

Bagdad Mine Stockpile Extension Environmental Assessment

DOI-BLM-AZ-C010-2014-0014-EA

Volume 2 Appendices

**Bureau of Land Management
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Appendix A

**LAWS AND REGULATIONS CONSIDERED IN THE BAGDAD EA
ANALYSIS**

Table A-1. Laws and Regulations Considered in the Bagdad EA Analysis

Law	Description
American Indian Religious Freedom Act of 1978 (42 United States Code [USC] 1996)	This act protects and preserves the right of freedom to believe, express, and exercise traditional cultural practices of American Indians, Eskimos, Aleuts, and Native Hawaiians. This includes to right to access sacred sites, use and possess sacred objects, and the freedom to practice traditional rites and ceremonies.
Archaeological Resources Protection Act of 1979 (16 USC 470)	The purpose of this act is to protect and secure archaeological resources and sites on public and Tribal (including those held in trust by the United States).
Bald and Golden Eagle Protection Act of 1940 (16 USC 660–668c)	This act provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commercial sale of such birds.
Clean Air Act of 1963 (42 USC 7401 <i>et seq.</i> , as amended)	This act requires any federal entity engaged in an activity that may result in the discharge of air pollutants to comply with all applicable air pollution control laws and regulations (federal, state, or local). This act directs the attainment and maintenance of the National Ambient Air Quality Standards for six different criteria: pollutants, including carbon dioxide; ozone; particulate matter; sulfur oxides; oxides of nitrogen; and lead.
Clean Water Act of 1972 (33 USC 1251 <i>et seq.</i> , as amended)	This act stipulates broad national objectives to restore and maintain the physical, biological, and chemical integrity of surface waters of the United States.
Endangered Species Act of 1973 (16 USC 1531 <i>et seq.</i> , as amended)	Section 7 of this act requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that undertaking, funding, permitting, or authorizing an action is not likely to jeopardize the continued existence of listed species or to destroy or adversely modify designated critical habitat. Critical habitat, as defined under the act, exists only after the USFWS officially designates it. Critical habitat comprises 1) features within the geographic area that are essential to the conservation of the species and that may require special management consideration or protection; and 2) those specific areas outside the geographic area that are occupied by a species at the time it is listed or are essential to the conservation of the species.
Federal Land Policy and Management Act of 1976 (43 USC 1701)	This act provides a management framework for all public lands, and allows for a variety of uses on those lands. It provides policy guiding land use planning, land inventory, administration, and the objective that public lands be managed on the basis of multiple use and sustained yield.
Fish and Wildlife Coordination Act of 1934 (16 USC 661–667[e], as amended)	This act requires coordination with federal and state wildlife agencies for the purpose of mitigating losses of wildlife resources caused by a project that impounds, diverts, or otherwise modifies a stream or other natural body of water.
General Mining Act of 1872 (30 USC 22–42, as amended)	This act authorizes and administers the exploration and mining of minerals for economic gain. It codifies the process of acquiring mining claims on public lands.
Migratory Bird Treaty Act of 1918 (16 USC 703–712, as amended)	This act provides for the protection of migratory birds and prohibits their unlawful take or possession. The act bans “taking” any migratory bird or possessing parts, nests, features, or eggs of such bird except under the terms of a valid permit issued pursuant to the act. Exceptions may be granted through the issuance of a permit for activities such as scientific collecting, raptor propagation, and Native American religious purposes.

Table A-1. Laws and Regulations Considered in the Bagdad EA Analysis (Continued)

Law	Description
Mining and Mineral Policy Act of 1970 (30 USC 21 <i>et seq.</i>)	This act declares that it is the continuing policy of the U.S. Government in the national interest to foster and encourage private enterprise in the mining industry and development of mineral resources.
Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 <i>et seq.</i>)	This act requires protection and repatriation of Native American cultural items found on, or taken from, federal or tribal lands, and requiring repatriation of cultural items controlled by federal agencies or museums receiving federal funds.
National Environmental Policy Act of 1969 (42 USC 4321 <i>et seq.</i> , as amended)	NEPA requires federal agencies to take into consideration the environmental consequences of proposed actions, as well as input from state and local governments, Indian tribes, the public, and other federal agencies, during their decision-making process. The CEQ was established under NEPA to ensure that all environmental, economic, and technical considerations are given appropriate consideration in this process.
National Historic Preservation Act of 1966 (54 USC 300101 <i>et seq.</i>)	Federal undertakings must comply with Section 106 of the National Historic Preservation Act, which mandates that potential effects on significant historic properties be considered prior to approval of such undertakings. Significant historic properties are defined as sites, districts, buildings, structures, and objects eligible for the National Register of Historic Places. Consideration of these resources is to be made in consultation with the State Historic Preservation Office and other interested agencies and parties.
National Materials and Minerals Policy, Research and Development Act of 1980 (30 USC 1601)	This act provides for a national policy for materials and to strengthen materials research, development, production capability, and performance of the United States, and for other purposes.
Noxious Weed Act of 1974 (Public Law 93-269; 7 USC 2801 <i>et seq.</i> , as amended)	This act requires that all federal agencies develop a management program to control undesirable plants on federal lands under the agency's jurisdiction; establish and adequately fund the program; implement cooperative agreements with state agencies to coordinate management of undesirable plants on federal lands; and establish integrated management systems to control undesirable plants targeted under cooperative agreements.
Resource Conservation and Recovery Act of 1986 (42 USC 6901 <i>et seq.</i> , as amended)	This act is the primary federal law that regulates the disposal of hazardous or solid waste.
Safe Drinking Water Act (1974) (42 USC 300f <i>et seq.</i> , as amended)	Section 1424 of this act regulates underground injection into an aquifer that is the sole or principal drinking water source for an area.
Wild and Scenic Rivers Act (1968) (16 USC 1271 <i>et seq.</i>)	This act requires consideration of wild and scenic rivers in planning water resources projects. Developing water resources projects is prohibited on any river designated for study as a potential component of the national wild and scenic river system.
Wilderness Act of 1964 (16 USC 1131 <i>et seq.</i>)	This act created the National Wilderness Preservation System and created the legal definition of "wilderness" in the United States.
Secretary of the Interior Order 3175, Indian Trust Policy (1993)	This policy protects Indian assets from adverse impacts that may result from actions of the U.S. Department of the Interior.

Table A-1. Laws and Regulations Considered in the Bagdad EA Analysis (Continued)

Law	Description
Executive Order (EO) 11593, Cultural Environment (1971)	This order mandates that all Executive Branch agencies, bureaus, and offices compile an inventory of cultural resources, nominate all eligible properties to the National Register of Historic Places, preserve and protect their cultural resources, and ensure that agency activities contribute to the preservation and protection of non-federally owned cultural resources.
EO 11988, Floodplain Management	This order requires avoiding or minimizing harm associated with the occupancy or modification of a floodplain.
EO 11990, Protection of Wetlands	EO 11990 requires federal agencies or federally funded projects to restrict uses of federal lands for the protection of wetlands through avoidance or minimization of adverse impacts. The order was issued to “avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands whenever there is a practicable alternative.”
EO 12898, Environmental Justice	This order directs federal agencies to identify and address, as appropriate, disproportionately high, adverse human health and environmental effects of their programs, policies, and activities on minority populations and low-income populations.
EO 13007, Indian Sacred Sites	This order requires that all executive branch agencies responsible for federal land management will, where practicable, permitted by law, and not clearly inconsistent with essential agency functions, provide access to and ceremonial use of Indian sacred sites by Indian religious practitioners and will avoid adversely affecting the integrity of such sacred sites. The order also requires that federal agencies, when possible, maintain the confidentiality of sacred sites.
EO 13112, Invasive Species	This order seeks to improve coordination between federal agencies in efforts to combat invasive plant and animal species. It established the National Invasive Species Council as a high-level, interdepartmental federal advisory panel to provide leadership and planning in the prevention and control of invasive species nationwide.
EO 13186, Migratory Birds	This order requires each federal agency taking actions that have, or are likely to have, measurable negative effects on migratory bird populations and also to promote the conservation of migratory bird populations.

Appendix B

BAGDAD MINE POTENTIAL STOCKPILE LOCATIONS

A suitability evaluation of each of the potential stockpile locations identified in the vicinity of the Bagdad Mine was conducted using the criteria shown in Table B-1.

Table B-1. Criteria Used to Evaluate Potential Stockpile Locations

Criteria	Rationale
Purpose and Need	Does the alternative site location meet the purpose of and need for the action as presented in Section 1.3 of Chapter 1?
Practical and Technically Feasible	<p>Is the distance from the open pit less than 3 miles? (Three miles is considered the maximum distance from the pit at which haul trucks could still operate in an economically viable manner; at greater distances the additional fuel costs, driver time required, and tire and other equipment wear would make operating the mine uneconomic, and is therefore not considered a reasonable option by the BLM.)</p> <p>Can the site accommodate 900 million tons of mineralized waste rock?</p> <p>Is the stockpile technically feasible and constructible using industry standards and existing technology?</p> <p>Does the site exhibit geotechnical stability?</p> <p>Is the alternative location cost effective and efficient?</p>
Environmentally Reasonable	<p>Does the site allow for the ability to meet the Best Available Demonstrated Control Technology (BADCT) standard established pursuant to the Arizona Aquifer Protection Permit (APP) rules and regulations?</p> <p>Is the site located within the existing groundwater cone of depression created by the open pit?</p> <p>What would be required to control surface water runoff? What is the location relative to existing watersheds and drainage divides?</p> <p>Is there a potential to impact important resources (socioeconomic conditions, riparian areas, and threatened and endangered species)?</p>

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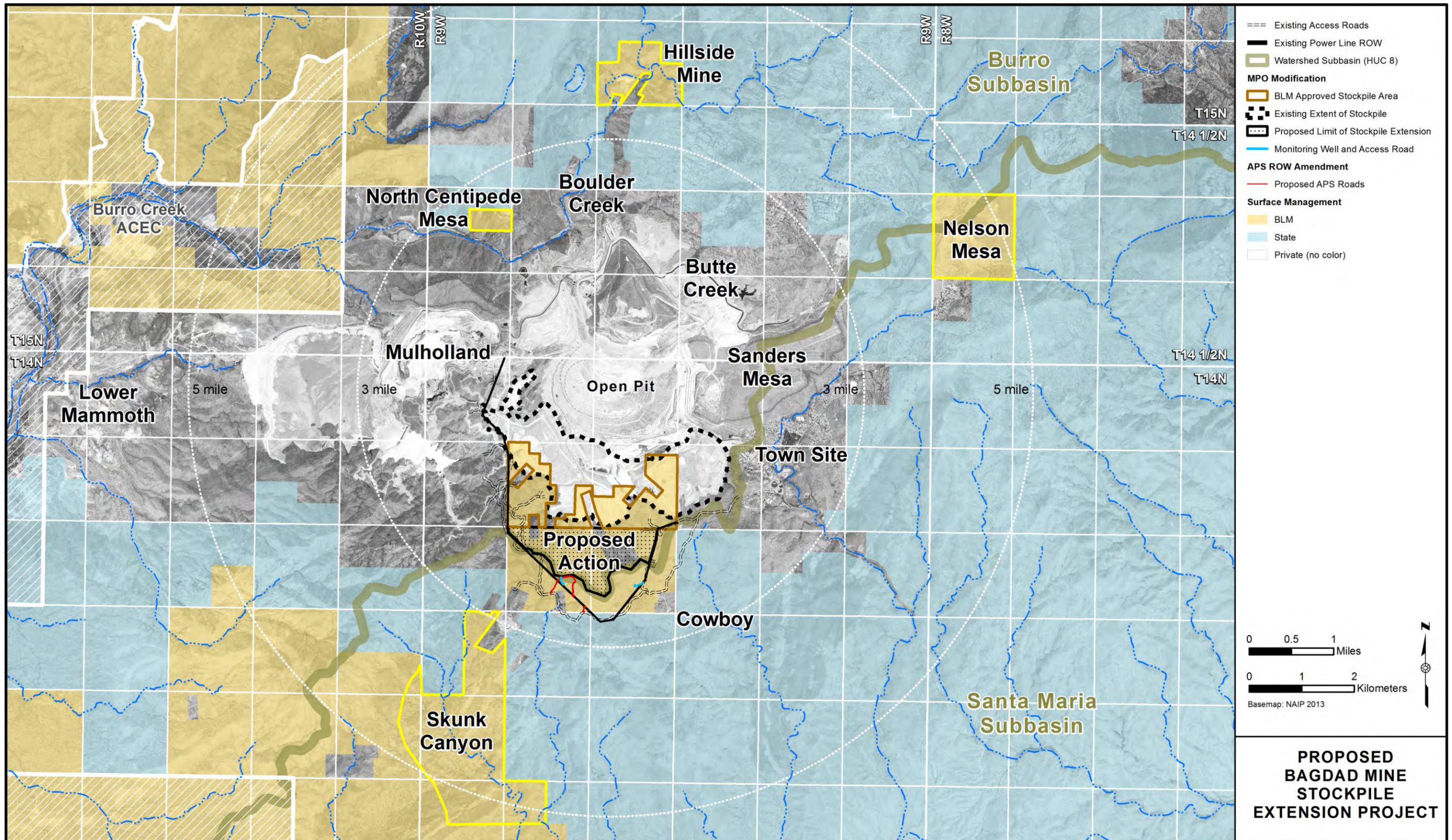


Figure B-1. Stockpile locations considered but dismissed.

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Table B-2. Bagdad Mine Potential Stockpile Locations

Potential Stockpile Location	Location Description and Feasibility Determination	Meets the Purpose and Need	Practical and Technically Feasible	Environmentally Reasonable
Stockpile Locations on BLM-Managed Land				
Skunk Canyon	Skunk Canyon is located on BLM-managed lands. It lies outside the 3-mile radius determined to be a reasonable and cost-efficient haul distance. This potential stockpile location lies beyond the groundwater cone of depression and south of the Santa Maria Sub-basin surface water divide. As such, infiltration and surface water runoff at this location would not be captured by the passive containment capture zone. In order for this location to comply with applicable surface water and groundwater standards, substantial infrastructure and controls would be required. This location is centered in an area that is largely undisturbed. The location is a higher-value Sonoran desert tortoise habitat than the Proposed Action, and is therefore considered an environmentally inferior option. For these reasons, the Skunk Canyon site is eliminated from further analysis. Wild and Scenic River values (Final Arizona Statewide Wild and Scenic Rivers Legislative Environmental Impact Statement: Rivers Appendix, December 1994 [BLM 1994]) on portions of the Santa Maria River could be adversely affected in the event of a surface water or groundwater control breach.	No	No	No
Nelson Mesa	Nelson Mesa is located on BLM-managed lands and lies within the groundwater cone of depression created by the open pit. Groundwater from this location would be captured by the passive containment capture zone. However, Nelson Mesa does not have the capacity to accommodate 900 million tons of waste rock and is underlain by basalt overlying rhyolite and Gila conglomerate and would be geotechnically unstable as a base to support the required volume of material, especially when saturated. Nelson Mesa lies outside the 3-mile radius that exceeds the maximum haul distance determined by mine planning to be reasonable and cost efficient. For these reasons, this site is eliminated from further analysis.	No	No	Yes
Hillside Mine	<p>The Hillside Mine site is located on BLM-managed lands. It is located outside the 3-mile radius determined to be a reasonable and cost-efficient haul distance, and it cannot accommodate 900 million tons of waste rock.</p> <p>The area lies adjacent to Boulder Creek, a sensitive environmental resource. To protect water resources, substantial infrastructure would be required to conduct leaching or stockpiling at this location, including the construction of a dam and/or diversion of underflow. A liner would likely be required to accommodate leaching; however, the steep topography (near vertical faces) makes installation of a liner technically infeasible at this location. The proximity of this location to Burro Creek, which supports habitat for special status species (BLM 1993), makes it much less environmentally reasonable than the Proposed Action. Wild and Scenic River values (BLM 1994) on portions of Burro Creek could be adversely affected in the event of a surface water or groundwater control breach.</p> <p>This potential stockpile location is outside the groundwater cone of depression created by the open pit. The open pit would not capture groundwater, and it would enter the region's groundwater supply. Surface water at this site would not naturally flow to the open pit; therefore, surface water controls and stormwater management infrastructure would be necessary. For these reasons, the Hillside Mine site is eliminated from further analysis.</p>	No	No	No
North Centipede Mesa	North Centipede Mesa is located on BLM-managed lands, but cannot accommodate 900 million tons of waste rock material. Located on a steep, south-facing slope adjacent to Boulder Creek, it would require substantial infrastructure to conduct leaching or stockpiling, including the construction of a dam and/or diversion of underflow. A liner would likely be required to accommodate leaching; however, the steep topography (near vertical faces) makes installation of a liner technically infeasible, similar to the Hillside Mine site. Wild and Scenic River values (BLM 1994) on portions of Burro Creek could be adversely affected in the event of a surface water or groundwater control breach. For these reasons, the North Centipede Mesa site is eliminated from further analysis.	No	No	No
Stockpile Locations on Private Land				
Lower Mammoth	<p>The Lower Mammoth site can accommodate 900 million tons of mineralized waste rock, and the location would provide for a geotechnically stable stockpile.</p> <p>However, the Lower Mammoth location is outside the groundwater cone of depression created by construction of the open pit. Groundwater not captured by the passive containment capture zone would potentially enter the region's groundwater supply. Substantial controls would also be required to manage surface water runoff at this location. Locating the stockpile in the Lower Mammoth area may result in loss of nearby riparian areas. Wild and Scenic River values (BLM 1994) on portions of Burro Creek could be adversely affected in the event of a surface water or groundwater control breach. This could negatively impact threatened, endangered, and other special species, and designated Areas of Critical Environmental Concern (ACECs). These potential impacts make this location much less environmentally reasonable than the Proposed Action.</p> <p>Located outside the 3-mile radius from the open pit, this site is outside the reasonable and cost-efficient haul distance. The longer haul distance may also increase emissions and dust because of increased haul traffic in the area. A liner system would be required to accomplish leaching at this location, limiting its practical and feasible constructability.</p> <p>The Lower Mammoth site is eliminated from detailed analysis because this location does not meet the purpose of and need for the action and is not practical, feasible, or environmentally reasonable.</p>	No	No	No
Mulholland Tailings	The Mulholland Tailings site is located between 2 and 3 miles from the open pit. However, stockpiling of materials on top of existing, saturated mill tailings would be geotechnically unstable and technically infeasible (or cost prohibitive to the point of being remote or speculative).	No	No	Yes
Boulder Creek	The Boulder Creek location would provide a stable, and even favorable, base for the stockpile, and it is within 2 to 3 miles from the open pit. However, this site was found to be a highly unfavorable option with regard to being environmentally reasonable. The Boulder Creek location is environmentally inferior to other potential sites, given the potential effects of the potential loss of riparian areas on threatened and endangered species and designated ACECs. Wild and Scenic River values (BLM 1994) on portions of Burro Creek could be adversely affected in the event of a surface water or groundwater control breach. Further, this site is outside the groundwater cone of depression created by the open pit, and the open pit would not capture groundwater. Similarly, surface water at this site would not naturally flow to the open pit; therefore, surface water controls and stormwater management infrastructure would be necessary. The inclusion and construction of substantial infrastructure would be required to conduct leaching or stockpiling, including the construction of a dam and/or diversion of underflow. The Boulder Creek location is eliminated from detailed analysis because it would not be environmentally reasonable and the infrastructure costs make it impractical and infeasible.	No	No	No

Table B-2. Bagdad Mine Potential Stockpile Locations (Continued)

Potential Stockpile Location	Location Description and Feasibility Determination	Meets the Purpose and Need	Practical and Technically Feasible	Environmentally Reasonable
Stockpile Locations on Private Land, cont'd.				
Butte Creek	<p>The Butte Creek site currently contains the existing Butte Creek Stockpile. It currently receives and stockpiles inert overburden materials and is being contemplated for expansion and possible permitting under the Arizona Department of Environmental Quality (ADEQ)-administered APP program to accept mineralized waste rock. The Butte Creek area has capacity for approximately 1.5 billion tons of waste rock and thus could accommodate the stockpile materials. The Butte Creek area offers ample capacity for the anticipated operations, and is within a favorable haul distance from the pit.</p> <p>The current inert overburden stockpile in the Butte Creek area is exempt from the APP. Modification of the facility to receive mineralized waste rock, as well as oxide ore that would be leached with raffinate (a dilute sulfuric acid solution), would require an amendment to FMBI's APP. In order to perform leaching processes in the Butte Creek area, construction of collection and conveyance systems would be necessary, and additional costs for infrastructure and associated permitting would occur. Leaching of the stockpile would require either an artificial geomembrane or soil liner (which would require an individual BADCT approach). The ADEQ would only grant the APP for leaching through the use of BADCT methods, which would be extremely costly. The development and construction of infrastructure to accomplish leaching at this location would also require substantial new surface disturbance. In addition, constructing the stockpile in this location could involve double handling of materials, increasing resource utilization during mineral processing.</p> <p>The Butte Creek area is located on private land and beyond the jurisdiction of the BLM; it therefore does not meet the BLM's purpose of and need for this action. In addition, the Butte Creek site is not practical and feasible in terms of infrastructure and cost; it is therefore eliminated from further analysis.</p>	No	No	Yes
Sanders Mesa	<p>The location of the Sanders Mesa site is less than 2 miles from the open pit. However, the Sanders Mesa site, which is composed of basalt overlying Gila conglomerate, would be geotechnically unstable as a base to support the required volume of material, especially when saturated. Constructing the stockpile at this location would be technically infeasible. Leaching at this location would also be infeasible and therefore would not meet the purpose of and need for the action. The Sanders Mesa area also currently supports an existing airport and solar facilities.</p> <p>Because the Sanders Mesa site is not practical and feasible and does not meet the purpose and need, it is eliminated from further analysis.</p>	No	No	Yes
Town Site	<p>The Town Site would be a technically feasible location for the stockpile. Located 2 to 3 miles from the open pit, it lies on stable and largely impermeable, crystalline bedrock within the groundwater cone of depression surrounding the open pit. Leaching could also be feasible at this site, although substantial infrastructure would be required for surface water management and control since this site lies within the Santa Maria Sub-basin and surface water would not drain toward the open pit. Substantial additional surface disturbances and capital outlay would be required to achieve adequate groundwater and surface water controls.</p> <p>The town of Bagdad, Arizona, occupies the Town Site. Use of this area for the stockpile would permanently eliminate the entire community and result in major, irreversible socioeconomic impacts. Of far lesser importance than the displacement of hundreds of Bagdad residents, but also worth noting, is the fact that modification of the Town Site to receive mineralized waste rock, as well as oxide ore that would be leached, would require an amendment to FMBI's APP. In order to perform leaching processes in the Town Site area, construction of collection and conveyance systems would be necessary, and additional costs for infrastructure and associated permitting would occur. Leaching of the stockpile would require either an artificial geomembrane or soil liner (which would require an individual BADCT approach). The ADEQ would only grant the APP for leaching through the use of BADCT methods, which would be extremely costly. The development and construction of infrastructure to accomplish leaching at this location would also require substantial new surface disturbances. For these reasons, the Town Site location is eliminated from detailed analysis.</p> <p>Wild and Scenic River values (BLM 1994) on portions of the Santa Maria River could be adversely affected in the event of a surface water or groundwater control breach.</p>	No	No	No
Cowboy	<p>The Cowboy site is located within 2 to 3 miles from the open pit and overlies stable, crystalline bedrock. However, the site is located outside of the groundwater cone of depression created by construction of the open pit; infiltration at this location would not be captured in the open pit. Due to the lack of capture, potentially contaminated groundwater may enter the surrounding environment and result in degradation of local water sources.</p> <p>Modification of the Cowboy site to receive mineralized waste rock, as well as oxide ore that would be leached with raffinate, would require an amendment to FMBI's APP. In order to perform leaching processes in the Cowboy area, construction of collection and conveyance systems would be necessary, and additional costs for infrastructure and associated permitting would occur. Leaching of the stockpile would require either an artificial geomembrane or soil liner (which would require an individual BADCT approach). The ADEQ would only grant the APP for leaching through the use of BADCT methods, which would be extremely costly. In addition, the development and construction of infrastructure to accomplish leaching at the Cowboy location would require substantial new surface disturbance.</p> <p>Similar to the Town Site locate, the Cowboy site is located in the Santa Maria Sub-basin. Surface water would not drain to the open pit and could flow into the surrounding environment. Substantial surface disturbances and capital outlay would be required to achieve adequate groundwater and surface water controls. Leaching could be feasible at this site with substantial infrastructure for surface water and groundwater management and control to prevent environmental degradation. This makes this site much less practical for stockpile development than the Proposed Action. Wild and Scenic River values (Final Arizona Statewide Wild and Scenic Rivers Legislative Environmental Impact Statement: Rivers Appendix, December 1994) on portions of the Santa Maria River could be adversely affected in the event of a surface water or groundwater control breach.</p> <p>The Cowboy location would also affect an existing home and ranching operation on private land that is not owned by FMBI. This potential stockpile location is not environmentally reasonable, does not meet the purpose and need of the action, and is therefore eliminated from further analysis.</p>	No	No	No

Appendix C

APS PLAN OF DEVELOPMENT

AZA 005961
APS Bagdad 115kV Transmission Line Plan of Development April 2009
Summary of Applicability for Amendment #5

Under Amendment #4 of Right-of-Way AZA 005960 the Plan of Development (POD) dated April 2009 was incorporated into its terms and conditions. The following items in the POD specifically address the construction and reclamation of the proposed maintenance roads and the impacts that would be anticipated from them. This POD would be carried forward as part of the APS Proposed Action:

- Section 4. (p. 8) Access Roads - provides a general description of the access roads contemplated during processing the application for the transmission line in 2009;
- Section 11. (p. 11) Stabilization and Rehabilitation - describes post construction reclamation activities;
- Table 4 (pp. 11 – 13) provides standard operating procedures to reduce potential adverse environmental impacts;
- Appendix A Vegetation Treatment Plan (pp. 16 – 20) describes the general vegetative treatment plan that was used for the construction of the transmission line and would be used for the proposed maintenance roads.

PLAN OF DEVELOPMENT

ARIZONA PUBLIC SERVICE

BAGDAD 115kV TRANSMISSION LINE RELOCATION PROJECT

AZA 5961

APRIL 2009

PURPOSE AND NEED FOR RIGHT-OF-WAY

Arizona Public Service Company (APS) has applied for a right-of-way grant (Serial Number AZA 5961) from the Bureau of Land Management (BLM) for the construction, operation, and maintenance of the proposed relocation of a 115 kilovolt (kV) transmission line serving the Freeport McMoRan (FMI) owned Bagdad Copper Mine. The proposed relocation would be to the south that would allow the mine to continue expansion as identified in their BLM approved mine plan as shown on Figure 1.

The proposed project is needed to allow FMI to continue expansion of their mining operations according to their approved mine plan. The current 115kV transmission line location interferes with the expansion of the south waste rock dump. The relocation is expected to take place in the summer/fall of 2009.

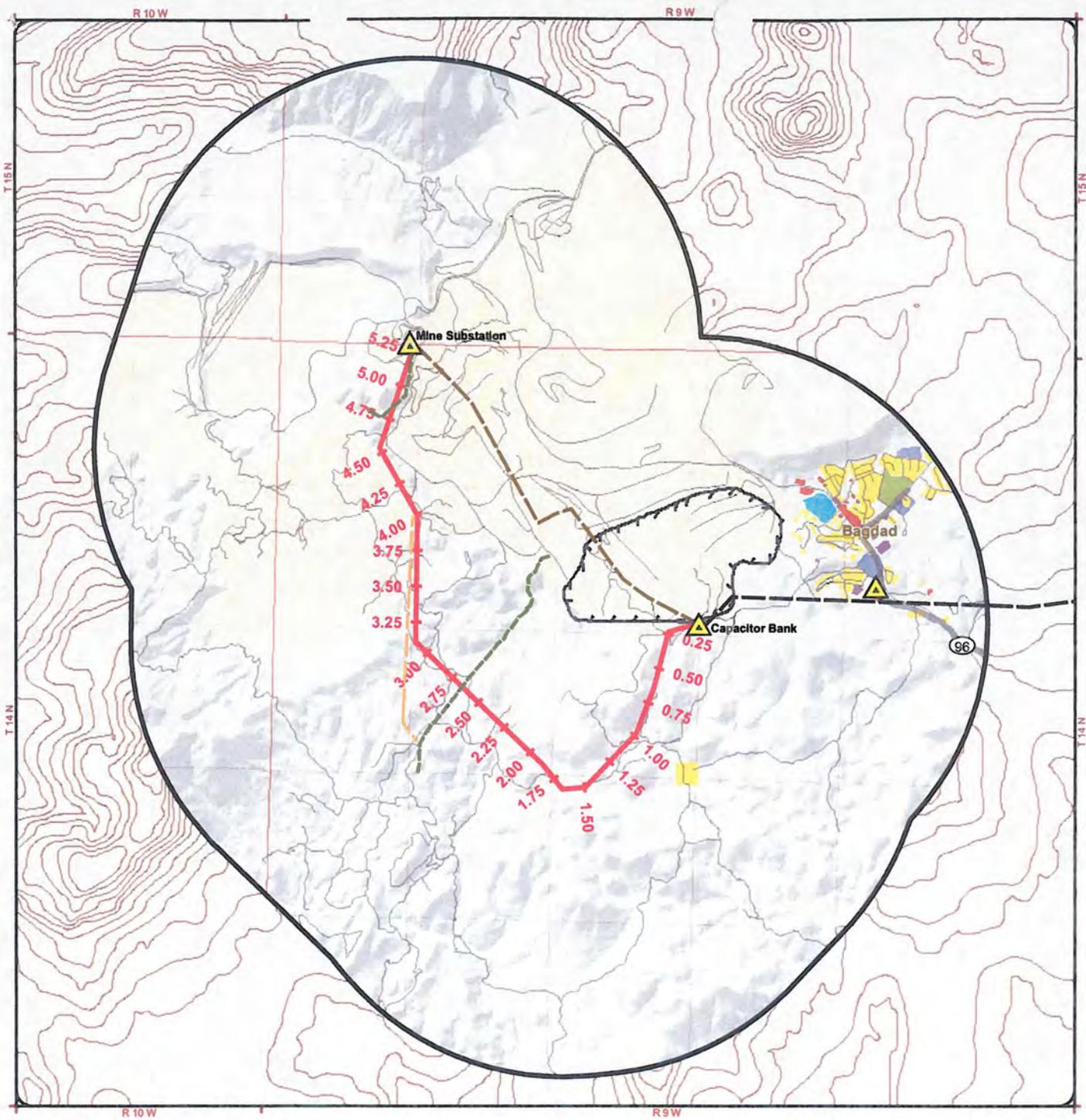
LOCATION

The transmission line will be located on BLM managed public land, State land and private land identified as Township 15 North, Range 9 West, Section 31, Township 14 North, Range 9 West, Sections 5, 6, 7, 8, 9, 10, 16, 17, and 21 Gila and Salt River Baseline and Meridian as shown on Figure 2. The project is located approximately 0.5 miles SW of Bagdad, AZ and 1 mile south of the FMI Bagdad Copper Mine.

