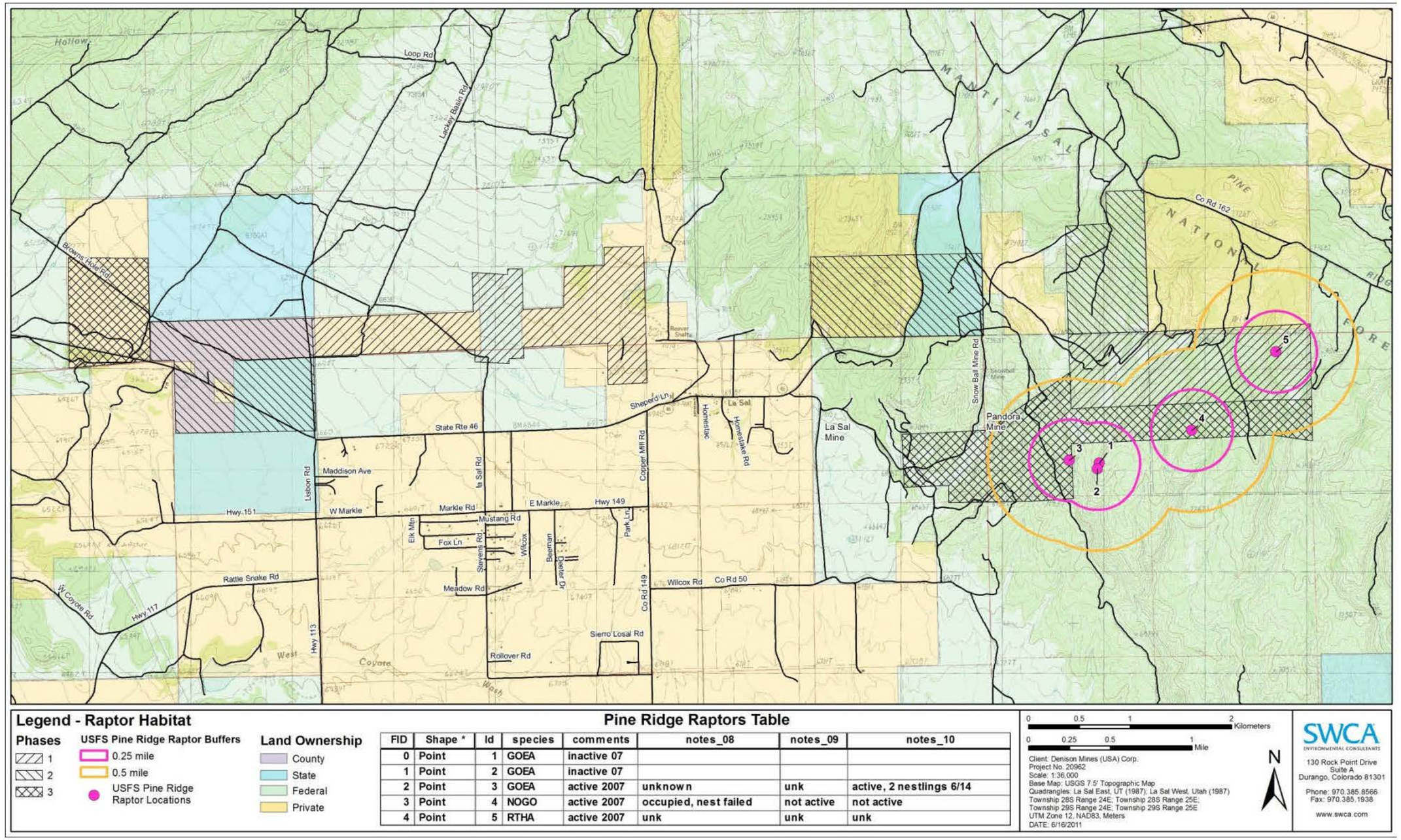


Figure B2. Elk habitat in the project area.



FID	Shape *	Id	species	comments	notes_08	notes_09	notes_10
0	Point	1	GOEA	inactive 07			
1	Point	2	GOEA	inactive 07			
2	Point	3	GOEA	active 2007	unknown	unk	active, 2 nestlings 6/14
3	Point	4	NOGO	active 2007	occupied, nest failed	not active	not active
4	Point	5	RTHA	active 2007	unk	unk	unk

Figure B3: Known raptor nests in the project area.