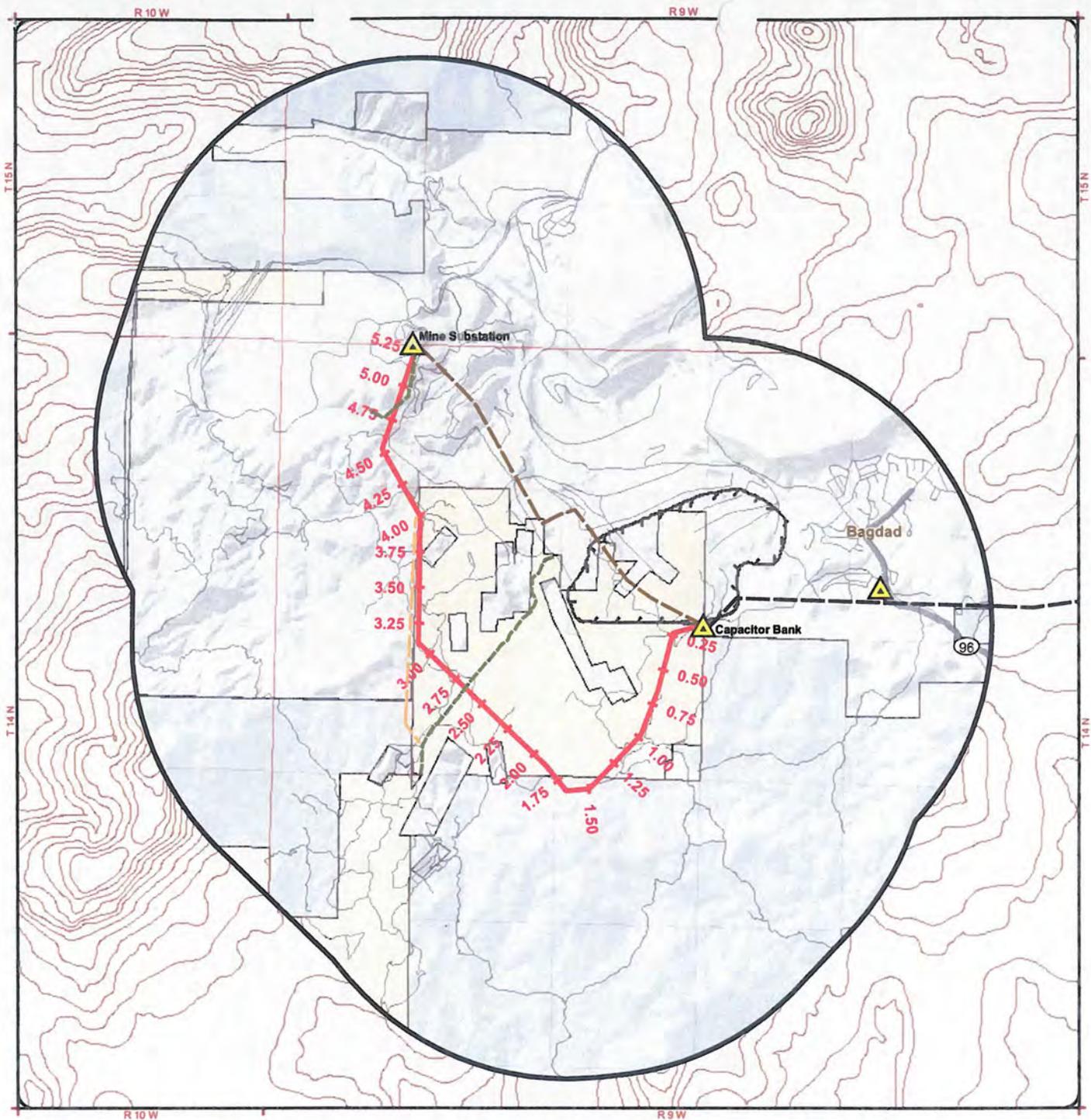
DESIGN FACTORS

The proposed right-of-way width would be 100 feet. The estimated length of the proposed transmission line route is approximately 5.3 miles, and crosses approximately 3.6 miles of BLM managed public land, 0.4 mile of Arizona State Trust land, and 1.3 miles of FMI owned private land.

Beginning at the capacitor bank in Sec.10, T. 14 N., R. 9 W., the proposed route proceeds to the southwest, crossing into BLM managed public land roughly parallel to Bruce Mine Road for approximately 1.5 miles. The proposed route crosses into a short segment of Arizona State Trust



Legend		Project Location	Bagdad 115kV Transmission Line Relocation Project
Project Features	Reference Features		
<ul style="list-style-type: none"> Proposed Route Existing 115kV Transmission Line (to be removed) 	<ul style="list-style-type: none"> Substation Existing 115kV Transmission Line Existing 69kV Transmission Line Existing 12kV Distribution Line Study Boundary Planned South Waste Rock Dump Expansion Boundary Township and Range Section Highway Road Milepost 		<p>Land Use</p> <p>Figure 1</p> <p>March 2009</p>
Land Use			
<ul style="list-style-type: none"> Commercial Educational Facilities Industrial Mining Parks/Preservation Public/Quasi-Public Recreation Residential Utilities Vacant 		<p>Sources:</p> <p>StreetMap USA, ESRI 2007; EPG 2008</p>	



Legend

- | | |
|--|--|
| Project Features | Reference Features |
| Proposed Route | Substation |
| Existing 115kV Transmission Line (to be removed) | Existing 115kV Transmission Line |
| Land Ownership | Existing 69kV Transmission Line |
| Bureau of Land Management | Existing 12kV Distribution Line |
| State Trust | Study Boundary |
| Private | Planned South Waste Rock Dump Expansion Boundary |
| | Township and Range |
| | Section |
| | Highway |
| | Road |
| | Milepost |

Project Location



Bagdad 115kV Transmission Line Relocation Project

*Land Ownership/
Jurisdictions*

Figure 2

March 2009



Sources:
StreetMap USA, ESRI 2007; EPG 2008



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land for approximately 0.3 miles where the route turns to the northwest, continuing to parallel Bruce Mine Road. The proposed route proceeds northwest crossing into BLM managed public land for 1.5 miles, and reaches an existing 12kV line, where the proposed route turns to the north parallel to the 12kV line for 0.75 miles. At the end of the 12kV line, the proposed project turns slightly northwest and crosses into private land. The proposed route then turns to the northeast on private land and proceeds to the existing mine substation for 1.25 miles.

The powerline would be constructed primarily with tubular steel monopoles and H-frame structures as shown in Figures 3 and 4. Turning structures would either be tubular steel monopoles, two- or three-pole structures as shown in Figures 5 and 6. The 115kV transmission line would be designed for a three-phase single-circuit, and one or two overhead ground wire(s). The structures would typically be approximately 74 feet tall, depending on the span length required. The span length between structures would vary between 800 and 1,500 feet, according to terrain conditions and to achieve site-specific mitigation objectives. The minimum ground clearance of the conductors is 25 feet. The steel poles would have a self-weathering finish, and conductors would have a low-reflective (non-specular), dulled finish to reduce visibility. In order to minimize impacts, structure selection and individual structure placement would be determined in the detailed design phase of the project. Structures would be constructed to conform to the Suggested Practices for Avian Protection on Power Lines (Avian Power Line Interaction Committee 2006).

GOVERNMENT AGENCY INVOLVEMENT AND PERMITS REQUIRED

A right-of-way permit application has been filed with the Arizona State Land Department for the portion of the route crossing Arizona State Trust land. Additionally, following completion of the National Environmental Policy Act (NEPA) process, an application for a Certificate of Environmental Compatibility will be filed with the Arizona Corporation Commission.

CONSTRUCTION OF FACILITIES

This Plan of Development (POD) includes standard construction and operating procedures and mitigation measures, as well as a native plant survey and noxious weed plan for the project. These elements would be implemented throughout the life of the project, in order to minimize potential environmental impacts. Construction of the proposed line and removal of the existing line is projected to take place over an estimated 9-month period. The 115kV line is projected to be in service in mid-2010. Tables 1 and 2 provide a summary of the project design characteristics, and personnel and equipment required.

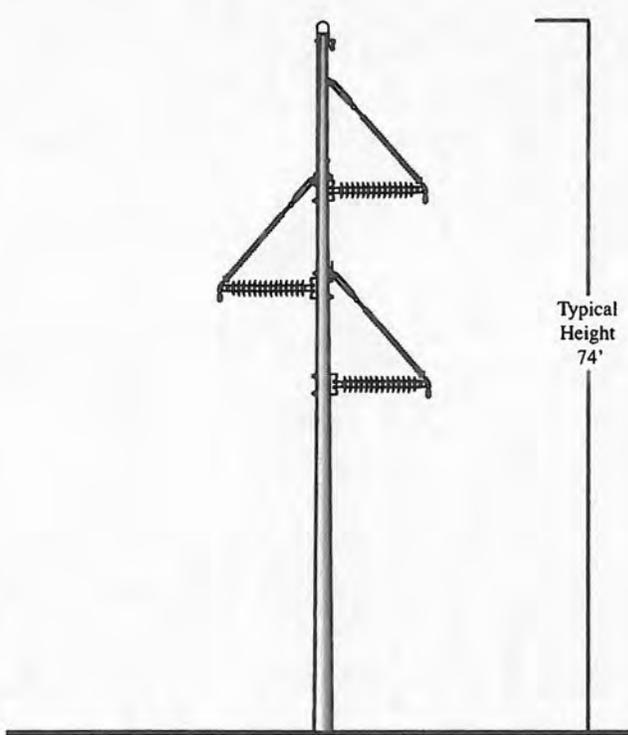


Figure 3 - Typical 115kV Single-Circuit Tubular Steel Monopole Structure

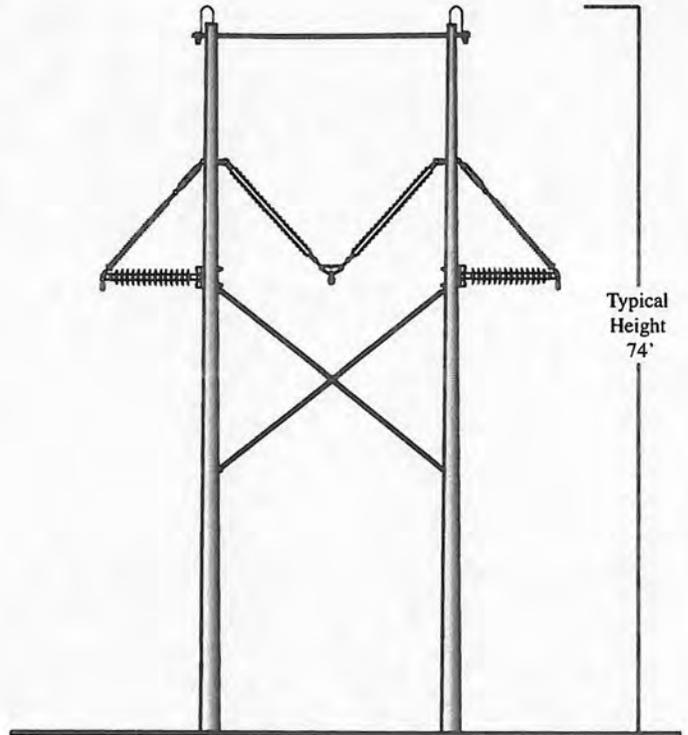


Figure 4 - Typical 115kV Single-Circuit Tubular Steel H-Frame Structure

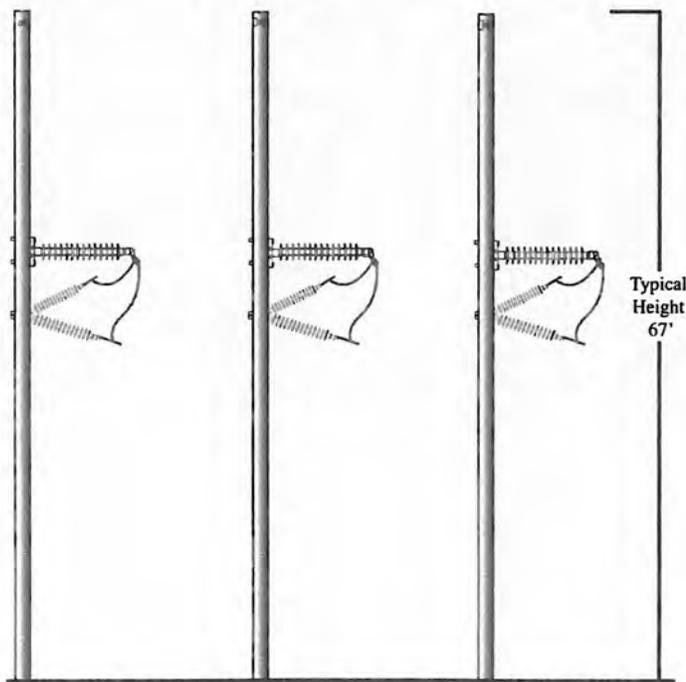


Figure 5 - Typical 115kV Single-Circuit Tubular Steel Three-Pole Heavy Angle Structure

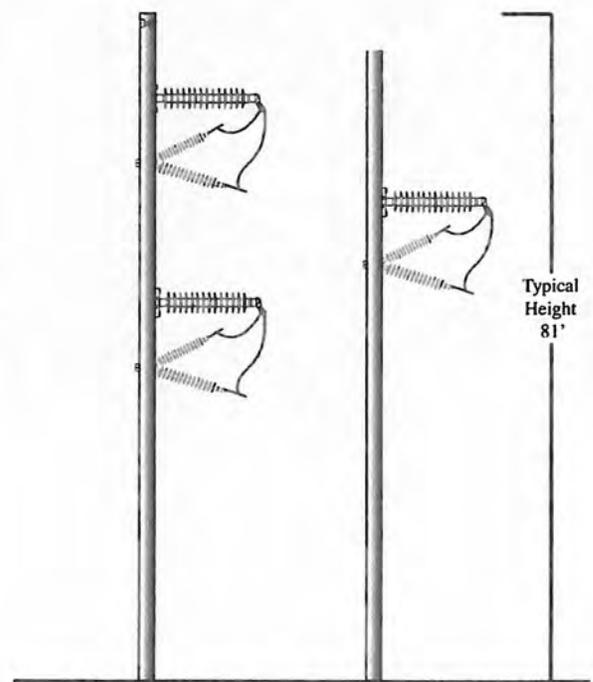


Figure 6 - Typical 115kV Single-Circuit Tubular Steel Two-Pole Heavy Angle Structure

Bagdad 115kV Transmission Line Relocation Project

TABLE 1 TYPICAL DESIGN CHARACTERISTICS	
Line Length	Approximately 5.3 miles
Type of Structures	Single-pole, H-Frame, self-weathering steel
Voltage	115,000
Capacity	Up to 400 megawatts per circuit
Circuit Configuration	Single-circuit 115kV
Conductor Size	1.1 inches
Ground Clearance of Conductor	25 feet minimum
Pole Foundation Depth	10 to 35 feet
Structure Height	Approximately 74 feet
Typical Span Length	800 to 1,500 feet
Typical Number of Structures Per Mile	5 to 7
Right-of-Way Width	100 feet
Land Disturbed (approximate): <u>Temporary</u> structure site	Temporary workspace would include an area between the existing access road to the edge of the permanent right-of-way; this width would vary between 40 and 60 feet. An area of approximately 30 by 40 feet per structure site is required for line construction equipment. BLM acres: 0.6 State acres: 0.1 Private acres: 0.3
wire pulling, splicing sites	An all-terrain vehicle would be used for wire pulling along the permanent right-of-way. Sites for tensioning equipment are located approximately 5,000 to 10,000 feet apart and the necessary area is approximately 150 feet by 60 feet. BLM acres: 1.2 State acres: 0.4 Private acres: 0.8
construction yards	Maximum of 3 to 4 acres total. BLM acres: 0.0 State acres: 0.0 Private acres: 6-8
temporary access road	BLM acres: 0.2 State acres: 0.0 Private acres: 0.0
<u>Permanent</u> Total Permanent Disturbance (structures, spur and access roads)	BLM acres: 5.9 State acres: 0.7 Private acres: 2.9
Access Roads	Use existing access and mine roads where practicable, plus new access roads BLM existing miles: 6.0 BLM new miles: 1.6 State existing miles: 0.6 State new miles: 0.2 Private existing miles: 2.8 Private existing miles: 0.8

TABLE 2 TYPICAL TRANSMISSION LINE CONSTRUCTION ESTIMATED PERSONNEL AND EQUIPMENT REQUIRED		
Survey	3 people	Equipment: 2 pickup trucks
Vegetation Transplanting	3 people	Equipment: 2 pickup trucks
Access Road Construction	18 people	Equipment:

TABLE 2 TYPICAL TRANSMISSION LINE CONSTRUCTION ESTIMATED PERSONNEL AND EQUIPMENT REQUIRED		
		2 bulldozers 6 pickup trucks 2 graders 2 backhoes
Hole Digging	2 people	Equipment: 1 hole digger 1 pickup truck
Pole Haul	2 people	Equipment: 1 pole haul truck
Structure Erection	4 people	Equipment: 1 line truck 1 pickup truck
Conductoring	12 people	Equipment: 1 drum puller 1 splicing truck 1 double-wheeled tensioner 1 wire reel trailer 1 line truck 1 sagging equipment 2 pickup trucks
Clean-up	4 people	Equipment: 2 pickup trucks
Rehabilitation	2 people	Equipment: 1 pickup truck
Total Personnel Required	50 people*	
* More personnel may be used in order to meet schedule.		

The following items show the sequence of events for construction, operation, maintenance and termination that are expected to take place during the life of this proposed ROW:

1. Right-of-Way Acquisition

New land rights will be required for the transmission line that will cross 3.5 miles of federal land to be obtained in the name of APS. A grant for up to a 100-foot right-of-way for the portion of the transmission line that will cross federal land administered by the BLM has been requested. The BLM receives right-of-way rental payments for those portions of the transmission line located on BLM managed public lands. Additional permanent access road requirements are anticipated.

New land rights also will be required for the transmission line for the 0.4 miles of Arizona State Trust land crossed by the project. A grant for up to a 100-foot right-of-way has been requested. The ASLD receives right-of-way rental payments for the portion of the transmission line located on Arizona State Trust land.

Private lands crossed by the project are owned by FMI., and would be obtained as easements or fee purchases. APS would try to purchase land rights on private lands through reasonable negotiations with FMI, or condemn as necessary. FMI would be reimbursed according to the fair market value of the easement on their properties.

2. Survey

The powerline and new access routes will be surveyed and staked using existing roads.

3. Vegetation

If the following species are present within the anticipated disturbed areas, they will be transplanted out of the area of disturbance (See the Vegetation Treatment Plan, attached as Appendix A):

- Beavertail pricklypear (*Opuntia basilaris*)
- Hedgehog cacti (*Echinocereus* spp.)
- Nolina [beargrass/sacahuista] (*Nolina microcarpa*)
- Yuccas (*Yucca* spp.)
- Agaves (*Agave* spp.)

4. Access Roads

Transmission line construction requires the movement of vehicles along the right-of-way. For this project, existing access roads will be utilized to the maximum extent possible. Existing access roads used during the project will not require upgrades or maintenance. New access road construction is anticipated. Table 3 provides estimated mileage for the use of existing access roads and new access roads, separated by jurisdiction. New roads are generally located within the 100' right-of-way.

TABLE 3 ESTIMATED ACCESS ROAD MILEAGE			
Type of Road	MILES		
	BLM	State	Private
Existing Roads	6.0	0.6	2.8
New Roads			
Graded	1.0	0.2	0.8
Cross Country	0.6	--	--

Standard operating procedures 1, 2, 3, 4, 5, 6, 9, 10, and 25 (see Table 4) will be employed during access road construction to minimize impacts.

5. Structure Sites

The clearing of some natural vegetation might be required; however, selective clearing will be performed only when necessary to provide for surveying, electrical clearance, line reliability, and construction and maintenance operations. Rights-of-way will not be chemically treated unless necessary to comply with requirements of a permitting agency.

At each structure site, areas will be needed to facilitate the safe operation of equipment. The vegetation in the work area will be trampled, not cleared. Standard operating procedures 1, 2, 3, 4, 5, 6, 9, 10, and 25 (see Table 4) will be employed during access road construction to minimize impacts. A biological monitor will be present during structure site clearing on BLM managed public land.

6. Foundation Installation

Excavations for poles are made with power equipment. Where the soil permits, a vehicle-mounted power auger or backhoe is used. In rocky areas, the foundation holes may be excavated by drilling and blasting, or special rock anchors may be installed. Blasting would require drilling holes in the area to be excavated. Conventional or plastic explosives would be used. Safeguards such as blasting mats may be used as necessary to protect adjacent property. After the hole is augured, poles will be set, backfilled, and tamped using existing spoils. Remaining spoils material will be spread on the ground. Where self-supporting poles are used at angle points, the back fill will be pre-mix concrete. Concrete trucks will be used for these angle point structures. Cleanout of the trucks will occur on private FMI land. Standard operating procedure 25 (see Table 4) will be employed to minimize impacts to wildlife.

7. Construction Yards

Two temporary construction yards will be located on private FMI land near the existing mine substation, and the capacitor bank at the terminus of the realigned route. Each construction yard will be a maximum of 3-4 acres. Facilities will be fenced and the gates locked. Standard operating procedures 1, 2, 3, 4, 6, 9, and 12 (see Table 4) will be employed to minimize impacts during construction of the construction yards.

8. Pole Assembly and Erection

Poles and associated hardware are shipped to each structure site by truck. Structure assembly and mounting of associated line hardware takes place at each site. The assembled structure is then raised and placed in the pre-dug holes.

For public protection during wire installation, guard structures are erected over obstacles such as railroads, existing power lines, and structures. Guard structures consist of H-frame poles placed

on either side of the obstacle. These structures prevent ground wire, conductors, or other equipment from falling on an obstacle. Equipment for erecting guard structures includes augers, line trucks, pole trailers, and cranes. Guard structures may not be required on small roads; on such occasions, other safety measures such as barriers, flagmen, or other traffic control are used. Guard structures will not be used on BLM managed public land.

9. Conductor

A pilot line is pulled from structure to structure (or strung) by a vehicle and threaded through the stringing sheaves at each tower. Then a larger diameter, stronger line (the pulling line) is attached to the pilot line and strung. This process is repeated until the ground wire or conductor is pulled through all sheaves.

The ground wire and conductor are strung using power pulling equipment at one end and power braking or tensioning equipment at the other end. Sites for tensioning equipment and pulling equipment are approximately 5,000 to 10,000 feet apart. A helicopter may be used as part of this process. If the helicopter was required to land, it would land on an existing roadway, such as Bruce Mine Road.

The tensioning site is an area approximately 150 feet by 60 feet. The tensioner, line truck, and wire trailer that are needed for stringing and anchoring the ground wire or conductors are located at this site. The tensioner, along with the puller, maintains tension on the ground wire or conductor. Maintaining tension ensures adequate ground clearance and is necessary to avoid damage to the ground wire, conductor, or any objects below them during the stringing operation.

The pulling site requires two-thirds the area of the tension site. A puller and trucks are needed for the pulling and temporary anchoring of the ground wire and conductor. Pulling and tensioning sites will be located along the proposed route at mileposts 0.1, 0.25, 3.1, and 4.0. Standard operating procedure 25 (see Table 4) will be employed to minimize impacts to wildlife.

10. Clean-up

Construction sites, material storage yards, and access roads will be kept in an orderly condition throughout the construction period. Refuse and trash, including stakes and flags, will be removed from the sites and disposed of in an approved manner. No construction equipment oil or fuel will be drained on the ground. Oils and/or chemicals will be hauled to an approved site for disposal. No open burning of construction trash will occur on BLM-administered lands.

The design, construction, operation, and maintenance of the project will meet or exceed the requirements of the National Electrical Safety Code and U.S. Department of Labor Occupational Safety and Health Standards, as well as APS' requirements for the safety and protection of landowners and their property.

11. Stabilization and Rehabilitation

Following construction and clean-up, reclamation will be completed. The disturbed surfaces not needed for future maintenance access and activities will be restored to the original contour of the land surface to the extent determined by the BLM. Appropriate site-specific seed mixes will be used where conditions vary.

Preferably, seed will be planted between the months of November and January following transmission line construction. Seed will be planted using drilling, straw mulching, or hydromulching as directed by the BLM.

12. Existing Line Removal

The planned Bagdad Mine waste rock expansion area will include the area traversed by the existing line. Existing poles would be cut off at ground level, and taken by truck using existing maintenance access roads. The cut towers will be disposed of on private FMI land. Standard operating procedure 25 (see Table 4) will be employed to minimize impacts to wildlife.

13. Operation and Maintenance

Ground maintenance patrols will review the line periodically. Routine maintenance will include replacing damaged insulators as needed, and tightening nuts and bolts.

14. Termination and Restoration

Upon termination of the right-of-way, all improvements will be removed within 90 days. Disturbed areas will be ripped to a depth of 2 inches to promote natural seeding.

STANDARD OPERATING PROCEDURES

APS and its contractors will implement the standard operating procedures shown in Table 4 throughout the project in order to reduce potential adverse environmental impacts. Most of the impacts are short term and generally occur during the construction period.

TABLE 4 STANDARD OPERATING PROCEDURES	
1.	All construction vehicle movement outside of the right-of-way will be restricted to predesignated access, or public roads.
2.	The limits of construction activities will be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits. The right-of-way boundary will be flagged in environmentally

**TABLE 4
STANDARD OPERATING PROCEDURES**

sensitive areas described in the POD to alert construction personnel that those areas will be avoided.
3. In construction areas where recontouring is not required, vegetation will be left in place wherever possible to avoid excessive root damage and allow for resprouting.
4. In construction areas where ground disturbance is significant or where recontouring is required, surface restoration will occur as required by the landowner or land management agency. The method of restoration typically will consist of returning disturbed areas to their natural contour (to the extent practical), reseeding, installing cross drains for erosion control, placing water bars in the road, and filling ditches. Seed will be tested and certified to contain no noxious weeds by the State of Arizona Agricultural Department. Seed viability also will be tested at a certified lab.
5. Improvements (e.g., tanks, developed springs, water lines, wells, fences, etc.) will be repaired or replaced to their predisturbed conditions as required by the landowner or land management agency if they are damaged or destroyed by construction activities. Temporary gates will be installed only with the permission of the landowner or the land management agency. Gates and/or cattle guards will be installed at any existing fence lines crossed by new permanent access roads.
6. Prior to construction, all construction personnel will be instructed on the protection of cultural, paleontological, and ecological resources. To assist in this effort, the construction contract will address (a) federal and state laws regarding antiquities, fossils, and plants and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.
7. An initial intensive cultural resource inventory survey will be conducted prior to construction. Impact avoidance and mitigation measures developed in consultation with appropriate land management and regulatory agencies and other interested parties will be implemented subsequent to the completion of the NEPA compliance document. In addition, supplemental surveys of appurtenant impact zones beyond the corridor will be undertaken as needed.
8. Any cultural and/or paleontological resource discovered during construction by APS or any person working on APS' behalf on public or federal land will be reported immediately to the authorized officer. APS will suspend operations in the area until an evaluation is completed to prevent the loss of cultural or scientific values.
9. All construction and maintenance activities will be conducted in a manner that would minimize disturbance to vegetation, drainage channels, and intermittent and perennial streambanks. In addition, dust-control measures will be utilized as necessary during construction in sensitive areas. All existing roads will be left in a condition equal to or better than their condition prior to the construction of the transmission line.
10. All requirements of those entities having jurisdiction over air quality matters will be adhered to, and any necessary permits for construction activities would be obtained. Open burning of construction trash (cleared trees, etc.) will not be allowed on BLM-administered lands.
11. During operation of the transmission line, the right-of-way will be maintained free of construction related non-biodegradable debris.
12. Totally enclosed containment will be provided for all hazardous materials (if needed) and trash. All construction waste, including trash, litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials.
13. Structures will be constructed to conform to "Suggested Practices for Avian Protection on Power Lines" (Avian Power Line Interaction Committee 2006).
14. Third-party environmental contractors will be used throughout the construction effort, from clearing through rehabilitation.
15. APS will trim trees in preference to cutting trees, and will cut trees in preference to bulldozing them.
16. Construction holes left open overnight will be covered to prevent harm to humans, livestock or wildlife.
17. APS will clean off-road equipment (power or high-pressure cleaning) of all mud, dirt, and plant parts prior to moving equipment onto public land.
18. APS will respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures. The transmission line will be patrolled on a regular basis so that damaged insulators or other line materials that could cause interference are repaired or replaced.

**TABLE 4
STANDARD OPERATING PROCEDURES**

19. APS will apply necessary mitigation to minimize problems of induced currents and voltages onto conductive objects sharing a right-of-way, to the mutual satisfaction of the parties involved.
20. The proposed hardware and conductor will limit the audible noise, radio interference, and television interference due to corona. Tension will be maintained on all insulator assemblies to ensure positive contact between insulators, thereby avoiding sparking. Caution will be exercised during construction to avoid scratching or nicking the conductor surface, which may provide points for corona to occur.
21. Standard structure design will be modified to correspond with spacing of existing transmission line structures where feasible. This list will reduce visual contrast or potential operational conflicts.
22. Non-specular conductors will be utilized to reduce visual impacts.
23. The design and color of the poles will be determined to achieve the minimum practicable visual impacts (i.e., dulled steel or self-weathering poles).
24. If construction activities occur between March 1 and August 31 it could disturb birds nesting within 100 feet of the project area. This could lead to nest abandonment and brood failure. If the project occurs during the migratory bird breeding season, a qualified biologist will need to perform a nest search within 150 feet of the project area prior to commencing construction. This survey should be done a maximum of 2 weeks prior to the estimated construction start date. Disturbances such as periodic maintenance and inspections of the facility could result in a short term disturbance of several hours or less but are not anticipated to result in nest abandonment. Maintenance of the road may result in a short-term disturbance (less than 1 hour) to nesting migratory birds, but is not expected to result in nest or brood abandonment.
25. Special status species or other species of particular concern will continue to be considered during the construction phase of the project, in accordance with management policies set forth by the BLM and other appropriate land management agencies. This will entail monitoring for plant and wildlife species of concern along the proposed transmission line and associated facilities (i.e., access roads and staging areas). In cases where such species are identified, appropriate action will be taken to avoid adverse impacts on the species and its habitat.

ARIZONA GAME & FISH DEPARTMENT DESERT TORTOISE HANDLING GUIDELINES

1. Stop your vehicle and allow the tortoise to move off the road.
2. If the tortoise is not moving, gently** pick up the tortoise and move it approximately 200 feet off the road to a shaded location.
 - a. Do not turn the tortoise over.
 - b. Move the tortoise in the direction it was traveling. If it was crossing the road, move it in the direction it was crossing.
 - c. Keep the tortoise within 12-18 inches of the ground, move slowly so as not to cause it to become alarmed.
 - d. Release the tortoise under the shade of a bush or rock.

** Tortoise store water in their bladder. If a tortoise becomes alarmed, its defense is to void its bladder onto the captor. This could lead to dehydration of the tortoise and potentially to death.

3. Prior to moving any parked vehicle or equipment at the project site, check for tortoise under the vehicles.

The following measures will be employed to further reduce impacts to tortoise habitat:

1. Within 48 hours or prior to onset of surface-disturbing activities, the construction right-of-way within Desert Tortoise habitat that is subject to immediate disturbance will be inspected by a qualified biologist for tortoises and their burrows. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim (Refer to October 23, 2007, Arizona Game and Fish Department [AZGFD] Tortoise Handling Procedures).
2. All tortoises found on the ground surface within construction corridors will be moved a minimum of 500 feet, but not more than 0.5 mile, from their original location and placed in a shaded location. Tortoises that wander onto construction corridors during construction periods will also be removed to a safe location as necessary and will be moved solely for the purpose of preventing death or injury (Refer to Oct. 23, 2007, AZGFD Tortoise Handling Procedures).
3. If a tortoise is endangered by any construction, the activity will cease until a worker who has been through the tortoise education program can move the tortoise out of the line of danger in accordance with stipulation #2 above.
4. A pre-construction Desert Tortoise survey by a biologist trained to conduct tortoise surveys is required in all tortoise habitat no earlier than 45 days (preferably no earlier than 2 weeks) prior to construction to identify burrows or other high-use tortoise areas. This stipulation can be combined with stipulation # 1 which would result in conducting only one survey. During these surveys, the status of previous survey results will be reviewed, and habitat features such as Desert Tortoise burrows will be flagged and staked. All important habitat features within the construction right-of-way will be flagged and staked to alert biological and work crews to their presence. Habitat features outside but within 100 feet of the construction right-of-way boundaries that may be inadvertently damaged or destroyed by construction activities also will be prominently flagged and staked to alert work crews to their presence. Tortoise surveys will be required in all areas of new disturbance, which includes the right-of-way, new access roads (temporary or permanent), widened portions of existing access roads, equipment storage areas, etc. If additional disturbance is anticipated in areas outside of the project corridor as the project progresses, these should be surveyed as well.
5. All locations of Desert Tortoise or their sign will be mapped on a 7.5 minute topography map with Township, Range, section and quarter section noted, date, observer's name, and

vegetation type. Copies of this information will be given to the BLM authorized officer and to the AZGFD, Heritage Data Base Manager, in Phoenix.

6. Proponent is required to obtain all necessary permits for handling or collecting of Desert Tortoise prior to construction (Refer to October 23, 2007, AZGFD Tortoise Handling Procedures).
7. To prevent mortality, injury, and harassment of Desert Tortoise and damage to their burrow, no pets will be permitted in any project construction area unless confined or leashed.
8. All construction vehicles and equipment will be restricted to the right-of-way to limit Desert Tortoise habitat degradation. If necessary, right-of-way boundaries will be flagged to alert work crews. Areas to be flagged and staked will be identified in the POD.
9. The proponent will limit speed of all vehicles along the right-of-way and access roads to 32 km per hour (15 mph) in the Desert Tortoise habitat. Construction and maintenance employees will also be advised that care should be exercised when commuting to and from the project area to reduce road mortality.

APS acknowledges that in the event the public land underlying the right-of-way encompassed in this grant, or a portion thereof, is conveyed out of federal ownership and administration of the right-of-way, or the land underlying the right-of-way is not being reserved to the United States in the patent/deed, and/or the right-of-way is not within a right-of-way corridor being reserved to the United States in the patent/deed, the United States waives any right it has to administer the right-of-way, or portion thereof, within the conveyed land under federal laws, statutes, and regulations, including the regulations at 43 CFR Part 2800, including any rights to have the holder apply to BLM for amendments, modifications, or assignments and for the BLM to approve or recognize such amendments, modifications, or assignments. At the time of conveyance, the patentee/grantee, and their successors and assigns, shall succeed to the interests of the United States in all matters relating to the right-of-way, or portion thereof, within the conveyed land, and shall be subject to applicable state and local government laws, statutes, and ordinances. After conveyance, any disputes concerning compliance with the use and the terms and conditions of the right-of-way shall be considered a civil matter between the patentee/grantee and the right-of-way holder.

APPENDIX A

VEGETATION TREATMENT PLAN

This appendix describes the general vegetative treatment plan used to identify pre-construction to restoration actions that will be required for the Bagdad 115 kilovolt (kV) transmission line project. There are 2 miles of new access roads resulting in permanent disturbance and 0.5 mile of temporary disturbance for cross-country access. For this project, there are certain steps that must be taken to ensure this plan is a success. Although avoidance of existing vegetation during the construction process is the preferred method, when this is not possible or practicable, the implementation of this plan will serve as the mitigation measures as requested by the Bureau of Land Management (BLM). Avoiding vegetation to the extent practicable will be the priority for the Bagdad project. This will allow for minimal disturbance of natural vegetation to continue within the project area.

Treatment Area

This plan identifies treatment areas within the construction area, which includes lands on which human activities have not been precluded. Nonetheless, these lands may support areas of undisturbed natural vegetation.

Identification of Treatment Levels

Treatment levels that prescribe the types of required pre- and post-construction actions were determined based on (1) the type(s) of construction activity, structure features, and the area of associated disturbance and (2) the duration of disturbance (temporary or permanent) associated with these features.

Types of Construction Activities and Facility Features

As presented in the environmental assessment, the activities associated with the construction of a transmission line will include the following tasks:

- Surveying the transmission centerline, other project features, and work areas
- Upgrading or construction of temporary and permanent access roads
- Clearing and grading activities for the right-of-way, tower sites, and construction yards
- Excavating and installing foundations
- Assembling and erecting towers with temporary and permanent pad sites
- Stringing conductors and ground wires
- Clean-up and reclamation of affected areas

The area affected by construction of the major facility features will vary, by feature, and is presented in Table A-1. This table identifies major project features and describes the area of potential temporary or permanent disturbance and effect.

TABLE A-1 CHARACTERISTICS OF THE BAGDAD 115kV TRANSMISSION LINE	
Feature	Description
Land Temporarily Disturbed	
Structure Work Area	Would occur within requested right-of-way
Wire-Pulling and Tensioning Sites	Would occur within requested right-of-way
Construction Yards	Would occur within requested right-of-way on private land
Overland Access	Drive and Crush
Land Permanently Disturbed/Required	
Structure Base	Steel pole foundation
Dirt Roads (no improvement)	Requires no improvement to dirt/gravel road
Dirt Road (with improvements)	Improvement of existing dirt road up to a 12-foot-wide access road
New Access Road (bladed)	Construction of up to a 12-foot-wide dirt access road

Disturbance Duration

This plan defines two broad types of disturbance durations. These are described below, and summarized by construction activity or project feature in Table A-1.

Short-Term/Temporary Use Areas – these areas are used only for the amount of time it takes to construct the project. Examples include work areas where heavy equipment is used to move and install towers, pulling and tensioning sites, and designated construction yards for equipment and materials.

Long-term/Permanent Use Areas – the use of these areas is long-term and the landscape is permanently altered through vegetation removal, site leveling, modifying natural drainages, and constructing towers. Permanent disturbance also includes constructing access roads needed for regularly scheduled maintenance of facilities and structures.

Disturbance Type

This plan defines four broad disturbance types based on activities associated with the construction of project structures that have been considered in the identification of treatment levels and practices. These include the following:

Disturbance Type 1 (D1) – No new disturbance

These areas include existing access roads and pre-disturbed locations that do not require improvement (vegetation removal or grading) that will remain permanent (in place) after project construction is complete.

Disturbance Type 2 (D2) – Overland Drive and Crush

In these areas disturbance is caused by accessing a site without significantly modifying the landscape. Vegetation is crushed, but not cropped. Soil is compacted, but no surface soil is removed. Examples may include tensioning and pulling areas, tower pad sites, and spur roads to towers. Even though vegetation may be damaged and even destroyed, the surface soil and seed bank remains in place. Some crushed vegetation will likely re-sprout after disturbance ceases. These activities would result in minimal to moderate disturbance.

Disturbance Type 3 (D3) – Clear and Cut

In these areas disturbance is caused by access to the project site which requires brushing off of all vegetation in order to improve or provide suitable access for equipment and vehicles. All vegetation is removed, soils are compacted, and minimal surface soil is removed (but no excavation of soils is performed). Examples include temporary access roads where overland access may be used in the construction of structures, or in areas where roads may be improved for access (selective tree and brush clearing). In general, Clear and Cut activities will result in moderate amounts of disturbance.

Disturbance Type 4 (D4) – Clear and Cut with Soil Removal

Disturbance in these areas is caused by removing all vegetation in the affected zone, the soils are compacted, and the surface soil is displaced (i.e., removal of topsoil). These activities result in heavier disturbance, and examples include new access roads that require grading and filling, clearing and grading that may be associated with some tower sites, and in some locations improvements to existing access.

Treatment Levels

Five levels of treatment (T1-T5) have been identified based on the potential type of disturbance and the duration of disturbance associated with the construction of the project features as previously described. These treatment levels are identified in Table A-2 and briefly described below.

TABLE A-2 TREATMENT LEVELS			
Disturbance Level		Disturbance Duration	
		Permanent	Temporary
D1	No New Disturbance	T 1	-
D2	Overland Drive and Crush	-	T 2
D3	Overland: Clear and Cut	-	T 3
D4	Clear and Cut with Soil Removal	T 4	T 5

Treatment Level 1 (T 1) – Minimal level of disturbance, minimal actions - permanent

Construction in these areas does not result in new disturbance, requires minimal pre-construction treatment, and will normally require no post-construction actions (outside of routine maintenance).

Treatment Level 2 (T 2) – Low level of disturbance, few actions - temporary

Construction and activities in these areas are temporary and will result in disturbance that is confined to overland construction which will include vegetation crushing, requiring limited restoration actions. Treatment actions focus on noxious weed control and de-compaction of affected soils. In addition, selective plants such as yucca and agave, may have to be replanted within the construction and heavy-traffic areas.

Treatment Level 3 (T 3) – Moderate level of disturbance, several actions - temporary

Construction and activities in these areas will result in moderate temporary disturbance, limited to clearing, and may require cutting of vegetation. In addition to the actions described under T 2, cleared vegetation will be used as vertical and supplemental mulch.

Treatment Level 4 (T 4) – High level of disturbance, few actions - permanent

Construction of project facilities in these areas results in a high level of disturbance (e.g., clearing, cutting, and soil removal); however, few treatment actions will be required because these areas are permanent. This applies most specifically to new access roads that will serve for long-term maintenance and operation of the transmission line. In these locations, vegetation will not be replanted and replacement of soils and mulch will be limited, if required at all.

Treatment Level 5 (T 5) – High level of Disturbance, maximum actions - temporary

These are the construction areas that will result in a high level of disturbance due to vegetation and soil removal. In these areas, actions pertaining to vegetation salvage and transplanting will be necessary to restore the disturbed seedbank.

Table A-3 identifies the various treatment levels to be specifically applied for each of the construction components/activities and associated disturbance levels/durations. In general, the order of preference on the associated disturbance levels is “overland drive and crush” in areas of new temporary disturbance (e.g. structure work areas, pulling and tensioning sites, etc.), otherwise, “clear and cut” where practical, and finally, if necessary “clear and cut with soil removal.”

TABLE A-3 CONSTRUCTION COMPONENT - TREATMENT LEVELS				
Construction Component	Disturbance Level	Disturbance Duration		Treatment Level
		Permanent	Temporary	
Structure Work Area	D2: Overland Drive and Crush		●	T 2
	D3: Overland Clear and Cut		●	T 3
	D4: Clear and Cut with Soil Removal		●	T 5
Wire-Pulling and Tensioning Sites, Wire-Splicing Sites, Construction Yards	D2: Overland Drive and Crush		●	T 2
	D3: Overland Clear and Cut		●	T 3
Structure Base	D4: Clear and Cut with Soil Removal	●		T 4
Existing Access Roads (no improvement)	D1: No New Disturbance	●		T 1
Existing Access Road (with improvements)	D4: Clear and Cut with Soil Removal	●		T 4
New Access Road	D2: Overland Drive and Crush		●	T 2
New Access Road	D3: Overland Clear and Cut		●	T 3
New Access Road	D4: Clear and Cut with Soil Removal	●	●	T 4/T 5

Treatment

When avoidance is not applicable, the BLM requires certain plants be transplanted within the project limits, but away from construction and heavy traffic areas. The plants that this technique would apply to are beavertail pricklypear (*Opuntia basilaris*), hedgehog cacti (*Echinocereus* spp.), nolina [beargrass/sacahuista] (*Nolina microcarpa*), yuccas (*Yucca* spp.), and agaves (*Agave* spp.).

Pricklypears or cholla that have been uprooted during blading operations should be scattered on disturbed areas around pole sites and on new roads where they can be driven over during construction. They should also be scattered where they will provide temporary vegetation cover in disturbed areas and may eventually help re-vegetate these areas over time.

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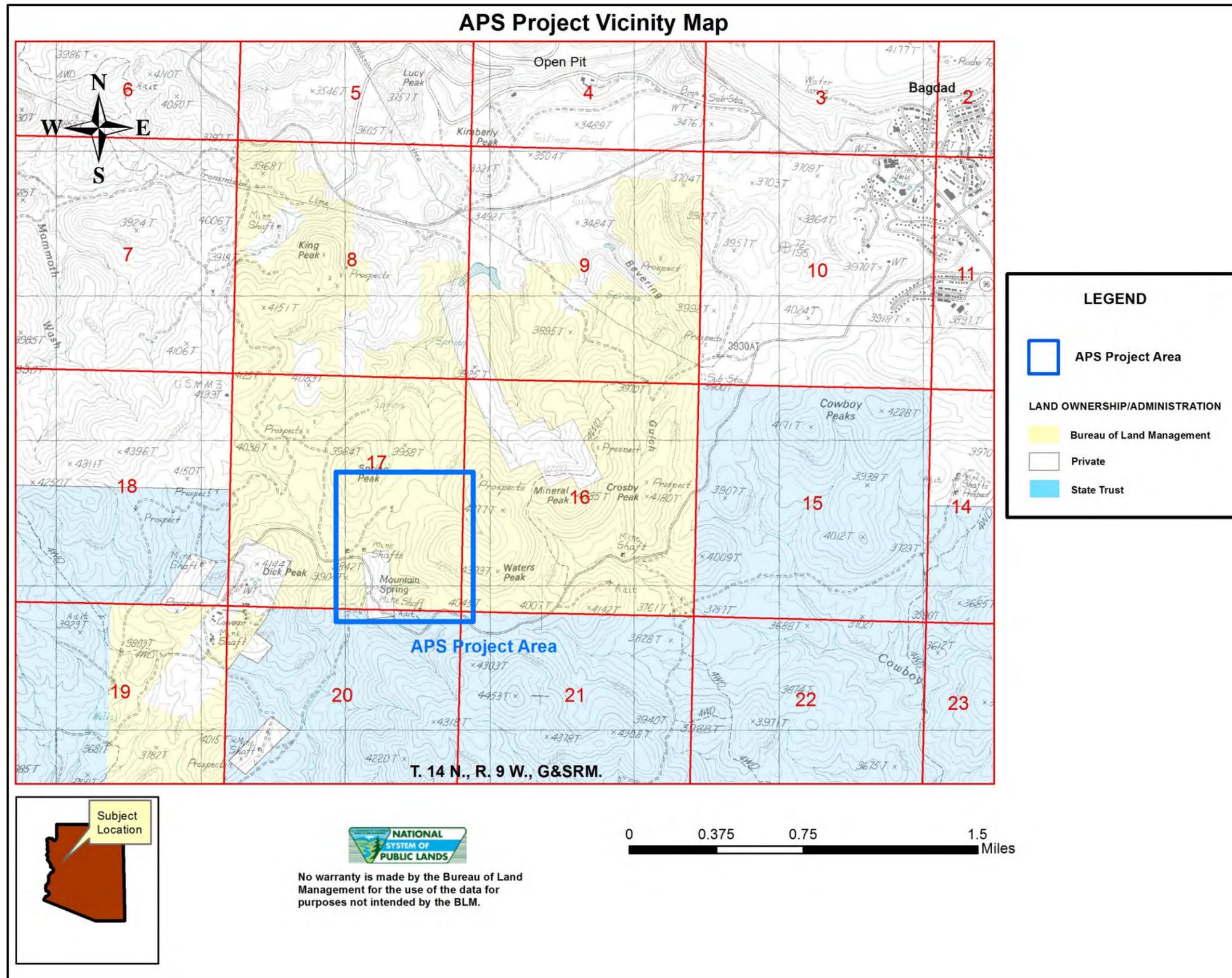


Figure C-1. APS Project Vicinity Map

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**APS 115kV Bagdad Transmission Line
Proposed Maintenance Roads to Structures 20, 21, and 22**

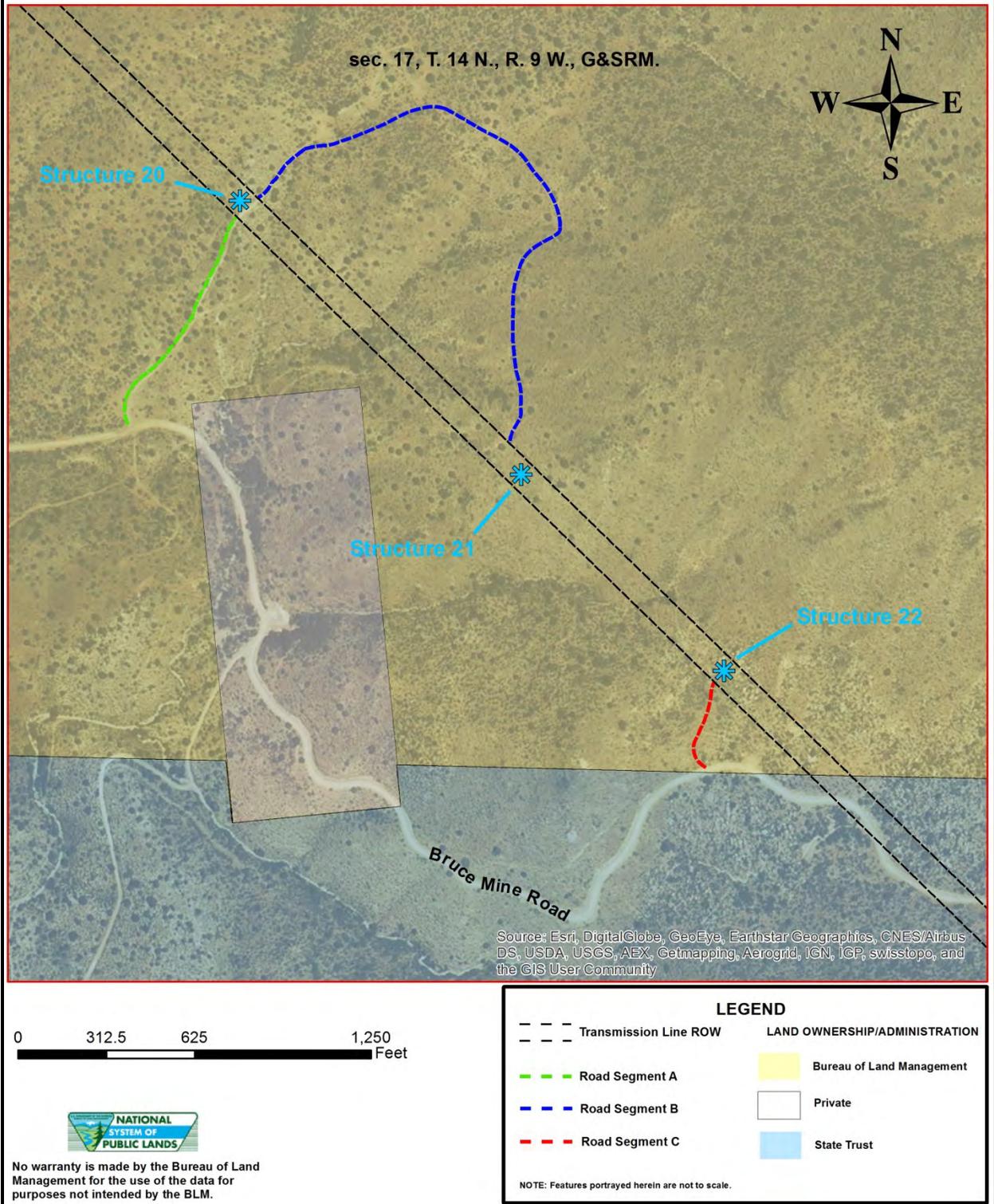


Figure C-2. Proposed Maintenance Roads to Structures 20, 21, and 22.

Appendix D

BIOLOGICAL SURVEY REPORT

**Bagdad Mine
Stockpile Extension
Baseline Biological Survey Report**

Prepared for

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1.0 INTRODUCTION

Freeport-McMoRan Bagdad Inc. (FMBI) is seeking authorization from the Bureau of Land Management (BLM) for the *Bagdad Mine Stockpile Extension Modification to the Mine Plan of Operations* (MPO Modification) (2014) and has prepared this baseline biological report to support the project review and analysis under the National Environmental Policy Act (NEPA). This baseline report provides information on the existing site conditions and describes the biological resources occurring in the project area.

1.1 Project Location

The project area is located approximately 100 miles northwest of Phoenix, on the south side of the existing Bagdad Mine and west of the unincorporated community of Bagdad in western Yavapai County, Arizona (Figure 1). As depicted in Figure 2 the project area encompasses approximately 1,210 acres, including Sections 16 and 17 of Township 14 North, Range 9 West of the Gila and Salt River Baseline and Meridian. The project area includes BLM-administered lands that are managed by the Kingman Field Office (KFO).

1.2 Report Objectives

This report provides baseline biological data to support review and analysis of the proposed project under NEPA, and summarizes the results of the data collection, research, and field reconnaissance survey, including the following:

1. Project area description
2. Characterization and mapping of vegetation communities
3. Wildlife observances
4. Identification of state and federal special status, including BLM sensitive species, that may have the potential to occur in the project area
5. Evaluation of need and location for species-specific surveys in the project area

This report considers the following biological regulations and policies:

- *Endangered Species Act of 1973* (ESA). The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. Section 7(a)(2) of the ESA requires cooperation and consultation with the U.S. Fish and Wildlife Service (USFWS) to ensure that federal actions are not likely to jeopardize the

continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

- BLM Manual 6840 – *Special Status Species Management*. This BLM manual provides policy and guidance for the conservation of BLM special status species and the ecosystems upon which they depend on BLM-administered lands. BLM special status species include: (1) species listed or proposed for listing under the ESA, and (2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA and designated as BLM sensitive by the State Director. Federal candidate species, proposed species, and delisted species in the five years following delisting are conserved as BLM sensitive species.
- *Migratory Bird Treaty Act of 1918*, as amended (MBTA). The MBTA makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale any migratory bird or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations. The migratory bird species protected by the MBTA are listed in 50 CFR 10.13.
- *Bald and Golden Eagle Protection Act of 1940*, as amended (BGEPA). This law provides for the protection of bald and golden eagles by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds.
- *Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds*. This order directs federal agencies to ensure that environmental analyses of federal actions required by NEPA or other established environmental review process evaluate the effects of actions and agency plans on migratory birds, with an emphasis on species of concern.
- *Executive Order 13112, Invasive Species*. This Executive Order was established to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. Federal agencies must identify actions, which may affect invasive species. To the extent practicable and permitted by law, agencies shall not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless the agency determines that the benefits of such actions clearly outweigh the potential harm and that feasible and prudent measures are taken to minimize risk.
- *Arizona Native Plant Law*. Administered by the Arizona Department of Agriculture (ADA), this state law was enacted to protect rare plant species and to protect some species from being over harvested. Protected native plants may fall into one or more of four categories:
 - Highly safeguarded: plants threatened for survival or are in danger of extinction.
 - Salvage restricted: plants subject to damage and vandalism.
 - Salvage assessed: plants with enough value if salvaged to support the cost of salvaging.
 - Harvest restricted: plants protected because they are subject to excessive harvesting due to the intrinsic value of products made with their wood or fiber.
- *Arizona Species of Greatest Conservation Need (SGCN)*. Pursuant to Arizona’s State Wildlife Action Plan: 2012-2022, the Arizona Game and Fish Department (AGFD) developed a number of “vulnerability” criteria, designed to evaluate a species’

conservation status and risk level by evaluating the abundance and distribution of the species. The criteria include indicators of population stability (*e.g.*, demographic status and declining status) and population risk (*e.g.*, fragmentation status and concentration status). Species identified in the SGCN list are ranked according to vulnerability, including:

- 1A: the vulnerability of these species matches at least one of the following:
 - Federally listed as endangered or threatened under the ESA
 - Candidate species under ESA
 - Specifically covered under a signed candidate conservation agreement (CCA) or a signed candidate conservation agreement with assurances (CCAA)
 - Recently removed from ESA and currently requires post-delisting monitoring
 - Closed season species (*i.e.* no take permitted) as identified in Arizona Game and Fish Commission Orders 40, 41, 42 or 43.
- 1B: species determined to be vulnerable, but do not match the above criteria.
- 1C: vulnerability status cannot be assessed due to lack of data and thus represent priority research and information needs.

2.0 METHODS

Telesto Solutions Inc. (Telesto) consulted local and regional references, topographic maps, aerial photographs, resource agency databases, and technical studies for the Bagdad Mine on the physiography and known or anticipated biological resources of the project area and vicinity. The project area topography, elevation, geology, soils, surface water resources, regional distribution of vegetation communities, known occurrences of federally protected species, or other special status species and critical habitat were reviewed to assess the project area.

A field reconnaissance survey was performed to identify and document landscape features, hydrological resources, vegetation and habitat types, and wildlife specific to or occurring within the project area. The survey was conducted from August 25-29, 2014 by biologists Rion Bowers, Dr. Marc Baker, Mike Benham, and Jill Himes. In addition, Dr. Walter Meyers conducted a focused survey for Sonoran desert tortoise within select portions of the project area (refer to Section 3.4.6). Field data was compiled on tablet computers pre-loaded with a custom application for data collection and project area maps to navigate in the field, document species and habitat occurrence, and assist in vegetation mapping. Field datasheets and the tablet computers were used to record habitat features, weather conditions, wildlife observations, vegetation types and observations, water feature/drainage descriptions, and evidence of special status species. Geo-referenced digital photographs were recorded throughout the survey area using the field tablet

computers. Survey intervals for vegetation mapping were based on ground cover, topography, and suitability of habitat for special status species that could occur in the area.

2.1 Project Area Data Review

2.1.1 Climate

The Western Regional Climate Center *Period of Record Monthly Climate Summary* for Bagdad, Arizona (2013) and the National Resource Conservation Service *Ecological Site Description* (2009) were consulted for the climatic conditions of the proposed project area.

2.1.2 Physiography

USGS 7.5' topographic maps (USGS, 1986 and 2011) and the Arizona Land Resource Information System (ARLIS) database (Arizona State Land Department (ASLD), 2014) were used to identify known or suspected locations of landscape features such as springs, stock tanks, access roads, and abandoned mine features. Landscape features were identified on the field tablet computer maps and targeted for specific survey during the field reconnaissance survey.

2.1.3 Regional Hydrology

Prior to the field reconnaissance survey, Telesto reviewed the USGS 7.5' topographic maps, the USFWS National Wetlands Inventory (NWI), and the USGS National Hydrography Dataset (NHD) to identify surface water resources in the project area or vicinity. Telesto field personnel visited the identified surface water features during the field reconnaissance survey and mapped the location of springs, seeps, and ephemeral drainages, paying particular attention to vegetation surrounding these features.

2.1.4 Geology

Geologic mapping of the project area depicted in Figure 3 (Anderson, 1955) was reviewed in preparation for the field reconnaissance survey. The surficial geology is described in Section 3.1.4.

2.1.5 Soils

The U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) Web Soil Survey was used to identify the general soil types in the project area in preparation for the field reconnaissance survey. Project area soils are depicted in Figure 4 and described in Section 3.1.5.

2.2 Vegetation Characterization and Mapping

Prior to the field survey, Telesto conducted a literature review to identify the types of vegetation communities and protected and sensitive plants with a potential to occur in the project area and vicinity. Telesto also consulted with the BLM.

Telesto reviewed aerial photographs of the project area and planned preliminary routes for vegetation sampling and transects to provide indications for plant community boundaries, isolated or unique habitat features, and other landscape features that may contain specific plant types. During the field reconnaissance survey, point sampling, vegetation transects, and general observations were conducted across the project area to:

- map the location of specific vegetation communities,
- obtain a comprehensive list of plant species,
- estimate the density of individual cacti and succulents,
- estimate the relative percent cover and distribution of perennial species
- identify special status plant species occurring in the project area
- note observations of invasive/non-native species, and
- note observations of the plants occurring near surface water features.

2.2.1 Regional Vegetation Biotic Communities

Telesto reviewed regional vegetation mapping of the major biotic communities (biomes) conducted by Brown and Lowe (1980). Researching prior surveys and reports and biotic community mapping in combination with information on soils, geology, and elevation, Telesto compiled a list of plants with a potential to occur in the project area. The list included perennial and annual forbs, graminoids, shrubs, trees, cacti, and succulents and was used as a guide during the field reconnaissance survey.

2.2.2 Vegetation Point Sampling

Vegetation point sampling was conducted at 51 locations throughout the project area. Point samples were used to identify and record major perennial and annual plant species, distinguish the location and boundaries of the primary vegetation communities, and estimate the percent coverage of perennial species.

2.2.3 Vegetation Transects

Vegetation transect data was collected using the field tablet computers with georeferenced aerial photograph and USGS 7.5' topographic base maps of the project area. Data collection included transect start and stop locations, vegetation types, species information, photographs, and other attributes. Field data was recorded on the tablet computers and printed datasheets. Transects were conducted by hiking through the project area and delineating approximately 50 meter by 4 meter (0.049 acre) transects. On-the-ground observations aided by the aerial photograph displayed on the field tablet computers helped to ensure that transects were located within representative plant communities where defined vegetative communities were visually apparent.

Sixty vegetation transects were delineated across the project area. Data collection at each transect included counting cacti and succulents, identifying the major vegetation community type, and recording the dominant perennials and annuals. Transect data was used to estimate the percent cover and density of certain species within each vegetation type on a per acre basis and estimate the total number of these plants within the project area.

2.2.4 Comprehensive Plant List

During the field reconnaissance survey, perennial and annual plant species identified from the prepared list or by the botanist were recorded to develop a comprehensive list of plants that occur in the project area.

2.2.5 Protected Arizona Native Plants

Telesto reviewed the ADA list of plants protected under the Arizona Native Plant Law. While salvage opportunities are limited in the project area due to the ruggedness of the terrain, the location and abundance of cactus and succulents were considered during the field reconnaissance survey in order to assess potential reclamation opportunities.

2.2.6 Culturally Important Plants

Telesto also reviewed the list of plants considered culturally important to the Hualapai Tribe provided through the BLM (Appendix A). With a few exceptions, most of the plants on the list are common in region. The general location and abundance of these species were considered during the field reconnaissance survey.

2.2.7 Riparian Habitat Considerations

Potential riparian habitat was documented on maps prior to the field visits. Telesto physically observed the locations that might support riparian habitat on and around the project area.

2.3 Wildlife Characterization

Telesto recorded and photographed general wildlife observations and wildlife signs (tracks, scat, burrows, *etc.*) during the field reconnaissance survey. Landscape features, including existing/abandoned mine features, surface water resources, rock outcrops/nesting/perch sites, and other natural or man-made features that may provide habitat for special status species were recorded and photographed. Existing/abandoned mines (including those identified prior to the field survey and features not previously identified) were documented from external/surface observations points, noting signs of potential bat use. No entry into abandoned mine features was completed during the field reconnaissance survey due to safety concerns. Binoculars were used to survey for birds, raptors, and potential nest sites and habitat. Focused attention was given to specific wildlife groups or species, including:

- Birds – passerines, raptors, and raptor nests
- Bats – shafts/adits, guano, caves, rock outcrops
- Sonoran desert tortoise – scat, burrows, caliche areas
- Amphibians – springs, seeps, stock ponds, and other surface water features

2.4 Special Status Species Identification

Federal and state agencies maintain a variety of databases related to biological resources, including lists of federally protected and other special status wildlife and plant species, maps of wetland areas, important bird areas, and nest locations. Telesto reviewed these databases and met with the BLM resource specialists to identify potential species and habitat components requiring field study and documentation to comply with the applicable regulatory requirements. As requested by the

BLM and as summarized in this section, federally protected, state sensitive, and BLM sensitive species are specifically considered in this report. Collectively, these species are referred to as “special status species.”

Species abstracts, range, life history, and habitat data were obtained from the USFWS Information, Planning and Conservation System (IPaC), the AGFD Heritage Database Management System (HDMS), and other technical resources that are referenced throughout this report. Natural history information for each of the special status species was reviewed to identify environmental parameters requiring investigation during the field reconnaissance survey. During the survey, Telesto identified areas of potential habitat for special status wildlife species, with particular attention to surface water features and mine shafts and adits (for bat species), as identified from the background research and the pre-field evaluation.

2.4.1 Federally Protected Species

An official list of federally protected species that potentially occur on the project area and/or may be affected by the proposed project was obtained through the USFWS IPaC system (Appendix B); the list of federally protected species that potentially occur in Yavapai County, Arizona was also reviewed (Appendix C). Telesto evaluated the potential for federally protected and other special status species to occur on or near the project area using information from the background research and field reconnaissance survey. The analysis considered the identification of vegetation and habitat in the project area, life history requirements, known elevation, range, distribution, and known locations or mapped species accounts. Based on this analysis, Telesto applied the following occurrence categories to each of the federally protected species:

- *Known to occur*: The species was identified by species-specific surveys or is documented to occur in the project area or vicinity.
- *May occur*: The project area is within the species’ currently known elevation range or distribution and vegetation communities, habitat, soils, or other biotic and abiotic indicators resemble those known to support the lifecycle and/or natural history requirements of the species.
- *Unlikely to occur*: The project area is within the species’ currently known range or distribution, but vegetation communities, soils, and other biotic and abiotic indicators do not resemble those known to support the lifecycle and/or natural history requirements of the species.

- *Does not occur*: The project area is not within the known range or distribution, and other biotic and abiotic indicators do not resemble those known to support the lifecycle and/or natural history requirements of the species.

2.4.2 Arizona Special Status Species

The AGFD HDMS on-line environmental review tool was used to identify known accounts of special status species that may occur in the project area. The AGFD also provided a report from the recently updated HDMS on-line review tool and a list of SGCN for Arizona. Copies of these lists are provided in Appendix B.

2.4.3 BLM Special Status Species

Telesto met with BLM biological resource specialist, Rebecca Peck, on August 13, 2014, to review the scope of the baseline biological study. The BLM identified nine species which should be specifically considered in the baseline biological report, field reconnaissance survey, and NEPA analysis (in addition to the USFWS species listed under the ESA, and Arizona sensitive species). However, all BLM listed species were investigated for their potential for occurrence in the project area.

2.4.4 Birds

The National Audubon Society maintains a list of Important Bird Areas (IBAs), which include areas that provide essential habitat for breeding, wintering, and/or migrating birds. To be designated as an IBA, a site must support at least one of the following criteria:

- Species of conservation concern (*e.g.*, threatened and endangered species)
- Restricted-ranges species (species vulnerable because they are not widely distributed)
- Species that are vulnerable because their populations are concentrated in one general habitat type or biome
- Species, or groups of similar species (such as waterfowl or shorebirds) that are vulnerable because they occur at high densities due to their congregatory behavior

Telesto recorded observations of migratory birds and general wildlife during the field reconnaissance survey in accordance with the BLM request.

3.0 RESULTS

3.1 Project Area Description

3.1.1 Climate

The climate in Bagdad is typical of the Arizona high desert (Table 1). The average summer high temperature approaches 97 degrees Fahrenheit (°F) in July, and the average winter low is just above 32 °F in January. The average annual precipitation is 14.42 inches per year. Winter moisture is frontal, originating in the north Pacific, and falls as rain or snow in widespread storms of low intensity and long duration. Snowfall ranges from a trace to 10 inches per year, and can occur from November through March. Snow seldom persists for more than a day except on north facing features (NRCS, 2009). Summer rains occur from July through September as high-intensity, convective monsoon thunderstorms (WRCC, 2013).

Table 1 Bagdad, Arizona Average Climate (1925-2013)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average/ Total
Average Maximum Temperature (°F)	58.3	61.2	66.2	73.7	82.7	92.0	96.5	94.3	89.6	79.4	67.8	59.7	76.8
Average Minimum Temperature (°F)	32.5	34.7	38.5	44.4	52.4	60.9	68.5	67.2	61.1	50.4	39.7	33.8	48.7
Average Total Precipitation (in)	1.64	1.96	1.40	0.73	0.28	0.27	1.31	2.18	1.26	1.03	0.90	1.46	14.42
Average Total Snow Fall (in)	0.7	0.5	0.4	0.1	0	0	0	0	0	0	0.2	0.8	2.7
Average Snow Depth (in)	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: (WRCC, 2013)

3.1.2 Physiography

The Bagdad Mine lies within the Central Highlands transition zone physiographic province, lying between the Colorado Plateau to the north and east and the Basin and Range to the south and west. This province is characterized by rugged mountains formed from igneous, metamorphic, and sedimentary rock. The project area encompasses approximately 1,210 acres of mountainous terrain. The surrounding landscape is generally characterized as low rolling hills, lava-capped mesas, and narrow, deeply incised canyons. Elevations in the vicinity of the Bagdad Mine range from approximately 2,300 feet at Burro Creek to roughly 5,100 feet in the Grayback Mountains

south of the mine. The drainage divide connects a series of named peaks, including (from west to east):

- Crosby Peak, elevation 4,180 feet
- Mineral Peak, elevation 4,385
- Waters Peak, elevation 4,393
- Spring Peak, elevation 4,150

Dick Peak also rises to an elevation of 4,144 feet in the southwestern portion of the project area. The steepest slopes in the project area exceed 60 percent, and much of the project area slopes exceed 10 percent.

The project area is mapped by the NRCS as part of the Mogollon Transition major land resource area in the Granitic Hills, 12-16” precipitation zone (R038XA104AZ) ecological site (NRCS, 2009).

3.1.3 Regional Hydrology

The project area lies within the Bill Williams River Basin (HUC6 150302) of the Lower Colorado Subregion. As depicted in Figure 1, the drainage divide (ridgeline) between the Burro Subbasin (HUC8 15030202) and the Santa Maria Subbasin (HUC8 15030203) corresponds roughly to the southern boundary of the proposed limit of the stockpile extension. On the north side of the Bagdad Mine, Boulder Creek flows westward to Burro Creek, which joins the Big Sandy River more than 30 river miles downgradient of the mine. Regionally, stormwater originating on the north side of the drainage divide is directed along this course. The earlier operations and creation of the open pit have altered natural hydrology in the upper reaches of the watershed. Stormwater from the stockpile and proposed stockpile extension is captured by the hydraulic sink created by the open pit and does not discharge into downgradient receiving waters.

South of the drainage divide, stormwater flows are naturally directed towards Bridle Creek, which joins the Santa Maria River approximately 16 river miles south of the project area. The Santa Maria River continues for approximately 25 miles before reaching Alamo Lake. Two monitoring wells and their related access roads proposed in the MPO Modification would generally lie on the south side of the drainage divide.

Ephemeral Drainages

During the field reconnaissance survey, ten ephemeral drainage features were identified and surveyed. The features are depicted in Figure 5 and are identified on the USGS 7.5' topographic map. Seven of the features occur on the north side of the ridgeline and direct stormwater runoff towards the existing stockpile and open pit. Three of the features are located on the south side of the ridgeline, within the Santa Maria Subbasin. In general, the ephemeral drainages have slopes ranging from approximately 3 to 20 percent and generally consist of narrow, bedrock-lined canyons on steep slopes (particularly the drainage features north of the ridgeline). South of the ridgeline, the three drainage features begin to transition from steep and narrow bedrock-lined channels to features exhibiting deposition of sands and gravels at breaks in the slope at the lower elevations of the project area. All of the surface drainage features are ephemeral, however, standing water was observed in several bedrock-lined reaches north of the ridgeline during the field reconnaissance survey. This standing water corresponds to the active summer monsoon storm events prior to and during the field work. Representative photographs of the features are provided in Appendix D.

Surface Water Point Features

Seven surface water point features were identified during the field reconnaissance survey (S1 through S7), as identified in Figure 6 and listed in Table 2. Four of these features are indicated on the USGS 7.5' topographic base map as springs or stock tanks, and three additional features were located during the field survey (Features S3, S4, and S5). Table 2 lists the ground surface elevation of these features and extrapolates projected elevation of groundwater from recent groundwater model update (Schlumberger, 2014). Table 2 reports whether the feature exists under conditions conducive to generating surface water expressions from pressure-induced flows (*i.e.* groundwater elevation is greater than the topographic elevation). For surface water point features that are not projected to have potential for pressure induced flow (and that are not man-made), the surface expression of water observed may be due to a temporarily elevated water table generated by noted monsoon precipitation events.

Table 2 Surface Water Point Features in the Project Area

Feature	Description	Location Relative to Ridge	Elevation (feet amsl)	Estimated Groundwater Elevation ¹ (feet amsl)	Potential for Pressure Induced Flow (Yes/No)
S1	Stock tank, constructed berm is washed out, and tank no longer retains water	North	3,968	3,800	No (man-made)
S2	Spring collector tank/cattle box; full of sediment; no standing water	North	3,798	3,790	No (man-made)
S3	Pooled water along drainage in rock outcrop observed during field survey	North	3,768	3,780	Yes
S4	Potential seep; surface expression of water observed during field survey	North	3,878	3,800	No
S5	Concrete spring box; full of sediment; no standing water (along Mineral Creek drainage)	North	3,692	3,760	Yes (man-made)
S6 Mountain Spring	Concrete/rock spring box at spring. Downgradient ranch area includes one circular metal stock tank and one long and thin, rectangular stock tank. The two stock tanks are not connected to the spring and are fed by precipitation.	South	3,802	3,780	No ²
S7	Open topped, above ground metal tank (fed by windmill operated pump/well in fault zone)	On top of ridge (north of divide)	3,954	3,800	No (man-made)

¹ Groundwater elevations were derived from an interpolated surface using contours provided by Schlumberger (2014).

² Mountain Spring (S6) is fed by a pipe that is tapped into the springhead located in the fault zone.

As depicted on Figure 6, the USFWS NWI identifies Mountain Spring as a shrub-wetland (Feature S6), and a stock tank (Feature S1) is designated as a freshwater pond. However, riparian vegetation and wetland characteristics were not observed at Mountain Spring or at the remnants of the earthen stock tank (Feature S1).¹

¹ No “waters of the U.S.” or “wetlands” as defined under the Clean Water Act occur within the area proposed for extension of the Stockpile. Figure 6 depicts data from the NWI; the data from the NWI do not identify or locate “wetlands” defined under the Clean Water Act. The USFWS mapping standards acknowledge the same distinction, caution against relying on the data for regulatory purposes, clarify that the NWI is a high level representation of data, and stress the need for project specific review of the data. For these reasons, NWI data that incorrectly maps features within the existing stockpile are not depicted. The BLM and FMBI have coordinated with the Corps to gain concurrence that the proposed Stockpile extension will not require the placement of fill into waters of the U.S. and no Section 404 permit is required.

Mountain Spring is located on private land south of the ridgeline and outside of the project area. Mountain Spring is fed via a pipe inserted into the springhead located in a fault area. Piping and two stock tanks downgradient from Mountain Spring indicate that this spring has been used in the past to water cattle, however, the piping is disconnected and the berms on the two stock tanks have been breached. During the field reconnaissance survey a small amount of surface flow trickled downhill from the spring box at Mountain Spring. A large waste rock pile from past mining activity lies immediately northwest of Mountain Spring, and other human activity has degraded the area surrounding this spring.

Groundwater

Groundwater in the project area exists within fractured bedrock and in localized, shallow alluvial deposits. The majority of groundwater is located in the highly fractured and faulted areas of bedrock. Areas where perched alluvial groundwater may occur are generally small, localized, and highly dependent on precipitation events (BLM, 1996). Regional groundwater generally flows from northeast to southwest, but is influenced by drawdown due to pumping in the area of the open pit (Schlumberger, 2014).

Specific Hydrologic Considerations from Survey

The field reconnaissance survey was conducted during monsoon season. As noted above, several substantial precipitation events occurred prior to and during the field work (Appendix E). These precipitation events resulted in above average surface flows and pooling, as well as increased occurrence of shallow groundwater. The precipitation and additional shallow groundwater enhanced the expression of surface water at point features in the project area, particularly at Features S3 and S4 (see ground-based photographs in Appendix D).

3.1.4 Geology

As depicted in Figure 3, the surficial geology underlying the project area is almost exclusively represented by Precambrian metamorphic bedrock of the Yavapai series. Mountain Spring Fault distinguishes between the Yavapai series Bridle formation to the west and the Hillside mica schist (also grouped in the Yavapai series) to the east. The Bridle formation consists of metamorphosed igneous (andesitic and basaltic lava flows) and sedimentary (tuffaceous beds and terrigenous

sediments) rocks, and is more than 3,000 feet thick. Surficial expressions of Dick rhyolite and diabase also occur. The Hillside mica schist consists of metamorphosed sandstone and shale, with a total thickness of 3,000 to 4,000 feet (Anderson, 1955). Hillside mica schist is accompanied by gabbro schist, Cheney Gulch granite, and Lawler Peak granite. The stable, crystalline geologic formations limit soil production and form a thin and coarse surface crust with schist-like properties over a granitic base.

The metamorphic terrain has been tightly folded on a large scale, resulting in structural and stratigraphic layering, dipping steeply to the northwest and trending northeastward. The structure of the Yavapai series is that of a syncline, with the western limb overturned in the southern part of the area. The folded structures were faulted and intruded by igneous rocks along the faulting, indicating folding and faulting of the Yavapai series occurred before the Precambrian intrusive activity.

3.1.5 Soils

Table 3 shows the soil groups mapped by the NRCS in the project area. Similar to the geology, the project area soils are roughly divided along the Mountain Spring Fault. The soils east of the fault are predominantly Barkerville cobbly sandy loam (BmF) with Barkerville very stony, sandy loam (BnD) intruding the east and southeast edges of the project area. Soils west of the fault are predominantly Moano gravelly loam (MgD). Figure 4 depicts the distribution of project area soils.

Table 3 Project Area Soils

Soil Type	Description	Slopes	Area (acres)	Percentage of Project Area
BmF	Barkerville cobbly sandy loam	20–60%	987	82%
BnD	Barkerville very stony sandy loam	5–25%	19	2%
MgD	Moano gravelly loam	0–30%	206	17%

The Barkerville soils parent material consist of alluvium and/or colluvium derived from granite, and the Moano gravelly loam parent material is residuum and/or colluvium derived from schist. These soil types are well drained and thin, with bedrock generally occurring within 20 to 40 inches of the surface for the Barkerville soils and within 6 to 20 inches of the surface for the Moano gravelly loam. This corresponds with field observations of vegetation density, where vegetation growing on Moano soils was notably less dense than growth on Barkerville soils. Table 4 lists physical characteristics of the two predominant soils in the project area. Soils in the project area

are classified for rangeland use. Hydric soils and prime and unique farmland do not occur in the project area (NRCS, 2014).

Table 4 Characteristics of Predominant Project Area Soils

Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth (inches)	USDA texture	Classification		Fragments (percent)			Percentage passing sieve number			Liquid limit (percent)	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
BmF—Barkerville cobbly sandy loam, 20 to 60 percent slopes														
Barkerville	90	B	0-10	Cobbly sandy loam	SM	A-1, A-2	0	15-25	80-90	75-85	40-60	20-30	20-25	NP-5
			10-25	Very gravelly loamy sand	SP-SM	A-1	0	0-30	75-85	25-35	10-20	5-10	0-14	NP
			25-30	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
MgD—Moano gravelly loam, 0 to 30 percent slopes														
Moano	85	D	0-9	Gravelly loam	GC, GC-GM, SC, SC-SM	A-6, A-4	0	0-10	65-75	55-65	40-60	35-45	25-35	5-15
			9-16	Unweathered bedrock	—	—	—	—	—	—	—	—	—	—

(NRCS, 2014)

Hydrologic soil group identifies soils having similar runoff potential under similar storm and cover conditions. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. *Group B*. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well-drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission. *Depth* to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the USDA, defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added. *Classification* of the soils is determined according to the Unified soil classification system (USC; ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO; 2004). The USC classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection. *Rock fragments* larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination

3.2 Vegetation Characterization and Mapping

3.2.1 Regional Vegetation Biotic Communities

Regional vegetation mapping conducted by Brown and Lowe (1980) classifies the major biotic communities (biomes) within the project area as interior chaparral and semi-desert grassland, as depicted in Figure 5. The Brown and Lowe mapping, conducted on a regional scale, depicts occurrences of semi-desert grassland biotic community interspersed with interior chaparral throughout the Central Highlands physiographic province. However, the Brown and Lowe mapping was conducted at too large of a scale to capture the details of the project area. Field surveys and site-specific vegetation mapping indicate that the Sonoran desert scrub biotic community/Arizona Uplands subdivision mapped by Brown and Lowe does not occur within the project area. A few species associated with the Sonoran Desert/Arizona Upland biotic communities do occur within the project area (saguaro cacti (*Carnegiea gigantea*) as the primary example), however these species had low representation and low percent cover compared with the disclimax shrub and grassland species, and thus were not important constituents of the biotic community.

During the field reconnaissance survey, Telesto identified two primary vegetation types occurring within the project area, chaparral and disclimax grassland (Figure 5). Chaparral (approximately 684 acres) occurs primarily on east- to north-facing slopes and along drainages, and disclimax grassland (approximately 521 acres) occurs primarily on the drier, west to south facing slopes. Near the center of the southern edge of the project area, a small pocket of granite outcroppings and boulders (approximately 18 acres) represents a unique habitat (rather than a vegetation type), and is characterized by the presence of saguaro cactus (*Carnegiea gigantea*) occurring within a mixture of both chaparral and disclimax grassland vegetation. A description of the vegetation types is provided in the following paragraphs, and a comparison of the vascular plant components between the chaparral and disclimax grassland is provided in Table 5.

3.2.2 Chaparral

The largest component with the chaparral vegetation type is Sonoran scrub oak (*Quercus turbinella*), with co-dominants desert *Ceanothus* (a species of shrub in the buckthorn family,

Ceanothus greggii), mountain mahogany (*Cercocarpus montanus*), California juniper (*Juniperus californica*), and Engelmann's prickly pear (*Opuntia engelmannii*). The local composition among areas of chaparral varies dramatically with other species, such as fairy duster (*Calliandra eriophylla*), narrowleaf goldenbush (*Ericameria linearifolia*), snakeweed (*Gutierrezia sarothrae*), catclaw acacia (*Senegalia greggii*), and banana yucca (*Yucca baccata*) being conspicuous. Overall, perennials comprise an estimated average of approximately 55 percent of the vegetation cover (Table 5).

3.2.3 Disclimax Grassland

The largest component with the disclimax grassland is Engelmann's prickly pear (*Opuntia engelmannii*). However, the species is not diagnostic for the vegetation type because it is also a large component of the chaparral. Co-dominants include fairy duster (*Calliandra eriophylla*), snakeweed (*Gutierrezia sarothrae*), and catclaw acacia (*Senegalia greggii*). As with the chaparral, local composition among areas of disclimax grassland varies dramatically with other species, such as narrowleaf goldenbush (*Ericameria linearifolia*), California buckwheat (*Eriogonum fasciculatum*), Wright's buckwheat (*Eriogonum wrightii*), and littleleaf ratany (*Krameria erecta*), being conspicuous. Both California juniper (*Juniperus californica*) and Sonoran scrub oak (*Quercus turbinella*) occur with some regularity, but not as co-dominants. The overall average percent cover for perennials is estimated to be approximately 41 percent (Table 5). Some grasses, such as purple three-awn (*Aristida purpurea*), sideoats grama (*Bouteloua curtipendula*), and bush muhly (*Muhlenbergia porter*) are common, but rarely co-dominant. There are small patches of big galleta (*Hilaria rigida*) that may indicate a much greater presence of that species before cattle were introduced.

3.2.4 Granite Boulder Area/ Mixed Vegetation

In the southern portion of the project area, several small, discrete areas of granite boulders and rock outcrops occur, intermixed with both chaparral and disclimax grassland vegetation, as indicated in Figure 5. In total, the boulder areas include approximately 18 acres (7.2 hectares). The boulders are generally 3 to 15 feet in diameter (1 to 5 m), rounded granite boulders and rock outcrop areas. Within these areas, plants representing both chaparral and disclimax grassland vegetation types were observed with neither community type as predominant.

The occurrence of saguaro cactus in the project area is limited and tend to be concentrated and co-located with the granite boulder areas, as indicated in Figure 7.

3.2.5 Vegetation Point Sampling

Vegetation point sampling was conducted at 51 locations throughout the project area. Point samples were used to identify and record major perennial and annual plant species, distinguish the location and boundary of two the primary vegetation community types, and estimate the percent coverage of perennial species. The percentage of cover for perennial species for the two vegetation community types is listed in Table 5. The data collected at each point sample location is provided in Appendix G.

3.2.6 Vegetation Transects

Vegetation transect data was used to calculate the percent cover and density of perennial plants within each vegetation type. This data is presented in Table 5, which shows the percent coverage of each species that occurs within both Chaparral and Semi-desert (disclimax) grassland community types. The Chaparral community type has a higher percent coverage due to the abundance of large woody trees and shrubs.

Table 5 Perennial Plant Species and Estimated Percent Cover by Vegetation Community

Species Common Name	Species Scientific Name	Percent Cover	
		Chaparral	Semi-desert (disclimax) grassland
Purple three-awn	<i>Aristida purpurea</i>	0	0.8
Sideoats grama	<i>Bouteloua curtipendula</i>	0.04	0.2
Fairy duster	<i>Calliandra eriophylla</i>	1.2	10
Crucifixion thorn	<i>Canotia holacantha</i>	0.7	0.04
Desert ceanothus	<i>Ceanothus greggii</i>	2.3	0
Mountain mahogany	<i>Cercocarpus montanus</i>	6.1	0.5
Buckhorn cholla ^(a)	<i>Cylindropuntia acanthocarpa</i>	0	0.1
Turpentine bush	<i>Ericameria laricifolia</i>	0.5	1.9
Narrowleaf goldenbush	<i>Ericameria linearifolia</i>	0.9	0.07
California buckwheat	<i>Eriogonum fasciculatum</i>	1.4	1.6
Wright's buckwheat	<i>Eriogonum wrightii</i>	0.5	1.4
Ocotillo ^(a)	<i>Fouquieria splendens</i>	0.2	0.2
Snakeweed ^(a)	<i>Gutierrezia sarothrae</i>	2.0	4.7
Slender janusia	<i>Janusia gracilis</i>	0	0.0
California juniper ^(a)	<i>Juniperus californica</i>	4.8	1.8
Littleleaf ratany	<i>Krameria erecta</i>	0.3	0.6

Species Common Name	Species Scientific Name	Percent Cover	
		Chaparral	Semi-desert (disclimax) grassland
Catclaw mimosa (wait-a-minute bush)	<i>Mimosa biuncifera</i>	0.04	0.2
Bush muhly	<i>Muhlenbergia porteri</i>	0	0.1
Beargrass ^(a)	<i>Nolilna microcarpa</i>	0.09	0
Engelmann's prickly pear ^(a)	<i>Opuntia engelmannii</i>	8.5	12
Velvet mesquite ^(a)	<i>Prosopis velutina</i>	0.09	0.3
Sonoran scrub oak ^(a)	<i>Quercus turbinella</i>	22	0.9
Sugar bush, sugar sumac	<i>Rhus ovata</i>	1.0	0
Desert senna	<i>Senna covesii</i>	0.04	0.07
Catclaw acacia ^(a)	<i>Senegalia greggii</i>	1.0	3.5
Desert sunflower	<i>Viguiera parishii</i>	0	0.07
Banana yucca ^(a)	<i>Yucca baccata</i>	0.8	0.1
Total		55	41

^(a)Species considered culturally important to the Hualapai Tribe
Values for conspicuous co-dominants for each vegetation type are in bold

3.2.7 Comprehensive Plant List

During the field survey, perennial and annual plant species that were identified from the prepared list or by the botanist were recorded in order to develop a comprehensive list of plants that occur in the project area. The comprehensive list is provided in Appendix F. Included in the comprehensive plant list is an indication as to whether the observed species is included in either the USDA or Arizona Department of Agriculture lists of noxious or invasive species. Observed plant species were compared against BLM sensitive species list and during field biological surveys no occurrences of sensitive species were observed within the survey area. Ground-based photographs of select plant species occurring in the project area are provided in Appendix D.

3.2.8 Protected Arizona Native Plants

The location and estimated abundance of cacti and succulents within the project area were noted during the field survey and extrapolated from the vegetation transect data. Table 6 shows the estimated number of each species that occur within the two vegetation community types and Table 7 displays the total estimate of each species site wide according to the vegetation type.

Table 6 Estimated Number of Cacti and Succulents per Acre by Vegetation Community

Common Name	Species	Chaparral		Disclimax grassland	
		Average Count (per acre)	Number of Transects	Average Count (per acre)	Number of Transects
McKelvey's century plant	<i>Agave mckelveyana</i>	7	31	0	29
Buckhorn cholla ^(a)	<i>Cylindropuntia acanthocarpa</i>	38	31	39	29
Hedgehog cactus	<i>Echinocereus engelmannii</i>	55	23	72	21
Pincushion cactus	<i>Mammillaria grahamii</i>	0	23	1	21
Beargrass ^(a)	<i>Nolina microcarpa</i>	14	31	0	29
Beavertail cactus ^(a)	<i>Opuntia basilaris</i>	0	23	2	21
Pancake prickly pear cactus ^(a)	<i>Opuntia chlorotica</i>	4	23	1	21
Engelmann's prickly pear ^(a)	<i>Opuntia engelmannii</i>	257	23	311	21
Desert prickly pear ^(a)	<i>Opuntia phaeacantha</i>	3	23	3	21
Banana yucca ^(a)	<i>Yucca baccata</i>	37	31	5	29
	<i>Yucca baccata heads</i>	23	23	6	21

^(a)Species considered cultural important to the Hualapai Tribe

Counts for each 4 m x 50 m (200 m² = 0.049 acres) are presented in Appendix F; results were converted to a per acre estimate.

Table 7 Estimated Total Number of Cacti and Succulent Species by Vegetation Community

Common Name	Species	Chaparral	Disclimax grassland	Total
McKelvey's century plant	<i>Agave mckelveyana</i>	4,800	0	4,800
Buckhorn cholla	<i>Cylindropuntia acanthocarpa</i>	26,200	20,300	46,500
Hedgehog cactus	<i>Echinocereus engelmannii</i>	37,900	37,500	75,400
Pincushion cactus ^(b)	<i>Mammillaria grahamii</i>	0	18	18
Beargrass ^(a)	<i>Nolina microcarpa</i>	9,600	0	9,600
Beavertail cactus ^(a)	<i>Opuntia basilaris</i>	0	1,000	1,000
Pancake prickly pear cactus ^(a)	<i>Opuntia chlorotica</i>	2,800	500	3,300
Engelmann's prickly pear ^(a)	<i>Opuntia engelmannii</i>	177,100	162,100	339,200
Desert prickly pear ^(a)	<i>Opuntia phaeacantha</i>	2,100	1,600	3,700
Banana yucca ^(a)	<i>Yucca baccata</i>	25,500	2,600	28,100
Total Area (acres)		689	521	1,210

^(a)Species considered cultural important to the Hualapai Tribe

^(b)Only observed in the granite boulder area; abundance estimate is based on the count and size of this area

3.2.9 Culturally Important Plants

Telesto observed the location and estimated abundance of plant species culturally important to the Hualapai Tribe that were recorded during the field survey (Appendix A). With a few exceptions, these plants are common in the project area.

3.2.10 Riparian Habitat Considerations

Telesto identified no riparian or wetland habitat within the project area, though a few riparian indicator species were documented. In general, vegetation along the ephemeral drainages and around the surface water point features, including Mountain Spring consists of relatively dense chaparral (in comparison to the density observed on the remainder of the project area). Grassland vegetation was observed along the drainages at lower elevations, especially south of the ridgeline (Figure 5). Across the project area, observed riparian vegetation is restricted to only a few individual trees in discrete, dispersed locations generally corresponding to surface water point features. Mountain spring supports a few riparian trees on the project site. North of project area, limited, small pockets of riparian vegetation including cottonwood and willow trees were observed at vegetation points/photos V9, V10, V12, and V22. The points are indicated in Figure 8 and Figure 9, and the photos are presented in Appendix D. These limited pockets of riparian vegetation correspond to the areas downgradient of surface water point features S4 and S5, indicating that shallow groundwater is available to support the riparian vegetation growth at these points.

3.3 Wildlife

Wildlife observations recorded during the field reconnaissance survey are listed in Table 8. These species are commonly found within the vegetation community types and habitat located in the project area.

Table 8 Wildlife Observed in the Project Area

Common Name	Scientific Name	Taxa
Cliff chipmunk	<i>Eutamias dorsalis</i>	Mammal
Coyote	<i>Canis latrans</i>	Mammal
Deermice	<i>Peromyscus sp.</i>	Mammal
Eastern cottontail	<i>Sylvilagus floridanus hesperius</i>	Mammal
Javelina	<i>Tayassu tajacu</i>	Mammal
Mule deer	<i>Odocoileus hemionus</i>	Mammal
Pocket mice	<i>Perognathus sp.</i>	Mammal
White-tailed antelope ground squirrel	<i>Ammospermophilus leucurus</i>	Mammal

Common Name	Scientific Name	Taxa
White-throated woodrat	<i>Neotoma albigula</i>	Mammal
Anna's hummingbird	<i>Calypte anna</i>	Bird
Black-tailed gnatcatcher	<i>Poliophtila melanura</i>	Bird
Black-throated sparrow	<i>Amphispiza bilineata</i>	Bird
Cactus wren	<i>Campylorhynchus brunneicapillus</i>	Bird
Canyon towhee	<i>Melospiza fusca</i>	Bird
Canyon wren	<i>Catherpes mexicanus</i>	Bird
Common raven	<i>Corvus corax</i>	Bird
Mourning dove	<i>Zenaidura macroura</i>	Bird
Northern cardinal	<i>Cardinalis cardinalis</i>	Bird
Gambel's quail	<i>Callipepla gambellii</i>	Bird
Red-tail hawk	<i>Buteo jamaicensis</i>	Bird
Roadrunner	<i>Geococcyx californicus</i>	Bird
Sage thrasher	<i>Oreoscoptes montanus</i>	Bird
Turkey vulture	<i>Cathartes aura</i>	Bird
Western kingbird	<i>Tyrannus verticalis</i>	Bird
Western scrub jay	<i>Aphelocoma californica</i>	Bird
Yellow warbler	<i>Dendroica petechia</i>	Bird
Clark's spiny lizard	<i>Sceloporus clarkii</i>	Reptile
Plateau fence lizard	<i>Sceloporus tristichus</i>	Reptile
Sonoran whipsnake	<i>Coluber bilineatus</i>	Reptile
Tree lizard	<i>Urosaurus ornatus</i>	Reptile
Arizona toad (tadpoles) ^(a)	<i>Anaxyrus microscaphus</i>	Amphibian

^(a)Tadpoles were observed at the pooled water in the drainage at Feature S3 and in the above ground, metal stock tank on the top of the ridgeline at Feature S7. The tadpoles are thought to be Arizona toad (formerly classified as Southwestern toad under the genus *Bufo*), which is consistent with amphibian species observed in prior studies. The observed presence of tadpoles in the ponded water suggests that this area provides surface water in a quantity and duration available to support the short cycle of amphibian reproduction (generally ranging from a couple of weeks to a month).

3.4 Special Status Species

3.4.1 Federally Protected Species

Twenty-two species including ten endangered, five threatened, four candidate, and three experimental populations (non-essential), are listed by the USFWS as potentially occurring in Yavapai County, Arizona. The USFWS recommends considering these species in an effects analysis for a project and including species that exist in another geographic area (*i.e.*, downstream or adjacent area) that may also be directly or indirectly affected by the project. An entire list of species investigated as listed by the USFWS can be found in Appendix H.

All of these species are discounted from occurring in the project area or nearby, due to species habitat requirements or known locality information. The USFWS IPaC report that was obtained from a focused search for just the project area narrowed the list of federally protected species down

to two endangered, two threatened, four candidate species, and one experimental population (non-essential) that have the potential to occur within the project area and vicinity.

The BLM lands that occur within the project area are designated as Class III habitat for the Sonoran Desert tortoise. The focused habitat assessment and survey did not find evidence of the tortoise. The Sonoran desert tortoise is the only federally protected species rated as “unlikely to occur” on the project area or vicinity. The potential for Sonoran desert tortoise to occur in the project area is further discussed in Section 3.4.6.

The other 21 species listed by the USFWS as potentially occurring in Yavapai County were determined not to occur in the project area because the project is not within the known distribution and range for the species, or specific habitat elements that are needed to support the life history requirements of these species do not occur on or near the project area.

3.4.2 Arizona Special Status Species

Fifty-six Species of Greatest Conservation Need (SGCN) potentially occur within a five-mile radius of the project area (Appendix C). Results of the screening analysis for these species potential to occur in the project area are presented in Appendix H. Most of these species do not occur or are unlikely to occur in the project area due to elevation restrictions, specific habitat requirements, or other specific life history needs that do not occur on or near the project area. The summary of species that may potentially occur or were noted to occur can be found in Table 9. The rationale for the potential for occurrence is included for each species.

Table 9 Screening Analysis for Species of Greatest Conservation Need

Species Name	Scientific Name	SGCN	Potential for Occurrence in Project Area
Harris’ antelope squirrel	<i>Ammospermophilus harrisi</i>	1B	May occur
Arizona toad	<i>Anaxyrus microscaphus</i>	1B	May occur
American pronghorn	<i>Antilocapra americana americana</i>	1B	May occur
Gila spotted whiptail	<i>Aspidoscelis flagellicauda</i>	1B	May occur
Ferruginous hawk	<i>Buteo regalis</i>	1B	May occur
Common nighthawk	<i>Chordeiles minor</i>	1B	May occur
Sonoran whipsnake	<i>Coluber bilineatus</i>	1B	May occur
Arizona black rattlesnake	<i>Crotalus cerberus</i>	1B	Known to occur
Spotted bat	<i>Euderma maculatum</i>	1B	May occur
Banded Gila monster	<i>Heloderma suspectum</i>	1A	May occur

Species Name	Scientific Name	SGCN	Potential for Occurrence in Project Area
Sonoran desert toad	<i>Incilius alvarius</i>	1B	May occur
Gila woodpecker	<i>Melanerpes uropygialis</i>	1B	May occur
Lincoln's sparrow	<i>Melospiza lincolni</i>	1B	May occur
Abert's towhee	<i>Melospiza aberti</i>	1B	May occur
Sonoran coralsnake	<i>Micruroides euryxanthus</i>	1B	May occur
Yuma myotis	<i>Myotis yumanensis</i>	1B	May occur
Stephen's woodrat	<i>Neotoma stephensi</i>	1B	May occur
Pocketed free-tailed bat	<i>Nyctinomops femorosaccus</i>	1B	May occur
Savannah sparrow	<i>Passerculus sandwichensis</i>	1B	May occur
Arizona pocket mouse	<i>Perognathus amplus</i>	1B	May occur
Regal horned lizard	<i>Phrynosoma solare</i>	1B	May occur
Yellow warbler	<i>Setophaga petechia</i>	1B	May occur
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>	1B	May occur
Arizona bell's vireo	<i>Vireo bellii arizonae</i>	1B	May occur
Kit fox	<i>Vulpes macrotis</i>	1B	May occur

3.4.3 BLM Special Status Species

Forty-four species are listed by the BLM as special status species for the state of Arizona (BLM 2010). Ms. Rebecca Peck of the BLM KFO highlighted nine of these species as possibly having a potential to occur near the project area. A detailed description of the 54 BLM sensitive species and habitat requirements is found in Appendix H, and a summary of those with the highest potential to occur (may occur, known to occur) is presented in Table 10.

Table 10 Screening Analysis for BLM Sensitive Species

Species Name	Scientific Name	Potential for Occurrence in Project Area
Allen's big-eared bat	<i>Idionycteris phyllotis</i>	May occur
Ferruginous hawk	<i>Buteo regalis</i>	May occur
Le Conte's thrasher	<i>Toxostoma lecontei</i>	May occur
Spotted bat	<i>Euderma maculatum</i>	May occur

None of the BLM sensitive species were observed in the project area during the field survey and either do not occur or are unlikely to occur in the project area. A detailed discussion of the Sonoran desert tortoise is presented in Section 3.4.6. Four species of bats listed as sensitive species by the BLM are unlikely to occur because there is no suitable habitat for these bats. The gilded flicker, the only sensitive bird species, is also unlikely to occur in the project area due to the absence of

large mature saguaro cactus and Sonoran desert scrub habitat. The gilded flicker is further discussed in Section 3.4.6.

3.4.4 Species of Economic and Recreational Importance

The project area is located within AGFD Game Management Unit 18B which is located on private lands, lands managed by the Arizona State Land Department, and lands administered by the BLM. The boundary of Unit 18B is depicted in Figure 10.

Several of the thirteen species listed as Species of Economic and Recreational Importance (SERI) in the State Wildlife Action Plan (AGFD, 2012) occur in portions of Unit 18B. These SERI's include five large mammal species, waterfowl and game birds that are important to the wildlife viewing, bird watching, and hunting communities. HabiMap Arizona (HabiMap, 2013) indicates that the density of SERI species in the project area is low and in the surrounding areas it is medium. Table 11 summarizes the range, habitat requirements and potential to occur (low, medium, high) in the project area.

Table 11 Species of Economic and Recreation Importance Predicted within Project Vicinity

Common Name (Scientific Name)	Range or Habitat Requirements	Potential for Occurrence in Project Area
American pronghorn (<i>Antilocapra americana americana</i>)	Pronghorn occur from southern Alberta and Saskatchewan south to northern Sonora and Chihuahua, Mexico, west to eastern Oregon, northeastern California, as well as east to mid-state regions of North Dakota, South Dakota, and Texas. Pronghorn primarily occur in grasslands and open shrub-grasslands, though they may occasionally be found in deserts and quaking aspen parkland (USFS, accessed April 2015). In unit 18B, pronghorn are found at Goodwin Mesa, Bozarth Mesa, and north of the San Luis Maria Baca Float/ORO Ranch near the boundary with unit 18A. Several herds occur on Behm and Contreras Mesas outside of Bagdad. These areas are approximately five miles north of the project area and separated from the project area by the open pit and existing stockpiles.	Low. The project area is not considered prime habitat for pronghorn. However, pronghorn may occasionally disperse through the area when migrating to other suitable areas.

Common Name (Scientific Name)	Range or Habitat Requirements	Potential for Occurrence in Project Area
Bighorn sheep (<i>Ovis canadensis</i>)	Bighorn sheep inhabit alpine meadows, grassy mountain slopes and foothills near rugged, rocky cliffs and bluffs. In winter, bighorn prefer slopes 2,500 to 5,000 feet (762 to 1,524 m) amsl where annual snowfall is less than 60 inches a year; they cannot paw through deeper snow to feed. Their summer range is between 6,000-8,500 feet (1,828 to 2,590 m) amsl. In AGFD unit 18B, sheep are most commonly observed in the Hells Half Acres area. Other areas that sheep can be found are Kaiser Springs, Burro Cliffs, Red Knob, Negro Ed, Burro Creek, Francis Creek, Pinky Canyon, Boulder Creek and Lawler Peak.	Medium. The project area does not contain alpine meadows or rugged rocky cliffs. However, bighorn may occasionally disperse through the area while moving between mountain ranges.
Black bear (<i>Ursus americanus</i>)	In Arizona, black bear is found in most woodland habitats, including pinyon-juniper, oak woodland, coniferous forest, and chaparral. Bear habitat occurs in the far northeastern corner of unit 18B. This area includes limited road access and rugged terrain. Conger Creek, Pine Creek, and Burro Creek have good bear habitat. A small amount of bear habitat also occurs in the remote northwestern portion of this unit along Trout Creek.	Low. The project area does not contain woodland habitat and the overall density of bears in the area is low. However, bears may occasionally forage or disperse through the area while moving between suitable patches of habitat.
Elk (<i>Cervus elaphus</i>)	Elk are found in low densities in the northeastern corner of unit 18B, north of Bozarth Mesa and on ORO Ranch. This species occupies high elevations from 7,000 to over 10,000 feet (2,133 to 3,048 m) during the summer, typically within a ½ mile of water. They stay at these elevations until forced down to lower elevation winter range by snow. Winter range varies from 5,500 to 6,500 feet (1,676 to 1,980 m) in Arizona, primarily within the pinyon-juniper zone. Prime habitat includes the spruce fir-sub-alpine belt.	Low. The project area does not contain summer or winter range habitat that is used by this species. However, elk may occasionally disperse through the area while moving between suitable patches of habitat.
Mule deer (<i>Odocoileus hemionus</i>)	Mule deer are found in a range of habitats in the Southwest, including desert shrublands at the lowest elevations, semi-desert shrubland-grassland communities, chaparral, mountain shrub, woodlands at middle elevations, and some forests at high elevations. The highest deer density occurs in the eastern portion of unit 18B. This area is relatively flat with rolling hills and scattered junipers. The southern portion of the unit also has a high population of deer in chaparral habitat. The Crosby and Grayback mountains southwest of the project area are popular hunting areas for deer.	Medium. Habitat for deer and deer sign was observed during the field survey. However, due to the existing disturbance from grazing, mining and human occupation in the area, the expected overall population of deer in the project area is low.

Common Name (Scientific Name)	Range or Habitat Requirements	Potential for Occurrence in Project Area
Javelina (<i>Pecari tajacu</i>)	In Arizona, javelina are found in shrublands, pinyon-juniper woodlands, conifer forests, and deserts. Unit 18B provides a mixture of these habitats including Mohave and Sonoran desert scrub in the lower portions and chaparral as elevation increases. There are many drainages and breaks that provide bedding and forage opportunities for this species. Habitat in the project area includes many of the features that would support this species.	Medium. Habitat for javelina and javelina sign was observed during the field survey. However, due to the existing disturbance from grazing, mining and human occupation in the area, the expected overall population of javelina in the project area is low.
Mountain lion (<i>Puma concolor</i>)	In North America, most mountain lion populations occur in the western U.S. and Canada (Tesky 1995). In Arizona, the species may be found in open woodland such as oak scrub, pinyon, juniper, mountain mahogany, ceanothus, and manzanita vegetation communities. They prefer rocky cliffs, ledges, vegetated ridge tops, or other areas that provide cover. They frequently follow stream courses and ridge tops as travel and hunting corridors (Tesky 1995). Mountain lion habitat occurs throughout unit 18B.	Medium. Habitat and forage for this species occurs in the project area. However due to the existing disturbance from grazing, mining, ranching, and human occupation in the area, the expected overall population of lions in the project area is low to medium.
Gambel's quail (<i>Callipepla gambelii</i>)	Gambel's quail are found almost exclusively in the southwestern U.S., primarily in Arizona and south into Mexico. They occur in thick chaparral and diverse shrub vegetation types of the Sonoran, Chihuahuan and Mohave deserts. Quail are non-migratory and annual movements of the covey are less than 2 kilometers. This species is found throughout unit 18B and surrounding areas.	High. Habitat and forage for this species occurs in the project area and on nearby lands.
Waterfowl (various spp.)	Waterfowl such as ducks and geese are restricted to permanent and temporary surface water resources that occur within the desert southwest.	Low. There are no permanent open water resources in the project area.

3.4.5 Birds

No IBAs are located proximate to the project area (Audubon, 2014). The nearest IBA is the Joshua Tree IBA, located approximately 40 miles west of the project area.

3.4.6 Specific Species Considerations

Sonoran Desert Tortoise

According to the *Management Plan for the Sonoran Desert Population of the Desert Tortoise in Arizona* (Arizona Interagency Desert Tootoise Team, 1996) the distribution of Sonoran desert tortoise south of the Grand Canyon ranges from Pearce Ferry in Mohave County to the south beyond the international border with Mexico and at many scattered locations in between. South

and east of the Colorado River, Sonoran desert tortoise occur primarily on rocky slopes and bajadas of Mohave desert scrub and the Arizona Upland and Lower Colorado River subdivisions of the Sonoran Desert. Sonoran desert tortoise is most often found in palo verde-mixed cacti associations, but range from about 500 feet amsl in Mojave Desert scrub to semi-desert grassland and interior chaparral at about 5,300 feet amsl. In the Arizona Upland subdivision, boulders, outcrops, and natural cavities are important substrate components of the habitat as shelter sites. Most often, tortoises excavate burrows in deeper soils at the base of boulders and rock outcrops found on bajadas slopes. Caliche caves in washes and incised, cut banks are also used for shelter sites, especially in the Lower Colorado River Valley subdivision (Arizona Interagency Desert Tortoise Team, 1996). Shelter sites are rarely found in shallow soils, such as those occurring in the project area (Section 3.1.5).

Dr. Walter Meyer conducted a focused field survey in portions of the study area. Prior to the field survey, Dr. Meyer investigated topographic maps and detailed aerial photography of the survey area to identify areas for on-site investigation of tortoise presence. Several sites in and near the southern border of the project area were identified for evaluation during the field survey. Habitat on these selected sites consists of large granitic boulders within a mixed vegetation community that includes saguaro cactus and representatives of interior chaparral and grassland plant communities. In addition, an ephemeral wash at the southeastern portion of the project area was evaluated as potential Sonoran desert tortoise habitat. These sites were surveyed for sign of tortoise including, tracks, scat, burrows, or clear evidence of forage. The wet conditions resulting from the precipitation events prior to and during the field survey were ideal for encountering tortoise. Areas of the focused, species-specific survey for tortoise by Dr. Meyer are depicted in Figure 7.

As described previously, terrain type and topographic features vary across the survey area, but generally include sloped hillsides ranging from moderate to steep, with differing presence of loose schist and granite outcrops. Several areas with saguaro cacti and large boulders are present south of the ridgeline, with the largest concentration along the southern border of the project area between Mountain Spring and Kellis Ranch. On the USGS and aerial maps, this area was identified as having the highest potential to contain suitable habitat for Sonoran Desert tortoise within the constraints of the project area.

The focused field survey and the larger field reconnaissance survey resulted in the following observations:

- No scrapes or habitable burrows indicative of tortoise habitation were observed during the focused survey or field reconnaissance survey.
- Mohave desert scrub and Arizona upland habitat does not occur in the project area.
- The shallow, granitic- and schist- derived soils and underlying shallow, Precambrian bedrock creates a thin, unstable surface layer that do not provide suitable burrowing habitat for Sonoran desert tortoise. No signs of tortoise scat was found in the proximity of crevasses, rock piles, or collected on pack rat midden.
- No tracks or sign of tortoise movements were observed in the focused survey area or larger project area during the field reconnaissance survey.
- No tortoise shells or skeletal remains were identified in the focused Sonoran desert tortoise survey or larger field reconnaissance survey.
- The soils and geologic features, particularly the Moano soils on the western portion of the project area support only sparse vegetation that would not sustain a large population of Sonoran desert tortoise.
- The drainage features in the project area (excepting the limited flatter reaches of Feature 10, as shown on Figure 7) are comprised of steep, bedrock-lined drainages that do not provide suitable burrowing habitat.
- No caliche was observed in the project area.
- Habitat within and surrounding the project area is designated as Category III by the BLM. Category III habitat does not support large populations of Sonoran desert tortoise.

These observations indicate that habitat within the project area is not consistent with the vegetation community types and substrate preferred by this species. Furthermore, surveys of surrounding areas completed during initial development of the Bagdad Mine did not detect large numbers of Sonoran desert tortoise (inclusive of a larger project area to the west). Prior surveys did not detect Sonoran desert tortoise within the footprint of the existing Stockpile. The Sonoran desert tortoise is unlikely to occur in the project area, and additional species-specific surveys would not be likely to identify a large population of Sonoran desert tortoise occupancy.

Gilded Flicker

The gilded flicker is a resident species of the Sonoran Desert regions of the southwestern U.S. and northwestern Mexico including the Baja Peninsula (except coastal regions between Tijuana and Guerrero Negro and along the west coasts of Mexican mainland south to Mazatlán). This species is considered permanent throughout its range, with only short, local migratory movements. In Arizona, gilded flickers are common residents in south-central portion of the state and are more

sparsely distributed west to the Colorado River Valley and north to the Big Sandy and Santa Maria river drainages at elevations ranging from 600 to 10,500 feet (Wise-Gervais, 2005).

The gilded flicker dwells in the southwestern desert woodlands, including saguaro cactus forests and other large cactus forests of Baja, California. Although it prefers dry deserts, it is sometimes found in wooded areas with mature cottonwood trees near streams.

This species has a high affinity for saguaro and other large columnar cactus, which provide optimum cavity nesting opportunities. Throughout its range, nest sites occur in areas near clearings and other open areas or in forests interspersed with meadows, fields and clear-cuts. The nest cavity is dug into the top part of saguaro cacti; females typically lay 3 to 5 eggs in a nest cavity during the breeding and nesting season from mid-March through April.

As indicated in Table 10, gilded flickers are unlikely to occur in the project area due to the lack of Sonoran desert scrub habitat and low number of saguaro cacti found on the project area.

Bats

Bats are known to use mine features, such as shafts, adits, and tunnels in the region as roosting habitat. Existing mine features identified on topographic maps or observed in the field that may support bats were located and photographed during the field survey. For safety reasons, the interior of open shafts and adits were not explored, and the entrances were not approached within several feet as a margin of safety. The exterior of mine features were visually inspected for signs of bat utilization, such as the presence of guano and droppings around the entrance area. While no evidence was noted, the lack of signs does not preclude the potential use of these features by bats.

Two closed adits were identified north of the ridgeline, and the remaining features were located south of the ridgeline. The three open features exhibit an average opening of 3 to 4 feet wide and unknown depth. One open shaft was supported with timbers and had a wooden head frame (Feature B3); closed Features A1 and A2 have either collapsed or have been backfilled. Representative photographs of these features are included in the Appendix D, and their locations are depicted on Figure 7. Table 12 lists the shafts and adits observed during the field survey.

Table 12 Existing Mine Features Located within the Project Area

Mine Feature*	Open/closed	Description
A1	Closed	Filled shaft
A2	Closed	Filled shaft
A3	Closed	Filled vertical shaft
A4	Closed	Prospect, roughly 5 feet x 8 feet vertical
B1	Open	Open, vertical hole at top of hill, connected to adit B2
B2	Open	Horizontal adit, appears to connect to open shaft B1
B3	Open	Adit with wood frame

* Figure 7 depicts the location of the mine features observed in the project area.

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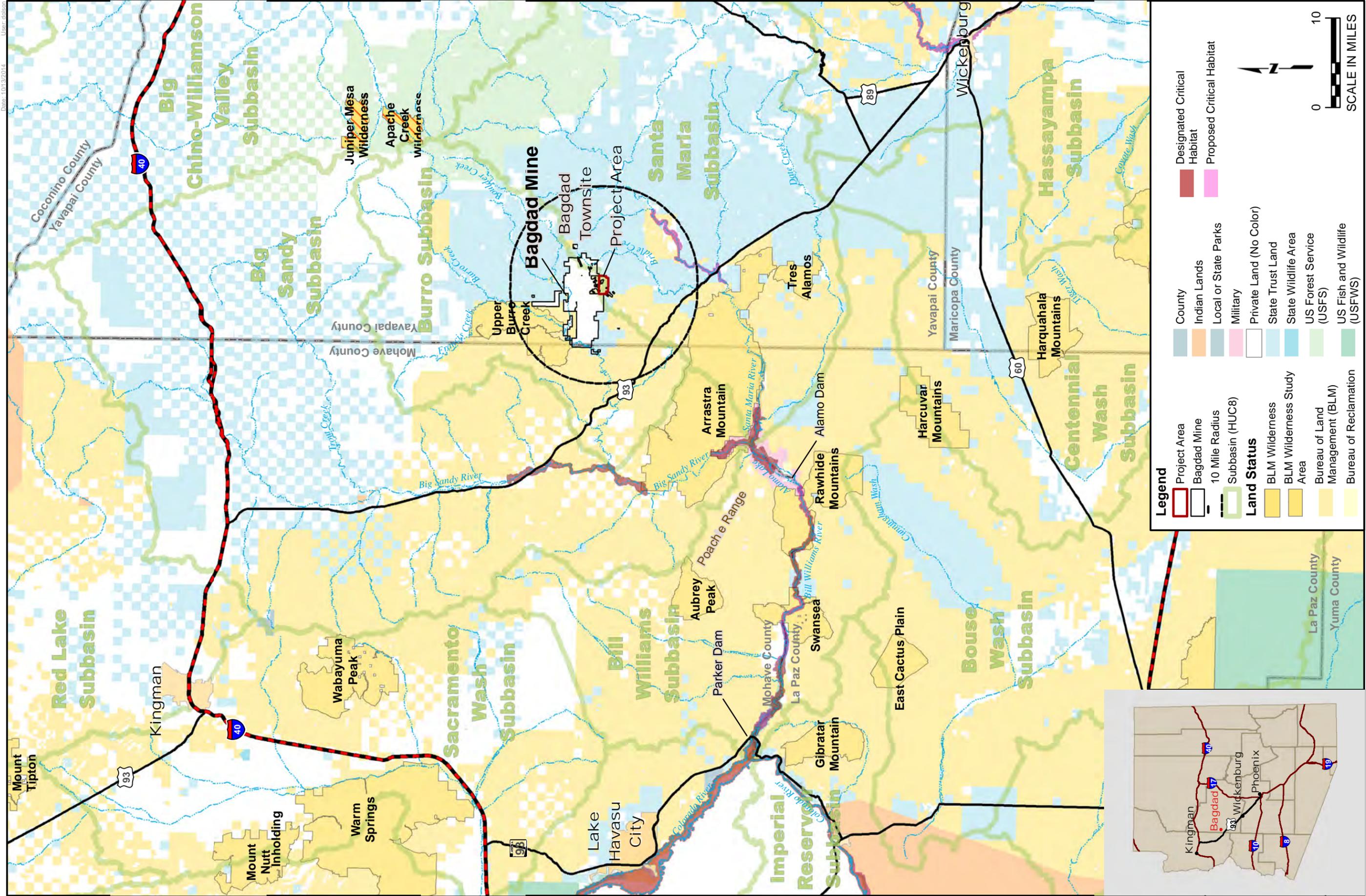
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Figures

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Figure 9	Vegetation Examples – East
Figure 10	AGFD Unit 18 Area

Label on Figures	Label Definition	Figure Number
S	Surface water point feature	4, 5, 6, 7
X	Transect photo point	5, 8, 9
D	Drainage photo	6,
W	Wildlife/signs of wildlife	7
B	Open adit or shaft	7
A	Closed adit or shaft	7
V	Vegetation photo point	8, 9
R	Boulder area photo point	8, 9
T	Vegetation type transition photo	8, 9
C	Chaparral vegetation type photo point	8, 9
G	Grassland vegetation type photo point	8, 9

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Legend

- Project Area
- Bagdad Mine
- 10 Mile Radius
- Subbasin (HUC8)

Land Status

- BLM Wilderness
- BLM Wilderness Study Area
- Bureau of Land Management (BLM)
- Bureau of Reclamation
- County
- Indian Lands
- Local or State Parks
- Military
- Private Land (No Color)
- State Trust Land
- State Wildlife Area
- US Forest Service (USFS)
- US Fish and Wildlife (USFWS)

Designated Critical Habitat

- Designated Critical Habitat
- Proposed Critical Habitat

SCALE IN MILES

0 10

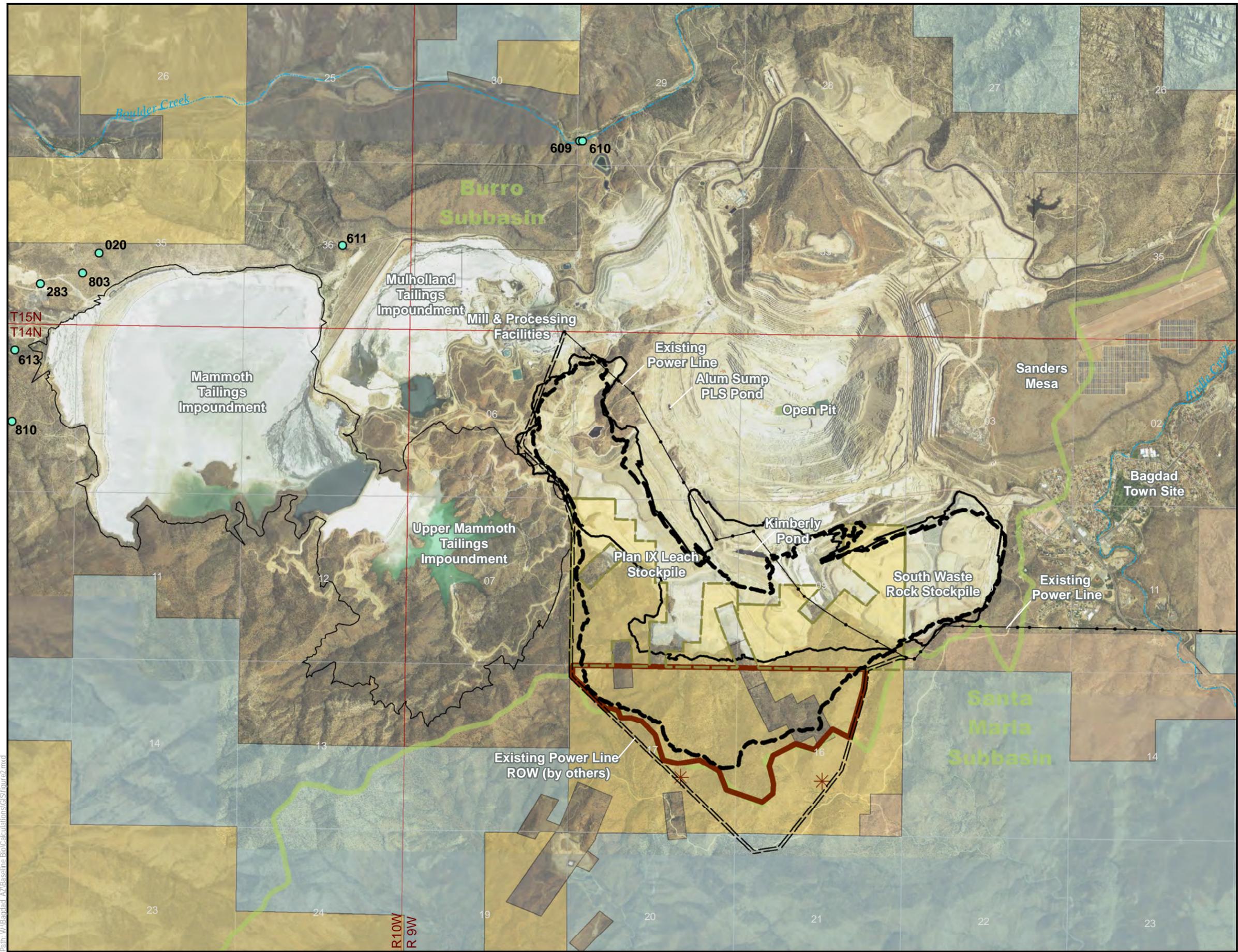
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FREEMPORT-MCMORAN

FIGURE 1
PROJECT LOCATION AND REGIONAL OVERVIEW
BAGDAD MINE STOCKPILE EXTENSION
BASELINE BIOLOGY

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Legend

- BLM Approved Disturbance Area
- Existing Extent of Stockpile
- Proposed Limit of Stockpile Extension
- Conceptual Extent of Stockpile
- Subbasin (HUC8)
- Potential Monitoring Well
- APP Point of Compliance Well

Surface Management

- Bureau of Land Management (BLM)
- FMBI Fee Land (No Color)
- State Trust Land
- Other Private Land

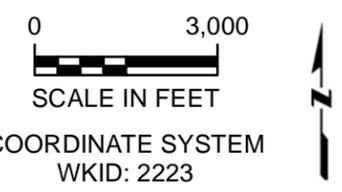


FIGURE 2
PROPOSED PROJECT
AND LAND OWNERSHIP
BAGDAD MINE STOCKPILE EXTENSION
BASELINE BIOLOGY

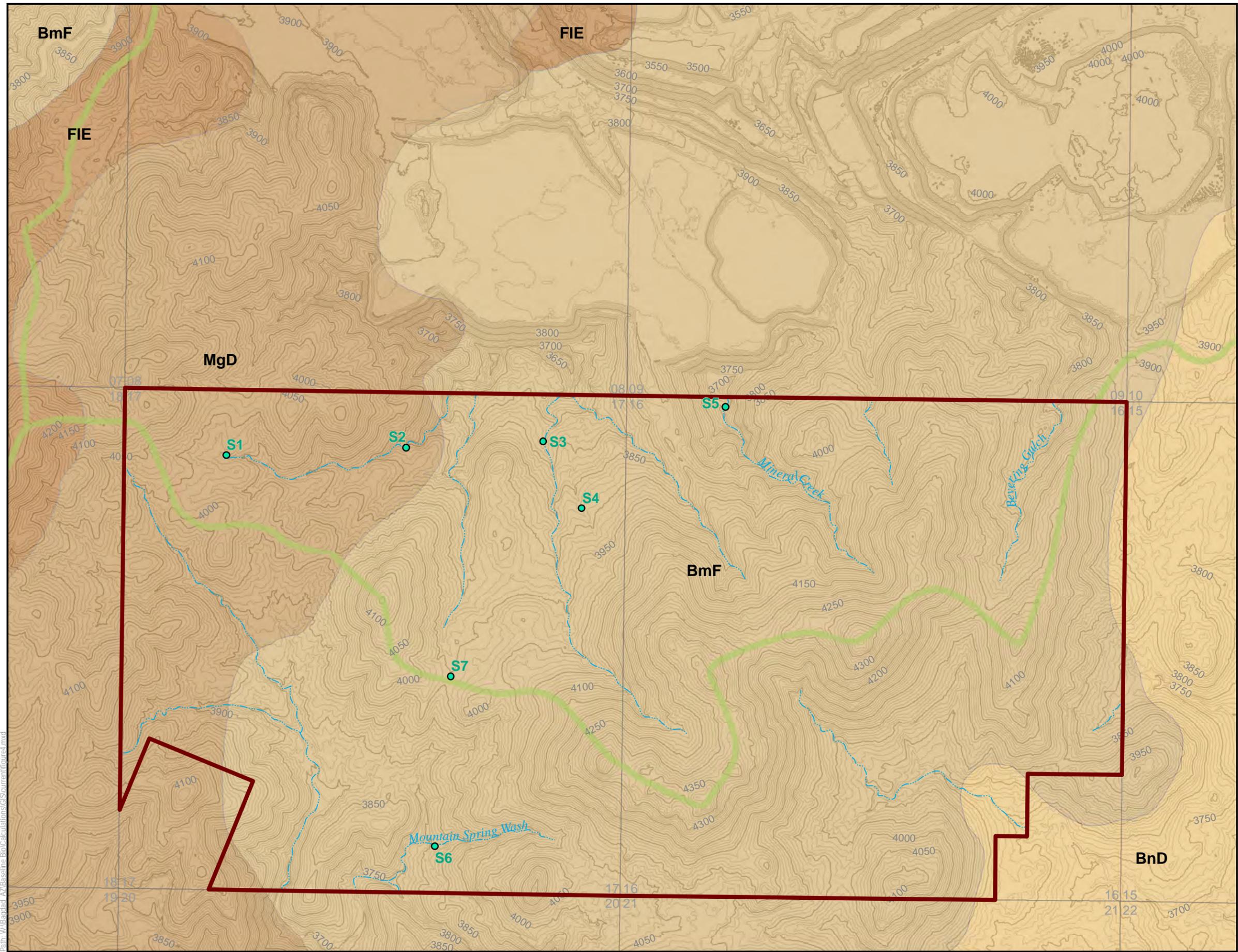
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Legend

- Project Area
- Subwatershed Divide (HUC12)
- Surface water point features

NRCS Soils

- BmF-Barkerville cobbly sandy loam, 20 to 60 percent slopes
- BnD-Barkerville very stony sandy loam, 5 to 25 percent slopes
- FIE-Faraway-Luzena complex, 20 to 40 percent slopes
- MgD-Moano gravelly loam, 0 to 30 percent slopes

0 1,000
SCALE IN FEET

COORDINATE SYSTEM
WKID: 2223

FIGURE 4
SOILS
BAGDAD MINE STOCKPILE EXTENSION
BASELINE BIOLOGY

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Fm **FREEPORT-McMORAN**

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Legend

- Project Area
- Subwatershed Divide (HUC12)
- Transect with photo point (X)
- Surface water point features

Vegetation Types

- Chaparral
- Disclimax grassland
- Boulder

0 1,000
 SCALE IN FEET
 COORDINATE SYSTEM
 WKID: 2223

FIGURE 5
VEGETATION TYPES
 (with transect and photo locations)
BAGDAD MINE STOCKPILE EXTENSION
BASELINE BIOLOGY

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- Legend**
- Project Area
 - Subwatershed Divide (HUC12)
 - National Wetlands Inventory Feature
 - Drainage photo (D)
 - Surface water point feature

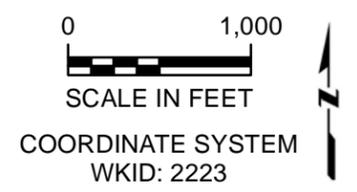


FIGURE 6
SURFACE WATER FEATURES
BAGDAD MINE STOCKPILE EXTENSION
BASELINE BIOLOGY

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Legend

- Project Area
- Subwatershed Divide (HUC12)
- Sonoran Desert Tortoise Survey Area
- Saguaro Area
- Wildlife/wildlife sign (W)
- Open adit or shaft (B)
- Closed adit or shaft (A)
- Surface water point features

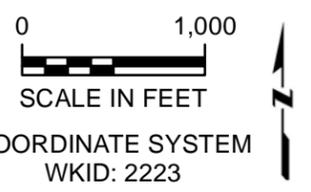


FIGURE 7
WILDLIFE
BAGDAD MINE STOCKPILE EXTENSION
BASELINE BIOLOGY

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Path: W:\Bagdad_AZ\Baseline_Bio\Calculations\GIS\Source\Figure7.mxd



Legend

- Project Area
- Subwatershed Divide (HUC12)
- Transect with photo point (X)
- Vegetation photo point (V)
- Boulder area photo point (R)
- Vegetation type transition photo (T)
- Chaparral vegetation type photo point (C)
- Grassland vegetation type photo point (G)

Vegetation Type

- Chaparral
- Disclimax grassland
- Boulder



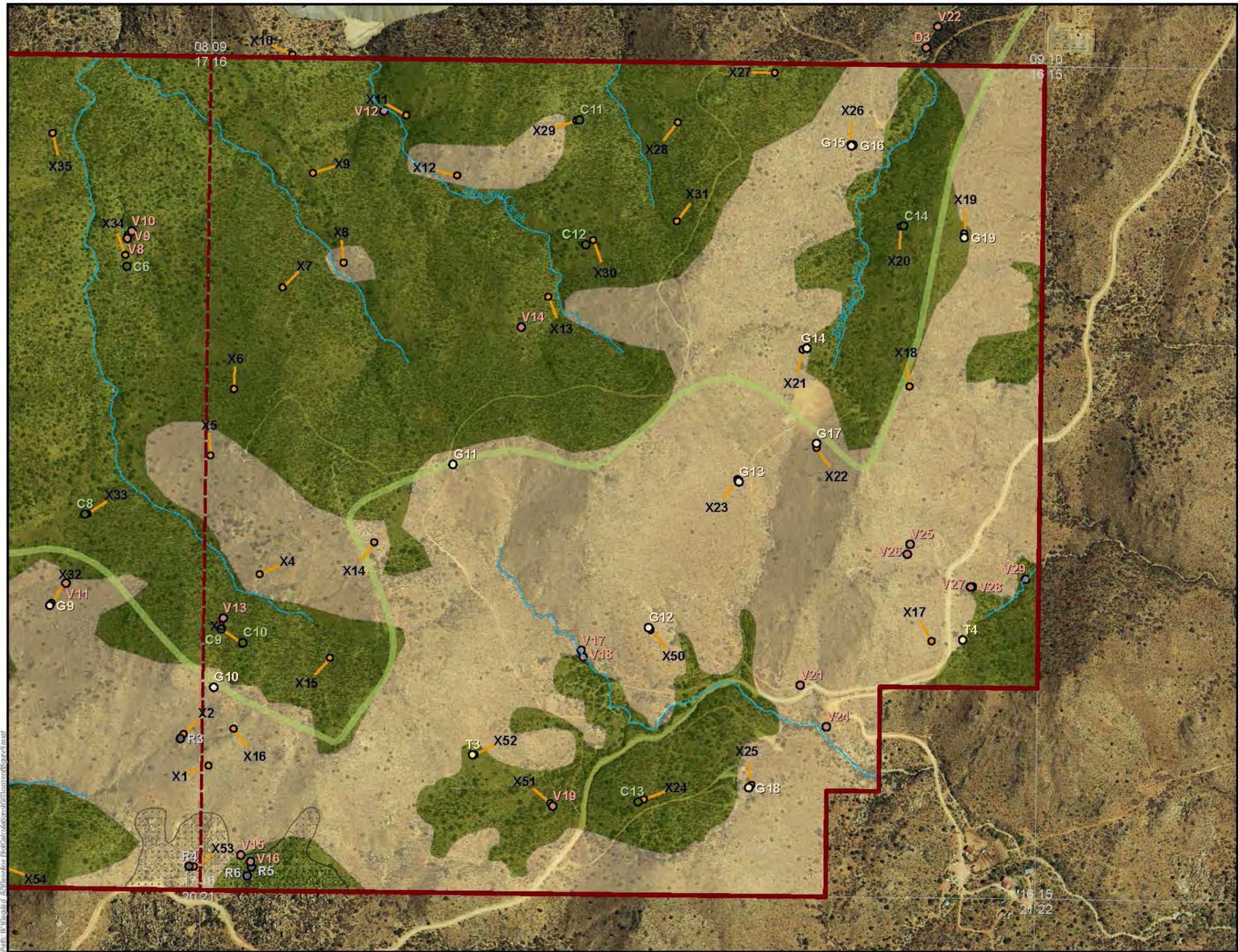
**FIGURE 8
VEGETATION EXAMPLES - WEST
BAGDAD MINE STOCKPILE EXTENSION
BASELINE BIOLOGY**

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Fm **FREEPORT-McMORAN**



Legend

- Project Area
- Subwatershed Divide (HUC12)
- Transect with photo point (X)
- Vegetation photo point (V)
- Boulder area photo point (R)
- Vegetation type transition photo (T)
- Chaparral vegetation type photo point (C)
- Grassland vegetation type photo point (G)

Vegetation Type

- Chaparral
- Disclimax grassland
- Boulder

0 600
 SCALE IN FEET
 COORDINATE SYSTEM
 WKID: 2223

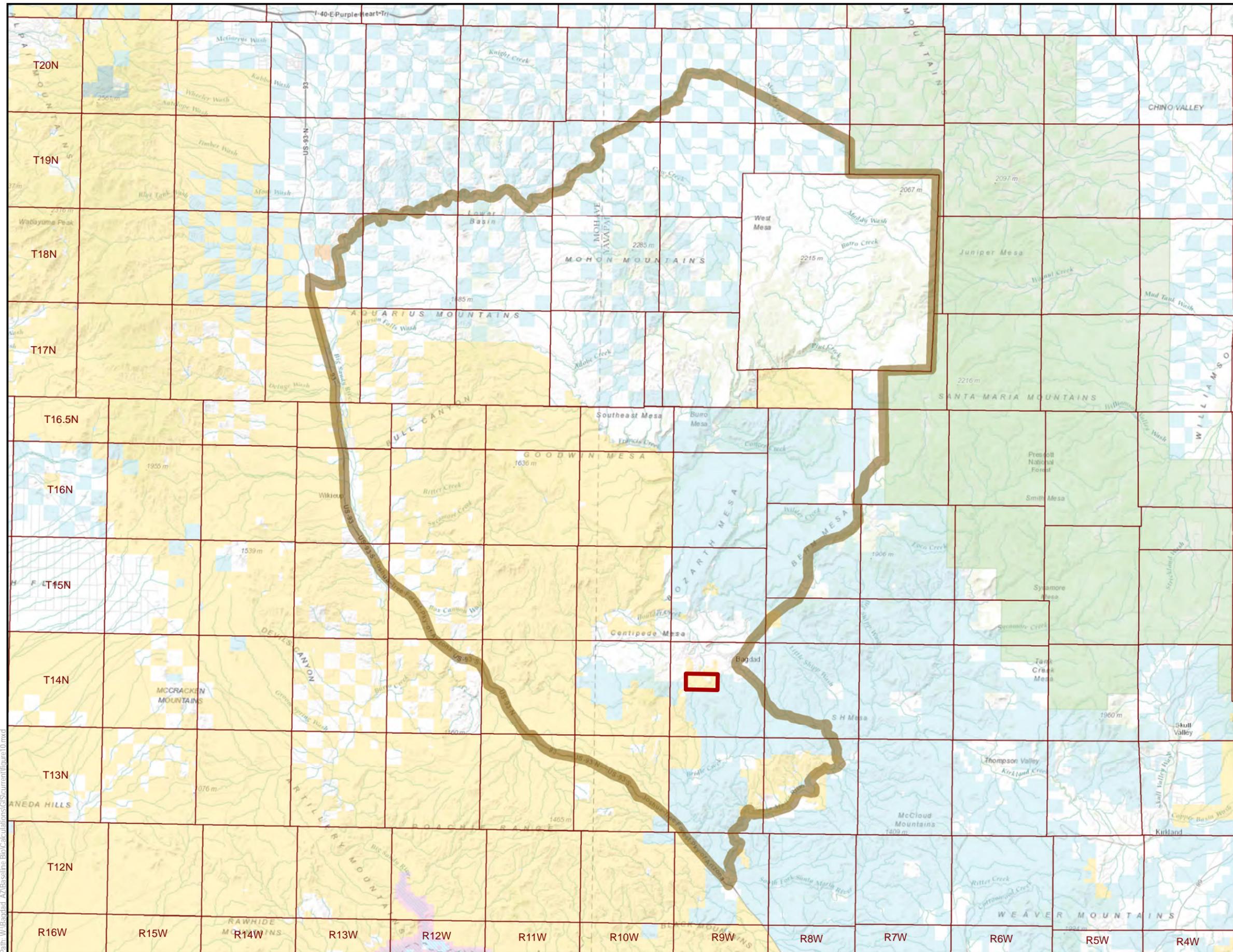
FIGURE 9
VEGETATION EXAMPLES - EAST
BAGDAD MINE STOCKPILE EXTENSION
BASELINE BIOLOGY

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Legend

- Project Area
- AGMU 18B

Surface Management

- Bureau of Land Management (BLM)
- Indian Lands
- Local or State Parks
- Military
- FMBI Fee Land (No Color)
- State Trust Land
- US Forest Service (USFS)

0 6
SCALE IN MILES

COORDINATE SYSTEM
WKID: 2223

FIGURE 10
AGFD UNIT 18B AREA
BAGDAD MINE STOCKPILE EXTENSION
BASELINE BIOLOGY

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PREPARED FOR:

FREEPORT-McMoRAN

Path: W:\Bagdad_AZ\Baseline_Bio\Calculations\GIS\Source\figure10.mxd

Photo Label	Photo title	Latitude	Longitude
X2	Transect 2 - grassland	34.54934	-113.216
X3	Transect 3 - chaparral	34.55136	-113.215
X4	Transect 4 - grassland	34.55229	-113.214
X5	Transect 5 - grassland	34.55434	-113.215
X6	Transect 6 - chaparral	34.55594	-113.215
X7	Transect 7 - chaparral	34.55759	-113.213
X8	Transect 8 - grassland (transition)	34.55772	-113.212
X9	Transect 9 - chaparral	34.55931	-113.213
X10	Transect 10 - chaparral	34.56129	-113.213
X11	Transect 11 - chaparral	34.56048	-113.211
X12	Transect 12 - grassland	34.55937	-113.21
X13	Transect 13 - chaparral	34.55672	-113.208
X14	Transect 14 - grassland	34.55426	-113.21
X15	Transect 15 - chaparral	34.55058	-113.213
X17	Transect 17 - grassland	34.55165	-113.2
X18	Transect 18 - grassland (transition)	34.55568	-113.2
X19	Transect 19 - chaparral (at transition)	34.55833	-113.199
X20	Transect 20 - chaparral	34.5583	-113.201
X21	Transect 21 - grassland	34.55641	-113.203
X23	Transect 23 - grassland	34.55416	-113.204
X24	Transect 24 - chaparral	34.54864	-113.205
X26	Transect 26 - grassland	34.56029	-113.202
X27	Transect 27 - chaparral	34.56117	-113.203
X28	Transect 28 - chaparral	34.56002	-113.206
X29	Transect 29 - chaparral (transition)	34.56016	-113.208
X31	Transect 31 - chaparral	34.55875	-113.205
X32	Transect 32 - grassland	34.55171	-113.218
X33	Transect 33 - chaparral	34.55357	-113.217
X34	Transect 34 - chaparral	34.55814	-113.217
X35	Transect 35 - chaparral	34.56	-113.218
X36	Transect 36 - chaparral	34.55641	-113.22
X37	Transect 37 - chaparral	34.55534	-113.221
X38	Transect 38 - chaparral	34.55656	-113.222
X39	Transect 39 - grassland	34.56022	-113.223
X40	Transect 40 - chaparral	34.55892	-113.224
X41	Transect 41 - chaparral	34.55646	-113.225
X42	Transect 42 - grassland	34.55893	-113.229
X43	Transect 43 - grassland	34.56043	-113.227
X45	Transect 45 - grassland	34.56089	-113.23
X46	Transect 46 - chaparral	34.56102	-113.232

Photo Label	Photo title	Latitude	Longitude
X47	Transect 47 - grassland	34.55915	-113.232
X48	Transect 48 - grassland	34.55623	-113.23
X49	Transect 49 - grassland	34.556	-113.227
X50	Transect 50 - grassland	34.55151	-113.206
X51	Transect 51 - chaparral	34.54834	-113.208
X52	Transect 52 - chaparral (transition)	34.54923	-113.209
X53	Transect 53 - grassland (boulders)	34.5472	-113.215
X54	Transect 54 - chaparral (boulders)	34.54719	-113.219
X55	Transect 55 - grassland	34.54884	-113.221
X56	Transect 56 - grassland (boulders)	34.54791	-113.224
X57	Transect 57 - chaparral	34.54929	-113.225
X58	Transect 58 - chaparral	34.55245	-113.226
X59	Transect 59 - chaparral	34.55144	-113.229
X60	Transect 60 - grassland	34.55199	-113.232
C1	Chaparral vegetation on Moano soils	34.56102	-113.232
C2	Typical chaparral vegetation	34.55646	-113.225
C3	Chaparral vegetation on Moano soils	34.55144	-113.229
C4	Typical chaparral vegetation	34.55244	-113.226
C5	Typical chaparral vegetation	34.55536	-113.222
C6	Low ridge granitic outcrops	34.55763	-113.217
C7	Typical chaparral vegetation	34.54931	-113.225
C8	Typical chaparral vegetation	34.55332	-113.218
C9	Typical chaparral vegetation	34.55136	-113.215
C10	Typical chaparral vegetation	34.55112	-113.214
C11	Typical chaparral vegetation	34.56029	-113.207
C12	Typical chaparral vegetation	34.55812	-113.207
C13	Typical chaparral vegetation	34.54844	-113.206
C14	Typical chaparral vegetation	34.55851	-113.201
G1	Disclimax grassland typical of Moano soils	34.5592	-113.232
G2	Disclimax grassland typical of Moano soils	34.55894	-113.229
G3	Disclimax grassland typical of Moano soils	34.56086	-113.228
G4	Disclimax grassland typical of Moano soils	34.55903	-113.228
G5	Disclimax grassland typical of Moano soils	34.56041	-113.227
G6	Disclimax grassland typical of Moano soils	34.55627	-113.23
G7	Disclimax grassland typical of Moano soils	34.556	-113.227
G8	Disclimax grassland typical of Moano soils	34.55242	-113.232
G9	Typical disclimax grassland vegetation	34.55173	-113.218
G10	Typical disclimax grassland vegetation	34.55034	-113.215
G11	Access road and disclimax grassland	34.55426	-113.21
G12	Disclimax grassland typical of Moano soils	34.55147	-113.206

Photo Label	Photo title	Latitude	Longitude
G13	Typical disclimax grassland vegetation	34.55403	-113.204
G14	View of typical disclimax grassland from edge of chaparral	34.55637	-113.203
G15	Typical disclimax grassland vegetation	34.55989	-113.202
G16	Typical disclimax grassland vegetation	34.55991	-113.202
G17	Typical disclimax grassland vegetation	34.55471	-113.202
G18	Typical disclimax grassland vegetation	34.54871	-113.204
G19	View of typical disclimax grassland from edge of chaparral	34.55832	-113.199
G20	Typical disclimax grassland vegetation	34.56301	-113.196
R1	Chaparral / boulder vegetation (soil change in background)	34.54792	-113.223
R2	Chaparral / boulder vegetation	34.54884	-113.221
R3	Boulder habitat	34.54944	-113.216
R4	Chaparral / boulder vegetation	34.54722	-113.215
R5	Typical disclimax grassland / boulder vegetation community	34.54722	-113.214
R6	Boulder field	34.54707	-113.214
T1	View of typical disclimax grassland with chaparral	34.55895	-113.224
T2	Typical disclimax grassland / boulder vegetation	34.54722	-113.219
T3	View of typical disclimax grassland from edge of chaparral	34.54922	-113.21
T4	Chaparral/disclimax grassland boundary; fence line and utility line	34.55133	-113.199
V1	Greenflower nipple cactus (<i>Mammillaria viridiflora</i>)	34.55785	-113.224
V2	Banana yucca (<i>Yucca baccata</i>)	34.55973	-113.223
V3	Saguaro (<i>Carnegiea gigantea</i>)	34.56008	-113.223
V4	Engelman's prickly pear (<i>Opuntia engelmannii</i>)	34.56053	-113.222
V5	Compass barrel cactus (<i>Ferocactus acanthodes</i>)	34.55155	-113.227
V6	Compass barrel cactus (<i>Ferocactus acanthodes</i>), flowering	34.55222	-113.225
V7	Compass barrel cactus (<i>Ferocactus acanthodes</i>), cluster (>10)	34.55217	-113.225
V8	Slender lipfern (<i>Cheilanthes feei</i>), rock live-forever (<i>Dudleya saxosa</i> ssp. <i>Collomiae</i>)	34.55812	-113.217
V9	Fremont cottonwood (<i>Populus fremontii</i>)	34.55817	-113.217
V10	Willow, cottonwood, flowing water after storm event	34.55825	-113.217

Photo Label	Photo title	Latitude	Longitude
V11	Big galleta (<i>Hilaria rigida</i>)	34.55212	-113.218
V12	Goodding's willow (<i>Salix gooddingii</i>)	34.56039	-113.212
V13	Single-leaf ash (<i>Fraxinus anomala</i>)	34.55155	-113.215
V14	Compass barrel cactus (<i>Ferocactus acanthodes</i>)	34.55667	-113.209
V15	Ocotillo, coachwhip (<i>Fouquieria splendens</i>)	34.54743	-113.214
V16	Saguaro (<i>Carnegiea gigantea</i>)	34.54732	-113.214
V17	Mckelvey's century plant (<i>Agave mckelveyana</i>)	34.55106	-113.207
V18	Banana yucca (<i>Yucca baccata</i>)	34.55095	-113.207
V19	Scrub oak (<i>Quercus turbinella</i>)	34.54835	-113.208
V21	Engelman's prickly pear (<i>Opuntia engelmannii</i>)	34.55051	-113.203
V22	Goodding's willow (<i>Salix gooddingii</i>)	34.56198	-113.2
V23	Littleleaf ratany (<i>Krameria erecta</i>)	34.56307	-113.2
V24	Desert senna (<i>Senna covesii</i>)	34.54979	-113.202
V25	Greenflower nipple cactus (<i>Mammillaria viridiflora</i>)	34.55299	-113.2
V26	Indian root (<i>Aristolochia watsonii</i>)	34.55281	-113.2
V27	Sonoran scrub oak (<i>Quercus turbinella</i>)	34.55225	-113.199
V28	Beavertail prickly pear (<i>Opuntia basilaris</i>)	34.55226	-113.199
V29	Scarlet four o'clock (<i>Mirabilis coccinea</i>)	34.5524	-113.198
D1	Drainage feature	34.5616	-113.23
D3	Drainage feature with desert broom	34.56162	-113.2
D3-1	Erosional feature near toe of Stockpile; facing downgradient (north)	34.56114	-113.212
D3-2	Drainage feature	34.55891	-113.21
D5-1	Drainage feature (following heavy rain)	34.55736	-113.218
D5-2	Drainage feature	34.55605	-113.218
D5-3	Drainage feature	34.55201	-113.214
D8-1	Drainage feature	34.54966	-113.225
D8-7	Drainage feature	34.55385	-113.227
D9-5	Mountain spring	34.54824	-113.221
D9-6	Erosional feature	34.54972	-113.222
D10-1	Drainage feature	34.5497	-113.202
D10-2	Drainage feature	34.55054	-113.204
D10-4	Drainage feature	34.55283	-113.204
D10-5	Drainage feature	34.55411	-113.203
D10-6	Drainage feature; facing downgradient (north)	34.55497	-113.203
D11-1	Drainage feature	34.55277	-113.198

Photo Label	Photo title	Latitude	Longitude
S1	Washed-out tank	34.55942	-113.229
S1	Washed-out tank	34.55951	-113.229
S2	Seep/spring location (wet wall)	34.55973	-113.223
S2	Spring tank / cattle box (full of sediment)	34.55971	-113.223
S2	Spring tank / cattle box (full of sediment)	34.56026	-113.222
S3	Ponded area following rainfall; southwestern toad (tadpoles) observed	34.55995	-113.218
S4	Potential seep, looking upgradient, following rainfall	34.55819	-113.217
S4	Potential seep, looking downgradient, following rainfall	34.55802	-113.217
S5	Spring box (with sediment)	34.56102	-113.212
S6	Mountain spring	34.54822	-113.222
S6	Mountain spring	34.54817	-113.222
S6	Ranch area downgradient from Mountain Spring; two tanks, disconnected from spring, now fed by precipitation	34.54816	-113.222
S6	Spring box downgradient of Mountain Spring; fed by precipitation	34.54815	-113.222
S6	Stock tank downgradient of Mountain Spring; fed by precipitation	34.54813	-113.222
W1	Clark's spiny lizard (<i>Sceloporus clarkii</i>)	34.56001	-113.223
W2	Potential raptor nest	34.55367	-113.227
W3	Utility pole w/ nest	34.55306	-113.228
W4	Tadpole	34.55977	-113.218
W5	Tadpole	34.55991	-113.218
W6	Javelina tracks	34.55028	-113.226
W7	Tadpole	34.55321	-113.221
W8	Sonoran whipsnake (<i>Masticophis bilineatus</i>)	34.54876	-113.224
W9	Coyote tracks	34.54954	-113.222
W10	Deer print	34.55646	-113.215
W11	Lizard	34.54822	-113.222
W12	Scat	34.55418	-113.21
W13	Bird nest	34.55651	-113.203
W14	Bird whitewash/perch	34.56204	-113.201
W15	Raven	34.55489	-113.2
W16	Packrat midden	34.55878	-113.199
W17	Packrat midden	34.55278	-113.201
W18	Deer scat	34.55274	-113.201
W19	Yellow warbler, common raven, black-throated sparrow observed at this location	34.56216	-113.198
W20	Mule deer tracks	34.55224	-113.199

Photo Label	Photo title	Latitude	Longitude
B1	Mine shaft (vertical hole; connected to adit depicted in B2)	34.54689	-113.218
B2	Mine adit (horizontal hole)	34.54632	-113.218
B3	Mine adit	34.54889	-113.204
A1	Closed mine feature - filled shaft	34.55822	-113.227
A2	Closed mine feature - filled shaft	34.55776	-113.227
A3	Closed mine feature - filled shaft	34.55083	-113.223
A4	Mine feature - prospect, roughly 5 x 8 feet (vertical)	34.55336	-113.202
L1	Cattle corral	34.5531	-113.221
L2	From ridgeline, facing north	34.55039	-113.215
L3	Rock outcrop	34.54936	-113.216
L4	Prior structure/disturbance	34.55665	-113.209
L5	Prior structure/disturbance	34.55658	-113.209
L6	Prior structure/disturbance	34.55681	-113.208
L7	View of stockpile and pit	34.56082	-113.205
L8	View of stockpile and pit	34.5588	-113.205
L9	Reclaimed area on ridgeline	34.56507	-113.204
L10	From reclaimed area on ridge facing west	34.55509	-113.203
L11	Reclaimed area	34.55498	-113.203

Appendix A Hualapai Tribe Plant List

Table A-1 – Hualapai Tribe Plant List

Common Name	Hualapai Name	Scientific Name	Prevalence
Algerita	Amaq	<i>Berberis fermontii</i>	Not observed
Apache plume	Madki	<i>Fallugia paradoxa</i>	Not observed
Arizona ash	Im'val	<i>Flaxinus velutina</i>	Not observed
Arizona cotton	Puchwam	<i>Perezia wrightii (Acourtia wrightii)</i>	Not observed
Arizona manzanita	Nyambuk	<i>Arctostaphylos</i>	Not observed
Arrowweed	I'thav	<i>Pluchea sericea</i>	Not observed
Banana yucca	Manad	<i>Yucca baccata</i>	Common
Barrel cactus	Mildad	<i>Ferocactus</i>	Isolated communities
Beargrass	Qanyud	<i>Nolina</i>	Infrequent
Big sagebrush	Maqwapda	<i>Artemisia spp.</i>	Infrequent
Black walnut	Gamjudk	<i>Juglans major</i>	Not observed
Black willow	I'yo:	<i>Salix spp.</i>	Isolated communities
Burrobush	O'gach	<i>Hymenoclea</i>	Not observed
Catsclaw	Gijes	<i>Acacia</i>	Common
Cattail	Hamsi'iv	<i>Typha spp</i>	Not observed
Cholla	Ɖaqwi:s	<i>Opuntia</i>	Common
Cliffrose	Jiqya:l	<i>Cowania mexicana</i>	Not observed
Cottonwood tree	Aha:	<i>Populus fremontii</i>	Isolated communities
Creosote bush	Ivthi:	<i>Larrea tridentata</i>	Not observed
Desert willow	Chimhov	<i>Chilopsis linearis</i>	Not observed
Devil's claw	Mak ɖuny	<i>Proboscidea parviflora</i>	Infrequent
Dock, wild rhubarb	Thi'hach	<i>Rumex hymenosepalus Torr.</i>	Not observed
Filaree	Min'min'ya'	<i>Erodicum</i>	Not observed
Four-winged salt bush	Ɖasilk	<i>Atriplex spp.</i>	Not observed
Gambel oak	Gambi	<i>Quercus gambelii</i>	Not observed
Globemallow	Jik buny	<i>Sphaeralcea</i>	Infrequent
Indian tea, Mormon tea	Jumway	<i>Ephedra spp.</i>	Not observed
Joshua tree	Hu'wala	<i>Yucca brevifolia</i>	Not observed
Juniper	Joq	<i>Juniperus</i>	Common
Mescal agave	Viyal	<i>Agave spp.</i>	Common
Mesquite	Na:l	<i>Prosopis</i>	Common
Milkweed	Ilwithuj	<i>Asclepias spp.</i>	Not observed
Mohave yucca	Manadgana	<i>Yucca mohavensis sarg.</i>	Not observed
Netleaf hackberry	Aqwa'	<i>Celtis reticulata</i>	Not observed
New Mexican locust	Kataɖ I Muhway	<i>Robinia neomexicana</i>	Not observed
Ocotillo	Igamyé	<i>Fouquieria</i>	Common
Pinon pine	Ko'	<i>Pinus edulis</i>	Not observed

Common Name	Hualapai Name	Scientific Name	Prevalence
Ponderosa pine	Hwa:l	<i>Pinus ponderosa</i>	Not observed
Prickly pear	Alav	<i>Opuntia</i> spp.	Abundant
Reed	Ata	<i>Phragmites communis trin.</i>	Not observed
Saguaro cactus	A'a'	<i>Carnegiea gigantea</i>	Isolated communities
Screwbean	I:s	<i>Prosopis pubescens</i>	Not observed
Seep willow	Hamdavil	<i>Baccharis</i> spp.	Isolated communities
Shrub live oak	Dinyikda	<i>Quercus turbinella</i>	Abundant
Snake weed	Gohwa:yo	<i>Gutierrezia</i> spp.	Abundant
Soapweed	Inyav	<i>Nolina parryi</i>	Not observed
Stick leaf mentzelia	Sele'	<i>Mentzelia</i> spp.	Not observed
Sumac	Gith'e:	<i>Rhus trilobata</i>	Not observed
Sunflower	Agad	<i>Helianthus</i> spp.	Not observed
Wild grape	I'je:qa	<i>Vitis</i> spp.	Not observed
Wild mulberry	Pu'i rna	<i>Morus</i>	Infrequent
Wild onion	Hanyoq	<i>Allium</i> spp	Not observed
Wild onion / turnip	Ni'pid / Impid / Pid	<i>Cymopterus</i> spp.	Not observed
Wild tobacco	U:v	<i>Nicotiana trigonophylla</i>	Infrequent
Wild tomato	Đamets	<i>Physalis</i> spp.	Infrequent
Yerba santa	Pilgidaduva	<i>Eriodictyon angustifolium</i>	Not observed

For species in this list, the following designations for abundance were used:

- Not Observed—This species was not observed in the field
- Infrequent—Not common, but individuals of this species were observed
- Isolated Communities—This species was common in limited, specific locations, but rare or not observed elsewhere
- Common—This species was observed in much of the project area
- Abundant—This species was prevalent to dominant in a substantial portion of the project area

Appendix B Federally Protected Species (USFWS IPaC)



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Arizona Ecological Services Field Office
2321 WEST ROYAL PALM ROAD, SUITE 103
PHOENIX, AZ 85021
PHONE: (602)242-0210 FAX: (602)242-2513
URL: www.fws.gov/southwest/es/arizona/;
www.fws.gov/southwest/es/EndangeredSpecies/lists/

Consultation Tracking Number: 02EAAZ00-2014-SLI-0554

September 03, 2014

Project Name: Bagdad WRP Expansion

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The Fish and Wildlife Service (Service) is providing this list under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The list you have generated identifies threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that *may* occur within one or more delineated United States Geological Survey 7.5 minute quadrangles with which your project polygon intersects. Each quadrangle covers, at minimum, 49 square miles. Please refer to the species information links found at http://www.fws.gov/southwest/es/arizona/Docs_Species.htm or <http://www.fws.gov/southwest/es/arizona/Documents/MiscDocs/AZSpeciesReference.pdf> for a quick reference, to determine if suitable habitat for the species on your list occurs in your project area.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect federally listed species and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If the Federal action agency determines that listed species or critical habitat *may be affected* by

a federally funded, permitted or authorized activity, the agency must consult with us pursuant to 50 CFR 402. Note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant, or discountable. An effect exists even if only one individual or habitat segment may be affected. The effects analysis should include the entire action area, which often extends well outside the project boundary or "footprint" (e.g., downstream). If the Federal action agency determines that the action may jeopardize a *proposed* species or adversely modify *proposed* critical habitat, the agency must enter into a section 7 conference. The agency may choose to confer with us on an action that may affect proposed species or critical habitat.

Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event they become proposed or listed prior to project completion. More information on the regulations (50 CFR 402) and procedures for section 7 consultation, including the role of permit or license applicants, can be found in our Endangered Species Consultation Handbook at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>.

In addition to species listed under the Act, we advise you to consider species protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 *et seq.*). Both laws prohibit the take of covered species. The list of MBTA-protected birds is in 50 CFR 10.13 (for an alphabetical list see <http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/MBTANDX.HTML>). The Service's Division of Migratory Birds is the lead for consultations under these laws (Southwest Regional Office phone number: 505/248-7882). For more information regarding the MBTA, BGEPA, and permitting processes, please visit the following web site:

<http://www.fws.gov/migratorybirds/mbpermits.html>. Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g. cellular, digital television, radio, and emergency broadcast) can be found at:

<http://www.fws.gov/southwest/es/arizona/CellTower.htm>

Although bald eagles (*Haliaeetus leucocephalus*) are no longer listed under the Act, they are protected under both the BGEPA and the MBTA. If a bald eagle nest occurs in or near the proposed project area, our office should be contacted. An evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles (see <http://www.fws.gov/southeast/es/baldeagle/>) and the Division of Migratory Birds consulted if necessary. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles (see <http://www.fws.gov/midwest/eagle/pdf/NationalBaldEagleManagementGuidelines.pdf>).

Activities that involve streams and/or wetlands are regulated by the U.S. Army Corps of Engineers (Corps). We recommend that you contact the Corps to determine their interest in proposed projects in these areas. For activities within a National Wildlife Refuge, we recommend that you contact refuge staff for specific information about refuge resources.

If your action is on Indian land or has implications for off-reservation tribal interests, we encourage you to contact the tribe(s) and the Bureau of Indian Affairs (BIA) to discuss potential tribal concerns, and to invite any affected tribe and the BIA to participate in the section 7

consultation. In keeping with our tribal trust responsibility, we will notify tribes that may be affected by proposed actions when section 7 consultation is initiated. For more information, please contact our tribal coordinator, John Nystedt, at (928) 556-2160 or John.Nystedt@fws.gov.

The State of Arizona protects some species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department (AGFD) for animals and Arizona Department of Agriculture for plants to determine if species protected by or of concern to the State may occur in your action area. The AGFD has an Environmental Review On-Line Tool that can be accessed at <http://www.azgfd.gov/hgis/>. We also recommend that you coordinate with the AGFD regarding your project.

For additional communications regarding this project, please refer to the consultation Tracking Number in the header of this letter. We appreciate your concern for threatened and endangered species. If we may be of further assistance, please contact Brenda Smith at 928/556-2157 for projects in Northern Arizona, our general Phoenix number (602/242-0210) for central Arizona, or Jean Calhoun at 520/670-6150 (x223) for projects in southern Arizona.

Sincerely,

/s/

Steven L. Spangle

Field Supervisor

Attachment



United States Department of Interior
Fish and Wildlife Service

Project name: Bagdad WRP Expansion

Official Species List

Provided by:

Arizona Ecological Services Field Office

2321 WEST ROYAL PALM ROAD, SUITE 103

PHOENIX, AZ 85021

(602) 242-0210

<http://www.fws.gov/southwest/es/arizona/>

<http://www.fws.gov/southwest/es/EndangeredSpecies/lists/>

Consultation Tracking Number: 02EAAZ00-2014-SLI-0554

Project Type: Mining

Project Description: [From Revised MPO] FMBI seeks approval of this MPO Modification for the extension of the existing, consolidated Plan IX Leach/South Waste Rock Stockpile (the Stockpile) at the Bagdad Mine. In addition, this MPO Modification proposes future, distributed facilities south of the Stockpile.



United States Department of Interior
Fish and Wildlife Service

Project name: Bagdad WRP Expansion

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-113.2327047 34.5756691, -113.1975141 34.5758811, -113.1974282 34.5467596, -113.2326188 34.5467596, -113.2327047 34.5756691)))

Project Counties: Yavapai, AZ



United States Department of Interior
Fish and Wildlife Service

Project name: Bagdad WRP Expansion

Endangered Species Act Species List

There are a total of 9 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Birds	Status	Has Critical Habitat	Condition(s)
Southwestern Willow flycatcher (<i>Empidonax traillii extimus</i>) Population: Entire	Endangered	Final designated	
Yellow-Billed Cuckoo (<i>Coccyzus americanus</i>) Population: Western U.S. DPS	Proposed Threatened	Proposed	
Fishes			
Headwater chub (<i>Gila nigra</i>)	Candidate		
Roundtail chub (<i>Gila robusta</i>) Population: Lower Colorado River Basin DPS	Candidate		
Flowering Plants			
Arizona Cliff-rose (<i>Purshia (=cowania) subintegra</i>)	Endangered		
Mammals			
Black-Footed ferret (<i>Mustela nigripes</i>) Population: U.S.A. (specific portions of AZ, CO, MT, SD, UT, and WY)	Experimental Population, Non-Essential		



United States Department of Interior
Fish and Wildlife Service

Project name: Bagdad WRP Expansion

Reptiles			
Northern Mexican gartersnake (<i>Thamnophis eques megalops</i>)	Threatened	Proposed	
Sonoran desert tortoise (<i>Gopherus morafkai</i>)	Candidate		
Snails			
Page springsnail (<i>Pyrgulopsis morrisoni</i>)	Candidate		



United States Department of Interior
Fish and Wildlife Service

Project name: Bagdad WRP Expansion

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Appendix C Arizona Special Status Species (HDMS)

Arizona Environmental Online Review Tool Report



Arizona Game and Fish Department Mission

To conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations.

Project Name:

Bagdad Mine Stockpile Extension Project

Project Description:

The Mine Plan of Operation (MPO) seeks to modify the 1996 MPO for the extension of the existing consolidated plan IX leach/South waste rock stockpile, located in T14N, R9W, Sec. 16 and 17.

Project Type:

Mining, Extraction Other minerals (copper, limestone, cinders, shale, salt), Other minerals (copper, limestone, cinders, shale, salt)

Contact Person:

Dee Kephart

Organization:

AZGFD

On Behalf Of:

AZGFD

Project ID:

AGFD-000128-HGIS

Please review the entire report for project type and/or species recommendations for the location information entered. Please retain a copy for future reference.

Disclaimer:

1. This Environmental Review is based on the project study area that was entered. The report must be updated if the project study area, location, or the type of project changes.
2. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area. This review is also not intended to replace environmental consultation (including federal consultation under the Endangered Species Act), land use permitting, or the Department's review of site-specific projects.
3. The Department's Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. HDMS data contains information about species occurrences that have actually been reported to the Department. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. HabiMap™ Arizona data, specifically Species of Greatest Conservation Need (SGCN) under our State Wildlife Action Plan (SWAP) and Species of Economic and Recreational Importance (SERI), represent potential species distribution models for the State of Arizona which are subject to ongoing change, modification and refinement. The status of a wildlife resource can change quickly, and the availability of new data will necessitate a refined assessment.

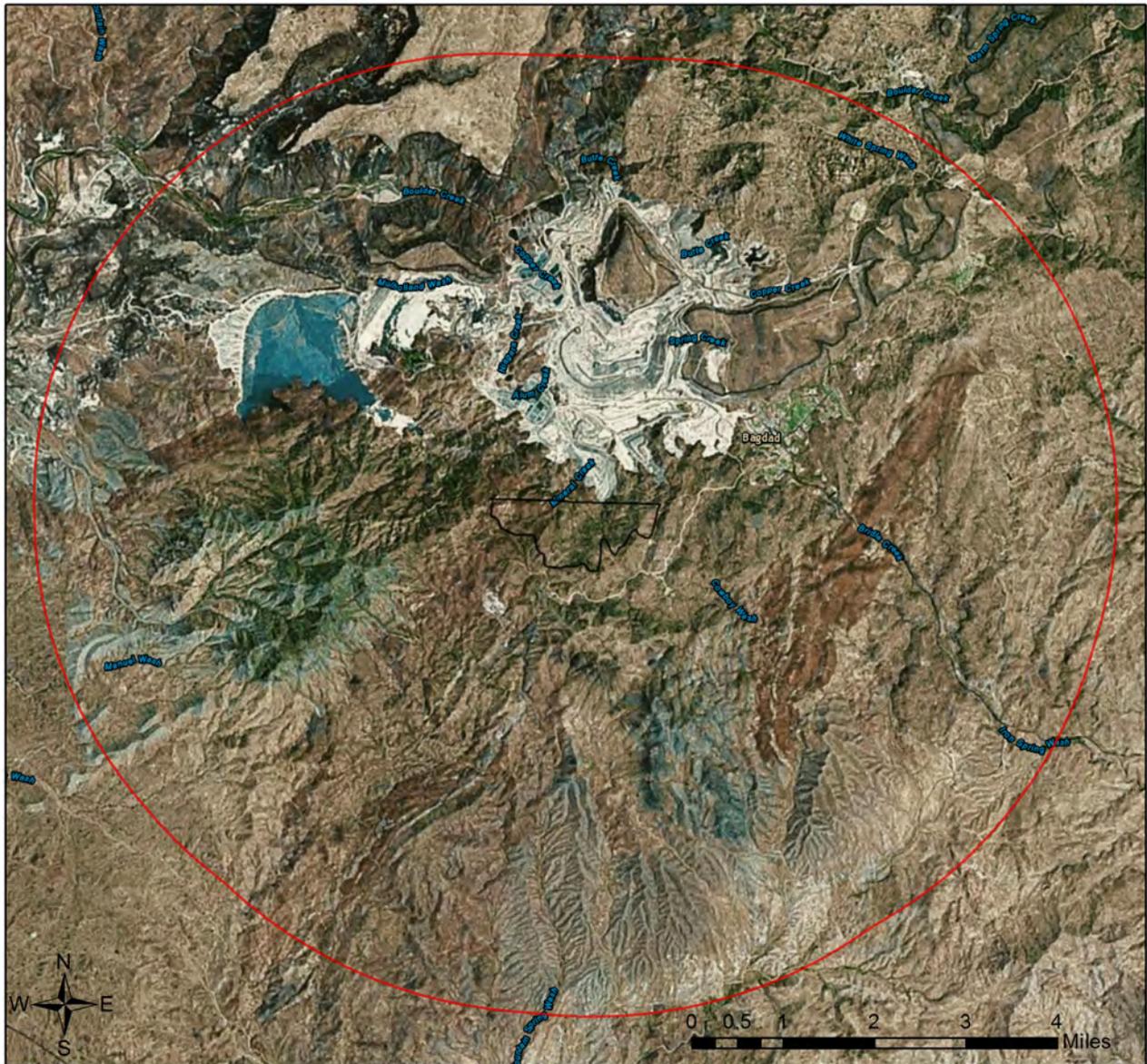
Locations Accuracy Disclaimer:

Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Report is solely responsible for the project location and thus the correctness of the Project Review Report content.

Recommendations Disclaimer:

1. The Department is interested in the conservation of all fish and wildlife resources, including those species listed in this report and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.
2. Recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation).
3. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project. These recommendations are preliminary in scope, designed to provide early considerations on all species of wildlife.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. Further coordination with the Department requires the submittal of this Environmental Review Report with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map). Once AGFD had received the information, please allow 30 days for completion of project reviews. Send requests to:
Project Evaluation Program, Habitat Branch
Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85086-5000
Phone Number: (623) 236-7600
Fax Number: (623) 236-7366
Or
PEP@azgfd.gov
6. Coordination may also be necessary under the National Environmental Policy Act (NEPA) and/or Endangered Species Act (ESA). Site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies

Bagdad Mine Stockpile Extension Project Aerial Image Basemap With Locator Map



- Project Boundary
- Buffered Project Boundary

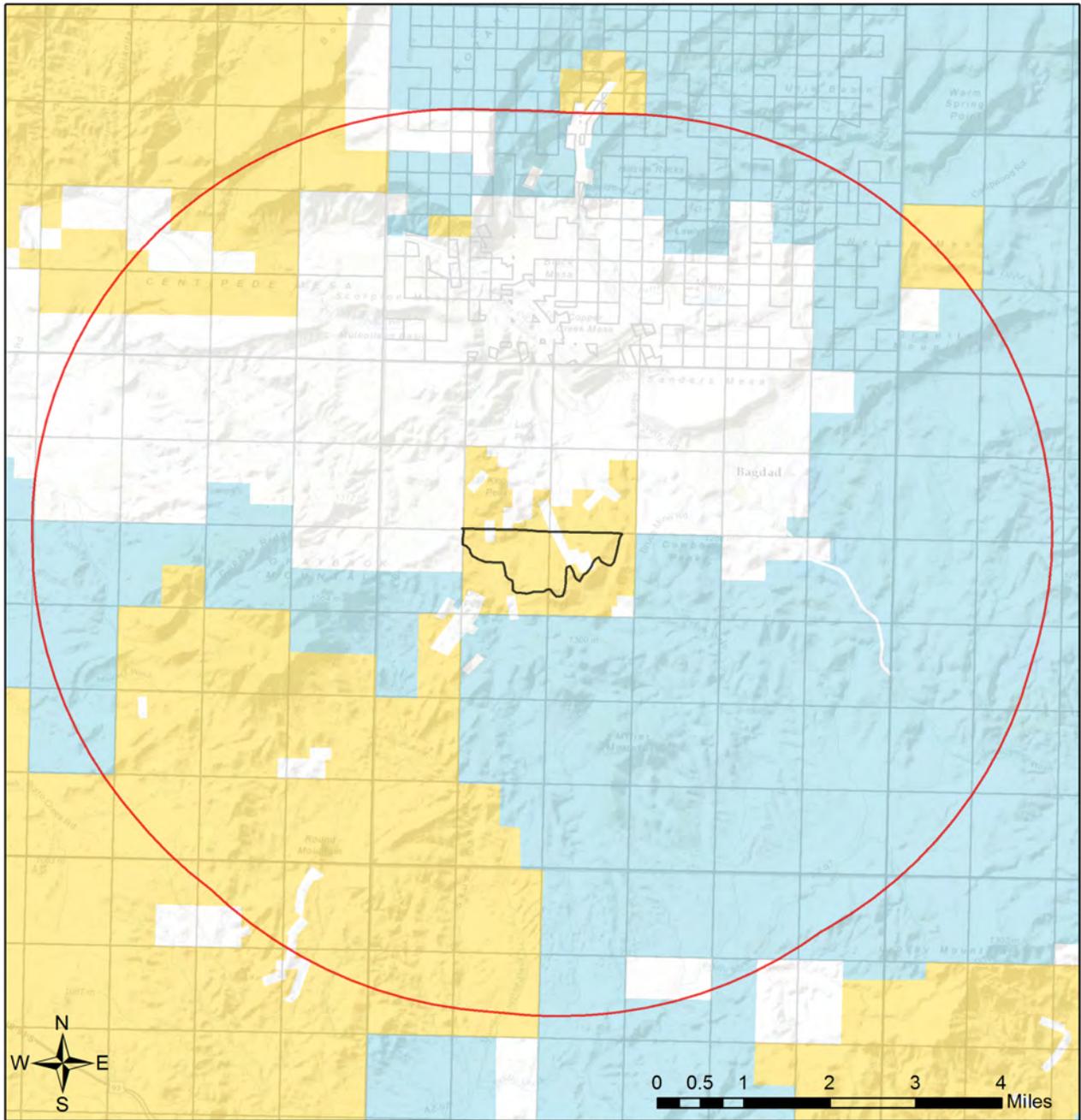
Project Size (acres): 594.81
 Lat/Long (DD): 34.5573 / -113.2168
 County(s): Yavapai
 AGFD Region(s): Kingman
 Township/Range(s): T14N, R9W
 USGS Quad(s): BAGDAD

Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong),



Bagdad Mine Stockpile Extension Project

Web Map As Submitted By User

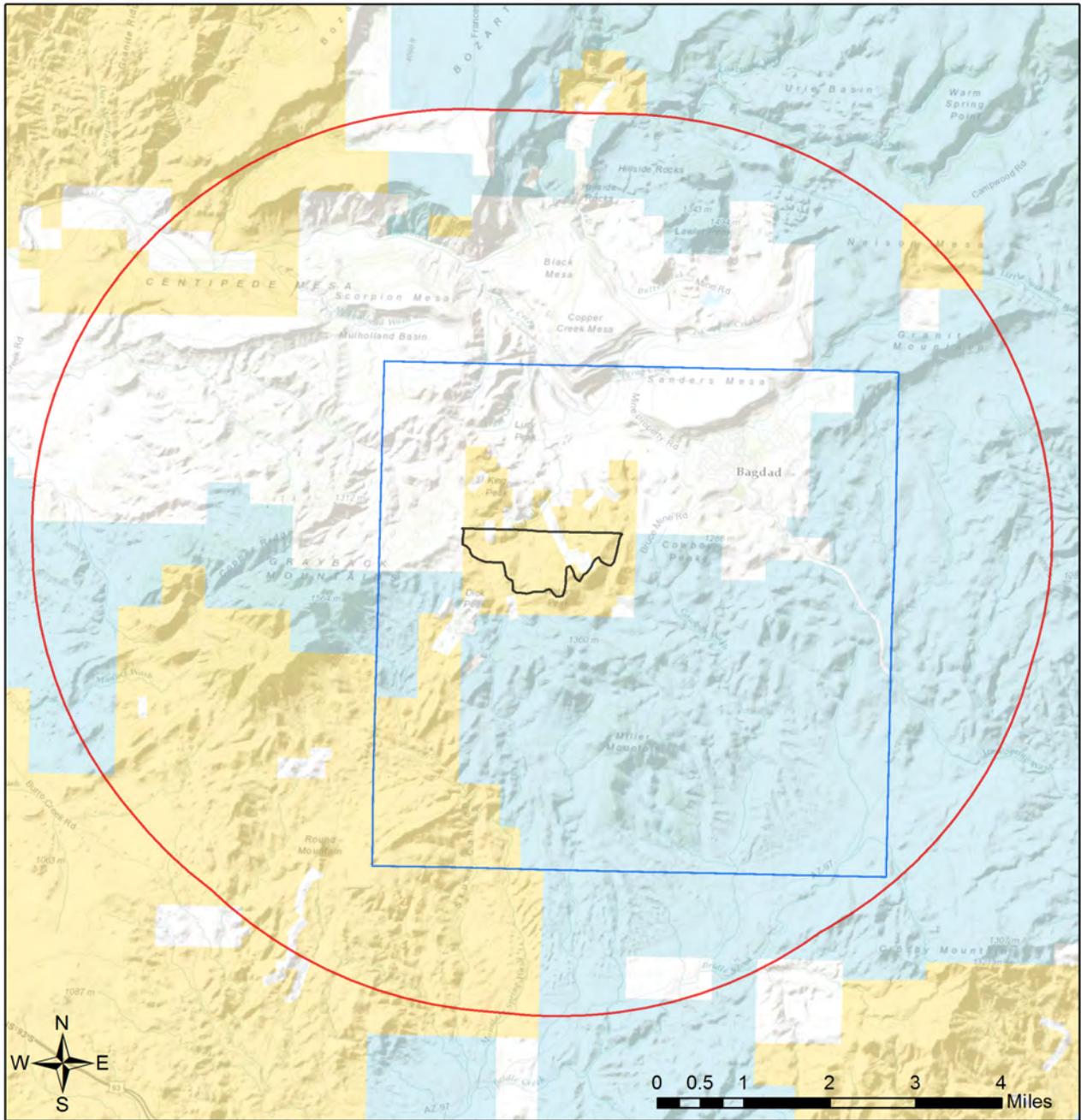


- | | | |
|---------------------------|--------------------------|------------------------------------|
| Project Boundary | National Park/Mon. | Project Size (acres): 594.81 |
| Buffered Project Boundary | Private | Lat/Long (DD): 34.5573 / -113.2168 |
| AZ Game and Fish Dept. | State and Regional Parks | County(s): Yavapai |
| BLM | State Trust | AGFD Region(s): Kingman |
| BOR | US Forest Service | Township/Range(s): T14N, R9W |
| Indian Res. | Wildlife Area/Refuge | USGS Quad(s): BAGDAD |
| Military | Sections | |
| Mixed/Other | Townships | |

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Bagdad Mine Stockpile Extension Project

Topo Basemap With Township/Ranges and Land Ownership



- | | |
|---------------------------|--------------------------|
| Project Boundary | Mixed/Other |
| Buffered Project Boundary | National Park/Mon. |
| Township/Ranges | Private |
| AZ Game and Fish Dept. | State and Regional Parks |
| BLM | State Trust |
| BOR | US Forest Service |
| Indian Res. | Wildlife Area/Refuge |
| Military | |

Project Size (acres): 594.81
 Lat/Long (DD): 34.5573 / -113.2168
 County(s): Yavapai
 AGFD Region(s): Kingman
 Township/Range(s): T14N, R9W
 USGS Quad(s): BAGDAD

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Special Status Species and Special Areas Documented within 5 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
<i>Aquila chrysaetos</i>	Golden Eagle	BGA		S		1B
<i>Buteogallus anthracinus</i>	Common Black-Hawk				WSC	1C
<i>Gila robusta</i>	Roundtail Chub	C*	S		WSC	1A
<i>Gopherus morafkai</i>	Sonoran Desert Tortoise	C*	S		WSC	1A
<i>Heloderma suspectum cinctum</i>	Banded Gila Monster	SC				1A
<i>Lithobates yavapaiensis</i>	Lowland Leopard Frog	SC	S	S	WSC	1A

Note: Status code definitions can be found at http://www.azgfd.gov/w_c/edits/hdms_status_definitions.shtml.

**Species of Greatest Conservation Need
 Predicted within Project Vicinity based on Predicted Range Models**

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
<i>Agosia chrysogaster</i>	Longfin Dace	SC		S		1B
<i>Aix sponsa</i>	Wood Duck					1B
<i>Ammospermophilus harrisi</i>	Harris' Antelope Squirrel					1B
<i>Anaxyrus microscaphus</i>	Arizona Toad	SC				1B
<i>Antilocapra americana americana</i>	America Pronghorn					1B
<i>Aquila chrysaetos</i>	Golden Eagle	BGA		S		1B
<i>Aspidoscelis flagellicauda</i>	Gila Spotted Whiptail					1B
<i>Botaurus lentiginosus</i>	American Bittern				WSC	1B
<i>Buteo regalis</i>	Ferruginous Hawk	SC		S	WSC	1B
<i>Catostomus clarkii</i>	Desert Sucker	SC	S	S		1B
<i>Catostomus insignis</i>	Sonora Sucker	SC	S	S		1B
<i>Chordeiles minor</i>	Common Nighthawk					1B
<i>Coccyzus americanus occidentalis</i>						
<i>Colaptes chrysoides</i>	Gilded Flicker			S		1B
<i>Coluber bilineatus</i>	Sonoran Whipsnake					1B
<i>Corynorhinus townsendii pallescens</i>	Pale Townsend's Big-eared Bat	SC	S	S		1B
<i>Crotalus cerberus</i>	Arizona Black Rattlesnake					1B
<i>Empidonax traillii extimus</i>	Southwestern Willow Flycatcher	LE			WSC	1A
<i>Euderma maculatum</i>	Spotted Bat	SC	S	S	WSC	1B
<i>Eumops perotis californicus</i>	Greater Western Bonneted Bat	SC		S		1B
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	SC	S	S	WSC	1A
<i>Gila robusta</i>	Roundtail Chub	C*	S		WSC	1A
<i>Gopherus morafkai</i>	Sonoran Desert Tortoise	C*	S		WSC	1A
<i>Haliaeetus leucocephalus</i>	Bald Eagle	SC, BGA	S	S	WSC	1A
<i>Heloderma suspectum</i>	Gila Monster					1A
<i>Incilius alvarius</i>	Sonoran Desert Toad					1B
<i>Kinosternon sonoriense sonoriense</i>	Desert Mud Turtle			S		1B

**Species of Greatest Conservation Need
 Predicted within Project Vicinity based on Predicted Range Models**

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
Lasiurus blossevillii	Western Red Bat		S		WSC	1B
Lasiurus xanthinus	Western Yellow Bat		S		WSC	1B
Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC	1A
Macrotus californicus	California Leaf-nosed Bat	SC		S	WSC	1B
Melanerpes uropygialis	Gila Woodpecker					1B
Melospiza lincolni	Lincoln's Sparrow					1B
Melospiza aberti	Abert's Towhee		S			1B
Micruroides euryxanthus	Sonoran Coralsnake					1B
Myotis occultus	Arizona Myotis	SC		S		1B
Myotis velifer	Cave Myotis	SC		S		1B
Myotis yumanensis	Yuma Myotis	SC				1B
Neotoma stephensi	Stephen's Woodrat					1B
Nyctinomops femorosaccus	Pocketed Free-tailed Bat					1B
Panthera onca	Jaguar	LE			WSC	1A
Passerculus sandwichensis	Savannah Sparrow					1B
Perognathus amplus	Arizona Pocket Mouse					1B
Phrynosoma solare	Regal Horned Lizard					1B
Progne subis hesperia	Desert Purple Martin			S		1B
Rhinichthys osculus	Speckled Dace	SC		S		1B
Setophaga petechia	Yellow Warbler					1B
Tadarida brasiliensis	Brazilian Free-tailed Bat					1B
Troglodytes pacificus	Pacific Wren					1B
Vireo bellii arizonae	Arizona Bell's Vireo					1B
Vulpes macrotis	Kit Fox					1B

Species of Economic and Recreation Importance Predicted within Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
Antilocapra americana americana	America Pronghorn					1B
Callipepla gambelii	Gambel's Quail					
Odocoileus hemionus	Mule Deer					
Pecari tajacu	Javelina					
Puma concolor	Mountain Lion					

Project Type: Mining, Extraction Other minerals (copper, limestone, cinders, shale, salt), Other minerals (copper, limestone, cinders, shale, salt)

Project Type Recommendations:

Recommendations will be dependant upon the goals of the fence project and the wildlife species expected to be impacted by the project. General guidelines for ensuring wildlife-friendly fences include: barbless wire on the top and bottom with the maximum fence height 42", minimum height for bottom 16". Modifications to this design may be considered for fencing anticipated to be routinely encountered by elk, bighorn sheep or pronghorn (e.g., Pronghorn fencing would require 18" minimum height on the bottom). Please refer to the Department's Fencing Guidelines located at <http://www.azgfd.gov/hgis/guidelines.aspx>.

During the planning stages of your project, please consider the local or regional needs of wildlife in regards to movement, connectivity, and access to habitat needs. Loss of this permeability prevents wildlife from accessing resources, finding mates, reduces gene flow, prevents wildlife from re-colonizing areas where local extirpations may have occurred, and ultimately prevents wildlife from contributing to ecosystem functions, such as pollination, seed dispersal, control of prey numbers, and resistance to invasive species. In many cases, streams and washes provide natural movement corridors for wildlife and should be maintained in their natural state. Uplands also support a large diversity of species, and should be contained within important wildlife movement corridors. In addition, maintaining biodiversity and ecosystem functions can be facilitated through improving designs of structures, fences, roadways, and culverts to promote passage for a variety of wildlife.

Planning: consider impacts of lighting intensity on mammals and birds and develop measures or alternatives that can be taken to increase human safety while minimizing potential impacts to wildlife. Conduct wildlife surveys to determine species within project area, and evaluate proposed activities based on species biology and natural history to determine if artificial lighting may disrupt behavior patterns or habitat use.

During planning and construction, minimize potential introduction or spread of exotic invasive species. Invasive species can be plants, animals (exotic snails), and other organisms (e.g., microbes), which may cause alteration to ecological functions or compete with or prey upon native species and can cause social impacts (e.g., livestock forage reduction, increase wildfire risk). The terms noxious weed or invasive plants are often used interchangeably. Precautions should be taken to wash all equipment utilized in the project activities before leaving the site. Arizona has noxious weed regulations (Arizona Revised Statutes, Rules R3-4-244 and R3-4-245). See Arizona Department of Agriculture website for restricted plants <http://www.azda.gov/PSD/quarantine5.htm>. Additionally, the U.S. Department of Agriculture has information regarding pest and invasive plant control methods including: pesticide, herbicide, biological control agents, and mechanical control: <http://www.usda.gov/wps/portal/usdahome>. The Department regulates the importation, purchasing, and transportation of wildlife and fish (Restricted Live Wildlife), please refer to the hunting regulations for further information http://www.azgfd.gov/h_f/hunting_rules.shtml

Minimization and mitigation of impacts to wildlife and fish species due to changes in water quality, quantity, chemistry, temperature, and alteration to flow regimes (timing, magnitude, duration, and frequency of floods) should be evaluated. Minimize impacts to springs, in-stream flow, and consider irrigation improvements to decrease water use. If dredging is a project component, consider timing of the project in order to minimize impacts to spawning fish and other aquatic species (include spawning seasons), and to reduce spread of exotic invasive species. We recommend early direct coordination with Project Evaluation Program for projects that could impact water resources, wetlands, streams, springs, and/or riparian habitats.

The Department recommends that wildlife surveys are conducted to determine if noise-sensitive species occur within the project area. Avoidance or minimization measures could include conducting project activities outside of breeding seasons.

Based on the project type entered; coordination with the Environmental Protection Agency may be required <http://www.epa.gov/>

Based on the project type entered; coordination with State Historic Preservation Office may be required
<http://www.pr.state.az.us/partnerships/shpo/shpo.html#anchor561695>

Pre- and post-survey/monitoring should be conducted to determine alternative access/exits to mines and to identify and/or minimize potential impacts to bat species. For further information when developing alternatives to mine closures, contact the Arizona Game and Fish Department Bat Coordinator in Nongame Branch:
http://www.azgfd.gov/inside_azgfd/agency_directory.shtml

Based on the project type entered; coordination with Arizona Department of Environmental Quality may be required (<http://www.azdeq.gov/>).

Project Location and/or Species Recommendations:

HDMS records indicate that one or more listed, proposed, or candidate species or Critical Habitat (Designated or Proposed) have been documented in the vicinity of your project. The Endangered Species Act (ESA) gives the US Fish and Wildlife Service (USFWS) regulatory authority over all federally listed species. Please contact USFWS Ecological Services Offices at <http://www.fws.gov/southwest/es/arizona/> or:

Phoenix Main Office
2321 W. Royal Palm Rd, Suite 103
Phoenix, AZ 85021
Phone: 602-242-0210
Fax: 602-242-2513

Tucson Sub-Office
201 N. Bonita Suite 141
Tucson, AZ 85745
Phone: 520-670-6144
Fax: 520-670-6155

Flagstaff Sub-Office
SW Forest Science Complex
2500 S. Pine Knoll Dr.
Flagstaff, AZ 86001
Phone: 928-556-2157
Fax: 928-556-2121

HDMS records indicate that Sonoran Desert Tortoise have been documented within the vicinity of your project area. Please review the Tortoise Handling Guidelines found at: <http://www.azgfd.gov/hgis/pdfs/Tortoisehandlingguidelines.pdf>

Appendix D Photolog

Photograph Log Key Code

Photograph Indicator Code	Description
X	Vegetation transect
C	Chaparral vegetation type
G	Disclimax grassland vegetation
R	Boulder area
T	Transition between chaparral and disclimax grassland vegetation types
V	Example vegetation photograph
D	Drainage feature
S	Surface water point
W	Wildlife/wildlife sign
B	Open adit or shaft
A	Closed adit or shaft
L	Landscape feature



Photo X2 Type: transect
Transect 2 - grassland



Photo X3 Type: transect
Transect 3 - chaparral



Photo X4 Type: transect
Transect 4 - grassland



Photo X5 Type: transect
Transect 5 - grassland



Photo X6 Type: transect
Transect 6 - chaparral



Photo X7 Type: transect
Transect 7 - chaparral



Photo X8 Type: transect
Transect 8 - grassland (transition)



Photo X9 Type: transect
Transect 9 - chaparral



Photo X10 Type: transect
Transect 10 - chaparral



Photo X11 Type: transect
Transect 11 - chaparral



Photo X12 Type: transect
Transect 12 - grassland



Photo X13 Type: transect
Transect 13 - chaparral



Photo X14 Type: transect
Transect 14 - grassland



Photo X15 Type: transect
Transect 15 - chaparral



Photo X17 Type: transect
Transect 17 - grassland



Photo X18 Type: transect
Transect 18 - grassland (transition)



Photo X19 Type: transect
Transect 19 - chaparral (at transition)



Photo X20 Type: transect
Transect 20 - chaparral



Photo X21 Type: transect
Transect 21 - grassland



Photo X23 Type: transect
Transect 23 - grassland



Photo X24 Type: transect
Transect 24 - chaparral



Photo X26 Type: transect
Transect 26 - grassland



Photo X27 Type: transect
Transect 27 - chaparral



Photo X28 Type: transect
Transect 28 - chaparral



Photo X29 Type: transect
Transect 29 - chaparral (transition)



Photo X31 Type: transect
Transect 31 - chaparral



Photo X32 Type: transect
Transect 32 - grassland



Photo X33 Type: transect
Transect 33 - chaparral



Photo X34 Type: transect
Transect 34 - chaparral



Photo X35 Type: transect
Transect 35 - chaparral



Photo X36 Type: transect
Transect 36 - chaparral



Photo X37 Type: transect
Transect 37 - chaparral



Photo X38 Type: transect
Transect 38 - chaparral



Photo X39 Type: transect
Transect 39 - grassland



Photo X40 Type: transect
Transect 40 - chaparral



Photo X41 Type: transect
Transect 41 - chaparral



Photo X42 Type: transect
Transect 42 - grassland



Photo X43 Type: transect
Transect 43 - grassland



Photo X45 Type: transect
Transect 45 - grassland



Photo X46 Type: transect
Transect 46 - chaparral



Photo X47 Type: transect
Transect 47 - grassland



Photo X48 Type: transect
Transect 48 - grassland



Photo X49 Type: transect
Transect 49 - grassland



Photo X50 Type: transect
Transect 50 - grassland



Photo X51 Type: transect
Transect 51 - chaparral



Photo X52 Type: transect
Transect 52 - chaparral (transition)



Photo X53 Type: transect
Transect 53 - grassland (boulders)



Photo X54 Type: transect
Transect 54 - chaparral (boulders)



Photo X55 Type: transect
Transect 55 - grassland



Photo X56 Type: transect
Transect 56 - grassland (boulders)



Photo X57 Type: transect
Transect 57 - chaparral



Photo X58 Type: transect
Transect 58 - chaparral



Photo X59 Type: transect
Transect 59 - chaparral



Photo X60 Type: transect
Transect 60 - grassland



Photo C1 Type: chaparral
chaparral vegetation on Moano soils



Photo C2 Type: chaparral
typical chaparral vegetation



Photo C3 Type: chaparral
chaparral vegetation on Moano soils



Photo C4 Type: chaparral
typical chaparral vegetation



Photo C5 Type: chaparral
typical chaparral vegetation



Photo C6 Type: chaparral
low ridge granitic outcrops



Photo C7 Type: chaparral
typical chaparral vegetation



Photo C8 Type: chaparral
typical chaparral vegetation



Photo C9 Type: chaparral
typical chaparral vegetation



Photo C10 Type: chaparral
typical chaparral vegetation



Photo C11 Type: chaparral
typical chaparral vegetation



Photo C12 Type: chaparral
typical chaparral vegetation



Photo C13 Type: chaparral
typical chaparral vegetation



Photo C14 Type: chaparral
typical chaparral vegetation



Photo G1 Type: grassland
disclimax grassland typical of Moano soils



Photo G2 Type: grassland
disclimax grassland typical of Moano soils



Photo G3 Type: grassland
disclimax grassland typical of Moano soils



Photo G4 Type: grassland
disclimax grassland typical of Moano soils



Photo G5 Type: grassland
disclimax grassland typical of Moano soils



Photo G6 Type: grassland
disclimax grassland typical of Moano soils



Photo G7 Type: grassland
disclimax grassland typical of Moano soils



Photo G8 Type: grassland
disclimax grassland typical of Moano soils



Photo G9 Type: grassland
typical disclimax grassland vegetation



Photo G10 Type: grassland
typical disclimax grassland vegetation



Photo G11 Type: grassland access road and disclimax grassland



Photo G12 Type: grassland disclimax grassland typical of Moano soils



Photo G13 Type: grassland typical disclimax grassland vegetation



Photo G14 Type: grassland view of typical disclimax grassland from edge of chaparral



Photo G15 Type: grassland typical disclimax grassland vegetation



Photo G16 Type: grassland typical disclimax grassland vegetation



Photo G17 Type: grassland
typical disclimax grassland vegetation



Photo G18 Type: grassland
typical disclimax grassland vegetation



Photo G19 Type: grassland
view of typical disclimax grassland from edge of chaparral



Photo G20 Type: grassland
typical disclimax grassland vegetation



Photo R1 Type: boulders
chaparral / boulder vegetation (soil change in background)



Photo R2 Type: boulders
chaparral / boulder vegetation



Photo R3 Type: boulders
boulder habitat



Photo R4 Type: boulders
chaparral / boulder vegetation



Photo R5 Type: boulders
typical disclimax grassland / boulder vegetation
community



Photo R6 Type: boulders
boulder field



Photo T1 Type: transition
view of typical disclimax grassland with chaparral



Photo T2 Type: transition
typical disclimax grassland / boulder vegetation



Photo T3 **Type:** transition
view of typical disclimax grassland from edge of chaparral



Photo T4 **Type:** transition
chaparral/disclimax grassland boundary; fenceline and utility line



Photo V1 **Type:** vegetation
greenflower nipple cactus (*Mammillaria viridiflora*)



Photo V2 **Type:** vegetation
banana yucca (*Yucca baccata*)



Photo V3 **Type:** vegetation
saguaro (*Carnegiea gigantea*)



Photo V4 **Type:** vegetation
Engelmann's prickly pear (*Opuntia engelmannii*)



Photo V5 Type: vegetation
compass barrel cactus (*Ferocactus acanthodes*)



Photo V6 Type: vegetation
compass barrel cactus (*Ferocactus acanthodes*),
flowering



Photo V7 Type: vegetation
compass barrel cactus (*Ferocactus acanthodes*),
cluster (>10)



Photo V8 Type: vegetation
slender lipfern (*Cheilanthes feei*), rock live-forever
(*Dudleya saxosa* ssp. *collomiae*)



Photo V9 Type: vegetation
Fremont cottonwood (*Populus fremontii*)

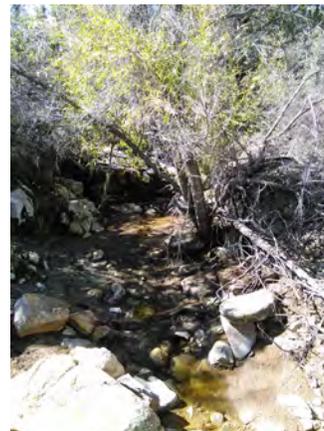


Photo V10 Type: vegetation
willow, cottonwood, flowing water after storm event



Photo V11 Type: vegetation
big galleta (*Hilaria rigida*)



Photo V12 Type: vegetation
Goodding's willow (*Salix gooddingii*)



Photo V13 Type: vegetation
single-leaf ash (*Fraxinus anomala*)



Photo V14 Type: vegetation
compass barrel cactus (*Ferocactus acanthodes*)



Photo V15 Type: vegetation
ocotillo, coachwhip (*Fouquieria splendens*)



Photo V16 Type: vegetation
saguaro (*Carnegiea gigantea*)



Photo V17 Type: vegetation
McKelvey's century plant (*Agave mckelveyana*)



Photo V18 Type: vegetation
banana yucca (*Yucca baccata*)



Photo V19 Type: vegetation
scrub oak (*Quercus turbinella*)



Photo V20 Type: vegetation
drainage feature with desert broom



Photo V21 Type: vegetation
Engelman's prickly pear (*Opuntia engelmannii*)



Photo V22 Type: vegetation
Goodding's willow (*Salix gooddingii*)



Photo V23 Type: vegetation
littleleaf ratany (*Krameria erecta*)



Photo V24 Type: vegetation
desert senna (*Senna covesii*)



Photo V25 Type: vegetation
greenflower nipple cactus (*Mammillaria viridiflora*)



Photo V26 Type: vegetation
Indian root (*Aristolochia watsonii*)



Photo V27 Type: vegetation
Sonoran scrub oak (*Quercus turbinella*)



Photo V28 Type: vegetation
beavertail prickly pear (*Opuntia basilaris*)



Photo V29 Type: vegetation
scarlet four o'clock (*Mirabilis coccinea*)



Photo D1 Type: drainage
drainage feature



Photo D2 Type: drainage
drainage feature



Photo D3 Type: drainage
drainage feature (following heavy rain)



Photo D4 Type: drainage
drainage feature



Photo D5 Type: drainage
drainage feature



Photo D6 Type: drainage erosional feature



Photo D7 Type: drainage erosional feature near toe of Stockpile; facing downgradient (north)



Photo D8 Type: drainage drainage feature



Photo D9 Type: drainage drainage feature



Photo D10 Type: drainage drainage feature



Photo D11 Type: drainage drainage feature; facing downgradient (north)



Photo D12 Type: drainage
drainage feature



Photo D13 Type: drainage
drainage feature



Photo D14 Type: drainage
drainage feature



Photo D15 Type: drainage
drainage feature



Photo S1 Type: surface water point
washed-out tank



Photo S1 Type: surface water point
washed-out tank



Photo S2 **Type:** surface water point spring tank / cattle box (full of sediment)



Photo S2 **Type:** surface water point spring tank / cattle box (full of sediment)



Photo S2 **Type:** surface water point seep/spring location (wet wall)



Photo S3 **Type:** surface water point ponded area following rainfall; southwestern toad (tadpoles) observed



Photo S4 **Type:** surface water point potential seep, looking downgradient, following rainfall



Photo S4 **Type:** surface water point potential seep, looking upgradient, following rainfall



Photo S5 Type: surface water point
spring box (with sediment)



Photo S6 Type: surface water point
Mountain Spring



Photo S6 Type: surface water point
spring box downgradient of Mountain Spring; fed by precipitation



Photo S6 Type: surface water point
ranch area downgradient from Mountain Spring; two tanks, disconnected from spring, now fed by precipitation



Photo S6 Type: surface water point
Mountain Spring



Photo S6 Type: surface water point
stock tank downgradient of Mountain Spring; fed by precipitation



Photo S6 Type: surface water point
Mountain Spring



Photo W1 Type: wildlife
Clark's spiny lizard (*Sceloporus clarkii*)



Photo W2 Type: wildlife
potential raptor nest



Photo W3 Type: wildlife
utility pole w/ nest



Photo W4 Type: wildlife
tadpole



Photo W5 Type: wildlife
tadpole



Photo W6 Type: wildlife
javelina tracks



Photo W7 Type: wildlife
tadpole



Photo W8 Type: wildlife
Sonoran whipsnake (*Masticophis bilineatus*)



Photo W9 Type: wildlife
coyote tracks



Photo W10 Type: wildlife
deer print



Photo W11 Type: wildlife
lizard



Photo W12 Type: wildlife scat



Photo W13 Type: wildlife bird nest



Photo W14 Type: wildlife bird whitewash/perch



Photo W15 Type: wildlife raven



Photo W16 Type: wildlife packrat midden



Photo W17 Type: wildlife packrat midden



Photo W18 Type: wildlife
deer scat



Photo W19 Type: wildlife
yellow warbler, common raven, black-throated sparrow
observed at this location



Photo W20 Type: wildlife
mule deer tracks



Photo B1 Type: mine feature (open)
mine shaft (vertical hole; connected to adit depicted in
B2)



Photo B2 Type: mine feature (open)
mine adit (horizontal hole)



Photo B3 Type: mine feature (open)
mine adit



Photo A1 Type: mine feature
closed mine feature - filled shaft



Photo A2 Type: mine feature
closed mine feature - filled shaft



Photo A3 Type: mine feature
closed mine feature - filled shaft



Photo A4 Type: mine feature
mine feature - prospect, roughly 5 x 8 feet (vertical)



Photo L1 Type: landscape feature
cattle corral



Photo L2 Type: landscape feature
from ridgeline, facing north



Photo L3 Type: landscape feature
rock outcrop



Photo L4 Type: landscape feature
prior structure/disturbance



Photo L5 Type: landscape feature
prior structure/disturbance



Photo L6 Type: landscape feature
prior structure/disturbance



Photo L7 Type: landscape feature
view of stockpile and pit



Photo L8 Type: landscape feature
view of stockpile and pit



Photo L9 Type: landscape feature
reclaimed area on ridgeline



Photo L10 Type: landscape feature
from reclaimed area on ridge facing west



Photo L11 Type: landscape feature
reclaimed area

Appendix E Weather Station Data during Field Reconnaissance Survey

Biological surveys were conducted August 25-29, 2014. Temperatures during the survey ranged from 57 to 94 degrees Fahrenheit (°F), with 0 to 100 percent cloud cover. Thunderstorms occurred during a portion of the survey.

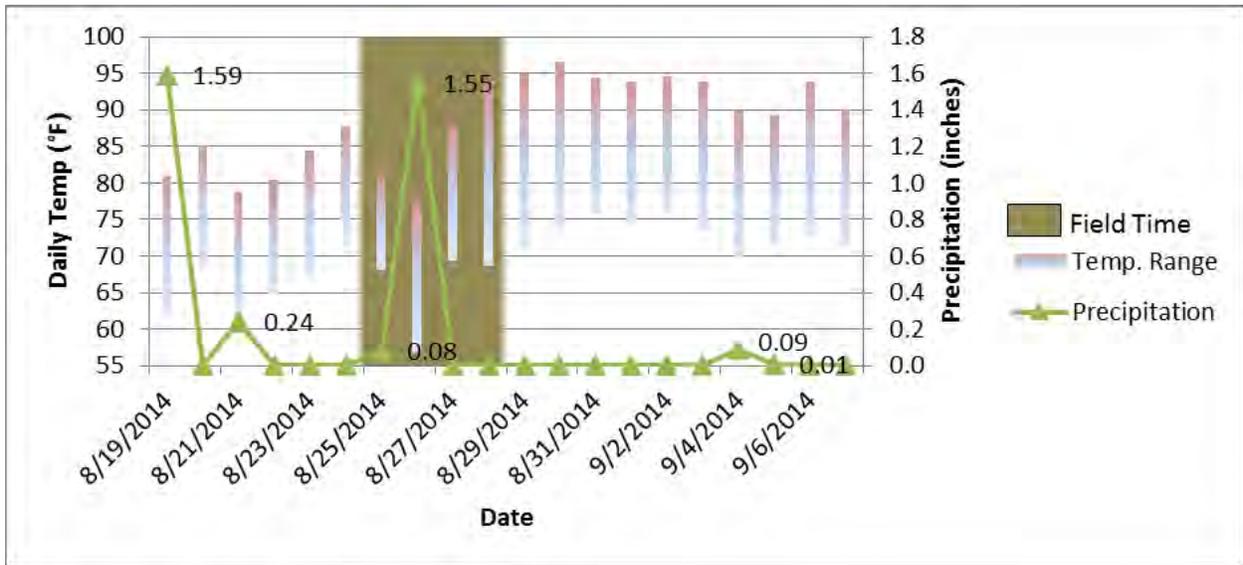


Figure E-1. Bagdad Mine Pit Edge Weather Station

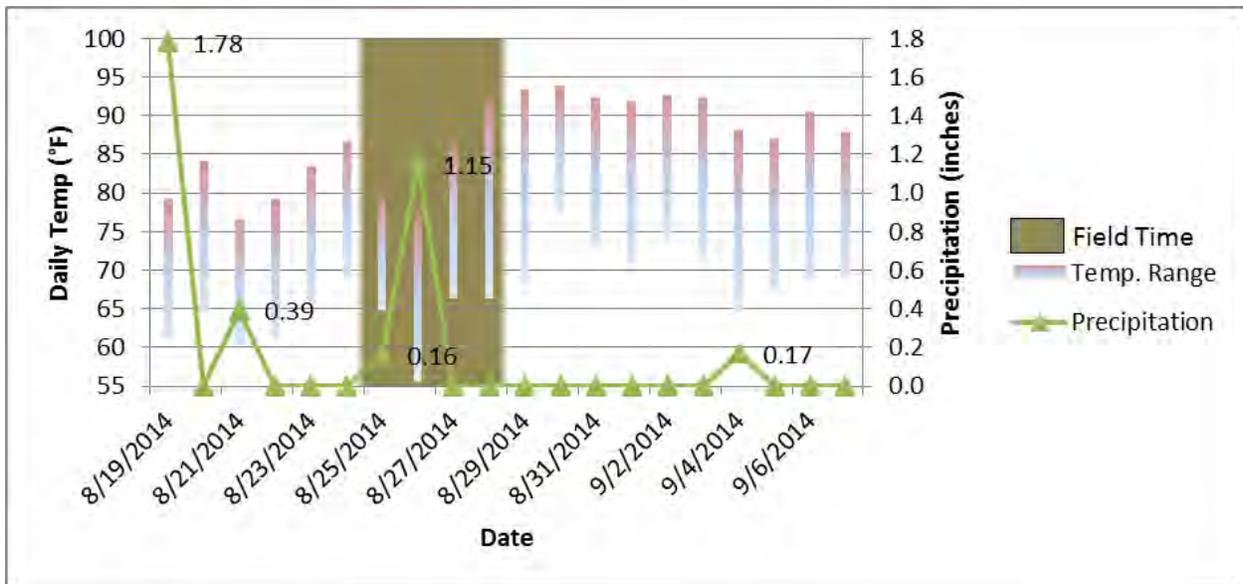


Figure E-2 Bagdad Mine Townsite Weather Station

Appendix F Comprehensive List of Plants Observed in Project Area

Taxon (annuals in red)	Common Name	ADA* Status	Noxious (N) or Invasive (I) Plant ^(a)
<i>Acemison rigidus</i>	Desert rock-pea	--	--
<i>Acourtia wrightii</i>	Brownfoot or perezia	--	--
<i>Adenophyllum porophylloides</i>	San Felipe dogweed	--	--
<i>Agave mckelveyana</i>	McKelvey's century plant	HS	--
<i>Allionia incarnata</i>	Trailing four o'clock	--	--
<i>Amaranthus fimbriatus</i>	Fringed amaranth	--	--
<i>Amaranthus palmeri</i>	Palmer's amaranth	--	--
<i>Ambrosia psilostachya</i>	Western ragweed	--	--
<i>Aristida adscensionis</i>	Sixweeks threeawn	--	--
<i>Aristida purpurea</i>	Purple three-awn	--	--
<i>Aristolochia watsonii</i>	Indian root	--	--
<i>Artemisia dracuncululus</i>	False tarragon	--	--
<i>Astragalus arizonicus</i>	Arizona locoweed	--	--
<i>Ayenia filiformis</i>	Trans-Pecos ayenia	--	--
<i>Baccaris sergiloides</i>	Desert baccharis	--	--
<i>Baccharis salicifolia--</i>	Seep willow	--	--
<i>Baccharis sarothroides</i>	Desert broom	--	--
<i>Bebbia juncea</i>	Sweetbush	--	--
<i>Boeravia coccinea</i>	Scarlet spiderling	--	--
<i>Boerhavia intermedia</i>	Five-wing spiderling	--	--
<i>Boerhavia wrightii</i>	Large-bract spiderling	--	--
<i>Bouteloua aristidoides</i>	Needle grama	--	--
<i>Bouteloua barbata</i>	Six-weeks grama	--	--
<i>Bouteloua curtipendula</i>	Sideoats grama	--	---
<i>Bouteloua eriopoda</i>	Black grama	--	--
<i>Bouteloua gracilis</i>	Blue grama	--	--
<i>Brickellia atractyloides</i>	Hollyleaf brickellbush	--	--
<i>Brickellia brachyphylla</i>	Brach brickellbush	--	--
<i>Brickellia californica</i>	California brickellbush	--	--
<i>Calliandra eriophylla</i>	Fairy duster, false-mesquite	--	--
<i>Canotia holacantha</i>	Crucifixion thorn	--	--
<i>Carnegiea gigantea</i>	Saguaro	HS	--
<i>Ceanothus greggii</i>	Desert ceanothus	--	--
<i>Cercocarpus montanus</i>	Mountain mahogany	--	--
<i>Chamaesyce florida</i>	Chiricahua Mountain sandmat	--	--
<i>Chamaesyce melanodenia</i>	Red-gland spurge	--	--
<i>Chamaesyce revoluta</i>	Threadstem sandmat	--	--
<i>Cheilanthes feei</i>	Slender lipfern	--	--
<i>Chloris virgata</i>	Feather fingergrass	--	--
<i>Cirsium neomexicanum</i>	New Mexico thistle, lavender thistle	--	--
<i>Cuscuta indecora</i>	Bigseed alfalfa dodder	--	--
<i>Cylindropuntia acanthocarpa</i>	Buckhorn cholla	--	--
<i>Cylindropuntia leptocaulis</i>	Christmas cactus	--	--
<i>Cynodon dactylon</i>	Bermuda grass	--	--
<i>Datura wrightii</i>	Sacred thorn-apple	--	--

Taxon (annuals in red)	Common Name	ADA* Status	Noxious (N) or Invasive (I) Plant ^(a)
<i>Dudleya saxosa ssp. Collomiae</i>	Rock live-forever	SR	--
<i>Echinocereus engelmannii</i>	Engelmann's hedgehog cactus	SR	--
<i>Encelia farinosa</i>	Brittlebush	--	--
<i>Eragrostis cilianensis</i>	Stinkgrass	--	--
<i>Eragrostis lutescens</i>	Sixweeks lovegrass	--	--
<i>Ericameria laricifolia</i>	Turpentine bush	--	--
<i>Ericameria linearifolia</i>	Narrowleaf goldenbush	--	--
<i>Eriogonum deflexum</i>	Flatcrown buckwheat	--	--
<i>Eriogonum fasciculatum</i>	California buckwheat	--	--
<i>Eriogonum inflatum</i>	Desert trumpet	--	--
<i>Eriogonum wrightii</i>	Wright's buckwheat, bastardsage	--	--
<i>Evolvulus alsinoides</i>	Slender dwarf morning-glory	--	--
<i>Ferocactus acanthodes</i>	Barrel cactus	SR	--
<i>Fouquieria splendens</i>	Ocotillo, coachwhip	--	--
<i>Fraxinus anomala</i>	Singleleaf ash	--	--
<i>Glandularia gooddingii</i>	Southwestern mock vervain	--	--
<i>Gutierrezia sarothrae</i>	Snakeweed	--	--
<i>Hedeoma nanum subsp. Macrocalyx</i>	False pennyroyal	--	--
<i>Heteropogon contortus</i>	Tanglehead	--	--
<i>Hilaria belangeri</i>	Curly-mesquite	--	--
<i>Hilaria rigida</i>	Big galleta	--	--
<i>Ipomoea coccinea</i>	Redstar, scarlet starglory	--	N
<i>Ipomoea purpurea</i>	Tall morning-glory	--	N
<i>Janusia gracilis</i>	Slender janusia	--	--
<i>Juniperus californica</i>	California juniper	--	--
<i>Justicia californica</i>	Chuparosa, beloperone	--	--
<i>Kallstroemia parviflora</i>	Warty caltrop	--	--
<i>Keckiella antirrhinoides</i>	Snapdragon penstemon	--	--
<i>Krameria erecta</i>	Littleleaf ratany	--	---
<i>Leptochloa panicea subsp. brachiata</i>	Mucronate sprangeltop	--	--
<i>Lycium andersonii</i>	Anderson thornbush, water jacket	--	--
<i>Machaeranthera gracilis</i>	Slender goldenweed	--	--
<i>Mammillaria grahamii</i>	Graham's nipple cactus	SR	--
<i>Mammillaria viridiflora</i>	Greenflower nipple cactus	SR	--
<i>Maurandella antirrhiniflora</i>	Roving sailor	--	--
<i>Melampodium leucanthum</i>	Plains blackfoot	--	--
<i>Mimosa biuncifera</i>	Catclaw mimosa (wait-a-minute bush)	--	--
<i>Mirabilis bigelovii</i>	Wishbone-bush	--	--
<i>Mirabilis coccinea</i>	Scarlet four o'clock	--	--
<i>Mirabilis multiflora</i>	Colorado four o'clock	--	--
<i>Mirabilis pumila</i>	Dwarf four o'clock	--	--
<i>Morus microphylla</i>	Texas mulberry	--	--
<i>Muhlenbergia porteri</i>	Bush muhly	--	--
<i>Nicotiana obtusifolia</i>	Desert tobacco	--	--
<i>Nolina bigelovii</i>	Bigelow's nolina	HR	--
<i>Nolina microcarpa</i>	Sacahuista	HR	--
<i>Oenothera caespitosa</i>	Tufted evening primrose	--	--
<i>Opuntia basilaris</i>	Beavertail pricklypear	SR	--
<i>Opuntia chlorotica</i>	Dollarjoint pricklypear	SR	--

Taxon (annuals in red)	Common Name	ADA* Status	Noxious (N) or Invasive (I) Plant ^(a)
<i>Opuntia engelmannii</i>	Engelmann's prickly pear (cactus apple)	SR	--
<i>Opuntia phaeacantha</i>	Brown-spined or tulip pricklypear	SR	--
<i>Panicum hirticaule</i>	Mexican panicgrass	--	--
<i>Pectis papposa</i>	Manybristle chinchweed	--	--
<i>Pellaea truncata</i>	Spiny cliffbrake	--	--
<i>Penstemon parryi</i>	Parry's beardtongue	--	--
<i>Phemeranthus aurantiacus</i>	Orange fameflower	--	--
<i>Phoradendron serotinum subsp. tomentosum</i>	American mistletoe	--	--
<i>Physalis hederifolia var. fendleri</i>	Fendler's groundcherry	--	--
<i>Populus fremontii</i>	Fremont cottonwood	--	--
<i>Porophyllum gracile</i>	Slender poreleaf	--	--
<i>Portulaca oleracea</i>	Little hogweed	--	N
<i>Portulaca suffrutescens</i>	Shrubby purslane	--	--
<i>Proboscidea parviflora</i>	Doubleclaw	--	--
<i>Prosopis velutina</i>	Velvet mesquite	HR	--
<i>Psilostrophe cooperi</i>	Whitestem paperflower	--	--
<i>Quercus turbinella</i>	Sonoran scrub oak	--	--
<i>Rhus aromatica</i>	Fragrant sumac	--	--
<i>Rhus ovata</i>	Sugar bush, sugar sumac	--	--
<i>Salix exigua</i>	Narrowleaf willow	--	--
<i>Salix gooddingii</i>	Goodding's willow	--	--
<i>Sarcostemma crispum</i>	Wavyleaf twinevine	--	--
<i>Scutellaria mexicana</i>	Mexican bladder sage	--	--
<i>Senecio flaccidus subsp. Flaccidus</i>	Threadleaf ragwort	--	--
<i>Senegalia greggii</i>	Catclaw acacia	--	--
<i>Senna covesii</i>	Desert senna	--	--
<i>Solanum elaeagnifolium</i>	Silverleaf nightshade	--	--
<i>Solanum rostratum</i>	Buffalobur nightshade	--	I
<i>Sphaeralcea ambigua</i>	Desert globemallow	--	--
<i>Stephanomeria pauciflora</i>	Brownplume wirelettuce	--	--
<i>Stipa speciosa</i>	Desert needlegrass	--	--
<i>Tamarix ramosissima</i>	Saltcedar	--	I
<i>Tragia ramosa</i>	Branched noseburn	--	--
<i>Trixis californica</i>	American threefold	--	---
<i>Viguiera parishii</i>	Desert sunflower	--	--
<i>Yucca baccata</i>	Banana yucca	HR	--
<i>Ziziphus obtusifolia</i>	Lotebush	--	--

(a) As listed on USDA and ADA invasive and noxious plants lists.

*Arizona Department of Agriculture protected native plant categories:

HR = Harvest Restricted. These plants are subject to excessive harvesting or overcutting because of their intrinsic value.

HS = Highly Safeguarded. These plants are threatened for survival or are in danger of extinction. Protection includes not only the plants themselves, but their plant parts such as fruits, seeds and cuttings.

SR = Salvage Restricted. These plants are subject to damage by theft or vandalism.

Observed plant species were checked against BLM sensitive species lists, and no occurrences of sensitive plant species were noted during field biological surveys.

Appendix G Vegetation Transect Results and Point Data

Table G.1 Vegetation Point Data – Interior Chaparral Vegetation Community

Vegetation Point	Visual Assessment of Percent Cover																				Mean					
	2	5	6	9	12	14	15	19	22	23	26	27	28	29	31	32	37	42	43	45		48	49	50	Minimum	Maximum
Purple three-awn <i>Aristida purpurea</i> ARIPUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Sideoats grama <i>Bouteloua curtipendula</i> BOCU	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0
Fairy duster <i>Calliandra eriophylla</i> CAER	0	0	0	0	0	5	2	0	0	0	0	0	2	0	0	0	0	0	4	15	0	0	0	0	15	1.2
Crucifixion thorn <i>Canotia holacantha</i> CAHO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	15	0.7
Desert ceanothus <i>Ceanothus greggii</i> CEGR	5	0	5	0	0	0	1	0	1	0	2	1	0	0	8	20	8	0	0	0	1	0	0	0	20	2.3
Mountain mahogany <i>Cercocarpus montanus</i> CEMO	15	20	30	5	15	0	10	10	20	10	1	3	0	0	0	0	0	2	0	0	0	0	0	0	30	6.1
Buckhorn cholla <i>Cylindropuntia acanthocarpa</i> CYAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
California buckwheat <i>Eriogonum fasciculatum</i> ERFA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	10	0	0	0	0	0	10	0.5
Turpentine bush <i>Ericameria laricifolia</i> ERLA	0	15	1	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0.9
Narrowleaf goldenbush <i>Ericameria linearifolia</i> ERLI	0	0	0	20	0	1	0	1	1	0	0	0	1	0	0	3	0	3	0	3	0	0	0	0	20	1.4
Wright's buckwheat <i>Eriogonum wrightii</i> ERWR	0	2	0	3	0	0	0	0	0	0	0	0	0	0	4	1	1	0	0	0	0	0	0	0	4	0.5
Ocotillo, coachwhip <i>Fouquieria splendens</i> FOSP	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	1	0	4	0.2
Snakeweed <i>Gutierrezia sarothrae</i> GUSA	0	5	0	0	0	15	2	1	0	0	3	1	0	0	0	0	0	5	0	2	6	0	5	0	15	2.0
Slender janusia <i>Janusia gracilis</i> JAGR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
California juniper <i>Juniperus californica</i> JUCA	0	0	0	2	0	1	0	0	1	0	2	7	20	15	8	3	2	2	1	0	7	30	10	0	30	4.8
Littleleaf ratany <i>Krameria erecta</i> KRER	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	2	0	3	0.3
Catclaw mimosa (wait-a-minute bush) <i>Mimosa biuncifera</i> MIMBIU	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0
Bush mulberry <i>Muhlenbergia porteri</i> MUPO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Sacahuista <i>Nolina microcarpa</i> NOMI	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1
Engelmann's prickly pear (cactus apple) <i>Opuntia engelmannii</i> OPEN	10	10	2	3	2	20	10	5	10	5	10	5	3	7	10	0	15	3	15	10	8	15	10	0	20	8.5
Velvet mesquite <i>Prosopis velutina</i> PRVE	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.1
Sonoran scrub oak <i>Quercus turbinella</i> QUTU	50	20	40	35	10	0	20	35	40	55	55	10	15	6	5	3	3	55	0	0	55	3	20	0	55	21.7

Fasting	Nothing	Transect	Veg Commun (1=Chaparral; 2=Grassland)	Common Name Scientific Name Veg ID											
				McKelvey's century plant <i>Agave mckelveyana</i> AGMC	Buckhorn cholla <i>Cylindropuntia acanthocarpa</i> CYAC	Engelmann's hedgehog cactus <i>Echinocereus engelmannii</i> ECEN	Graham's nipple cactus <i>Mammillaria grahamii</i> MAGR	Sacahuista (beargrass) <i>Nolina microcarpa</i> NOMI	Beavertail pricklypear <i>Opuntia basilaris</i> OPBA	Dollarjoint pricklypear <i>Opuntia chlorotica</i> OPCH	Engelmann's prickly pear (cactus apple) <i>Opuntia engelmannii</i> OPEN	Tulip pricklypear <i>Opuntia phaeacantha</i> OPPH	Banana yucca <i>Yucca baccata</i> YUBA	HEADS	
297148	3826505	011	1	0	0	ND	ND	0	ND	ND	ND	0	ND	0	ND
297411	3826161	013	1	0	0	ND	ND	1	ND	ND	ND	0	ND	0	ND
296990	3825467	015	1	0	0	ND	ND	0	ND	ND	ND	0	ND	0	ND
298218	3826263	019	1	0	0	2	0	0	0	0	36	0	1	20	0
298096	3826291	020	1	0	0	1	0	0	0	1	16	0	0	0	0
297584	3825182	024	1	0	2	0	0	0	0	0	15	0	0	0	0
297861	3826583	027	1	0	0	0	0	0	0	0	6	0	0	0	0
297671	3826494	028	1	0	0	0	0	0	0	0	21	1	0	0	0
297478	3826496	029	1	0	0	1	0	0	0	0	6	0	2	33	0
297500	3826269	030	1	0	0	10	0	0	0	0	19	1	0	0	0
297660	3826293	031	1	0	0	0	0	6	0	0	8	0	0	0	0
296514	3825742	033	1	0	0	0	0	0	0	0	14	0	0	0	0
296599	3826237	034	1	10	8	8	0	0	0	0	6	0	6	53	0
296457	3826486	035	1	0	5	0	0	0	0	1	6	0	0	0	0
296310	3826131	036	1	0	4	2	0	0	0	0	8	0	1	3	0
296182	3825972	037	1	0	1	1	0	0	0	0	8	1	11	150	0
296103	3826053	038	1m	0	0	3	0	0	0	0	15	0	15	99	0
295925	3826374	040	1m	0	0	0	0	0	0	0	7	0	0	0	0
295873	3826105	041	1m	0	6	0	0	0	0	0	9	0	2	6	0
295226	3826626	046	1m	0	2	31	0	0	0	0	16	0	2	85	0
297414	3825174	051	1	0	3	0	0	0	0	0	7	0	0	0	0
297257	3825271	052	1	0	1	2	0	0	0	0	14	0	0	0	0
296345	3825068	054	1b	0	2	1	0	0	0	0	16	0	0	0	0
295860	3825310	057	1m	0	6	0	0	0	0	2	12	0	1	6	0
295793	3825666	058	1m	0	0	1	0	0	0	0	14	0	7	23	0

Fasting	Northing	Transect	Veg Commun (1=Chaparral 2=Grassland)	Common Name Scientific Name Veg ID											
				McKelvey's century plant <i>Agave mckelveyana</i> AGMC	Buckhorn cholla <i>Cylindropuntia acanthocarpa</i> CYAC	Engelmann's hedgehog cactus <i>Echinocereus engelmannii</i> ECEN	Graham's nipple cactus <i>Mammillaria grahamii</i> MAGR	Sacahuista (beargrass) <i>Nolina microcarpa</i> NOMI	Beavertail pricklypear <i>Opuntia basilaris</i> OPBA	Dollarjoint pricklypear <i>Opuntia chlorotica</i> OPCH	Engelmann's prickly pear (cactus apple) <i>Opuntia engelmannii</i> OPEN	Tulip pricklypear <i>Opuntia phaeacantha</i> OPPH	Banana yucca <i>Yucca baccata</i>		
295505	3825551	059	1m	0	6	0	0	0	0	0	0	13	0	7	58
Sum				11	58	63	0	22	0	4	292	3	56	1.8	536
Mean				0.4	1.9	2.7	0.0	0.7	0.0	0.2	12.7	0.1	1.8	23.3	

Table G.4 Vegetation Transect Field Data – Disclimax Grassland Community Transects

Fasting	Northing	Transect	Veg Commun (1=Chaparral 2=Grassland)	Common Name Scientific Name Veg ID											
				McKelvey's century plant <i>Agave mckelveyana</i> AGMC	Buckhorn cholla <i>Cylindropuntia acanthocarpa</i> CYAC	Engelmann's hedgehog cactus <i>Echinocereus engelmannii</i> ECEN	Graham's nipple cactus <i>Mammillaria grahamii</i> MAGR	Sacahuista (beargrass) <i>Nolina microcarpa</i> NOMI	Beavertail pricklypear <i>Opuntia basilaris</i> OPBA	Dollarjoint pricklypear <i>Opuntia chlorotica</i> OPCH	Engelmann's prickly pear (cactus apple) <i>Opuntia engelmannii</i> OPEN	Tulip pricklypear <i>Opuntia phaeacantha</i> OPPH	Banana yucca <i>Yucca baccata</i>		
296755	3825259	001	2	0	7	ND	ND	0	0	ND	ND	ND	ND	0	ND
296696	3825314	002	2	0	2	ND	ND	0	0	ND	ND	ND	ND	0	ND
296845	3825623	004	2	0	0	ND	ND	0	0	ND	ND	ND	ND	0	ND
296758	3825848	005	2	0	0	ND	ND	0	0	ND	ND	ND	ND	0	ND
297019	3826218	008	2	0	4	ND	ND	0	0	ND	ND	ND	ND	0	ND
297246	3826389	012	2	0	0	ND	ND	0	0	ND	ND	ND	ND	0	ND
297411	3825693	014	2	0	0	ND	ND	0	0	ND	ND	ND	ND	0	ND
296794	3825333	016	2	0	1	ND	ND	0	0	ND	ND	ND	ND	0	ND
298151	3825479	017	2	0	0	0	0	0	0	1	7	0	0	0	0
298110	3825969	018	2	0	0	27	0	0	0	0	44	0	0	0	0
297905	3826055	021	2	0	0	3	0	0	0	0	23	0	0	0	0
297925	3825864	022	2	0	0	0	0	0	0	0	24	0	0	0	0
297780	3825804	023	2	0	0	2	0	0	0	0	18	0	0	0	0
297799	3825204	025	2	0	0	1	0	0	0	0	18	0	0	0	0
297999	3826437	026	2	0	0	1	0	0	0	0	32	3	0	0	0
296445	3825568	032	2	0	0	0	0	0	0	0	14	0	0	0	0

Easting	Northing	Transect	Veg Common (=Chaparal) (= Grassland);	Common Name Scientific Name Veg ID											
				McKelvey's century plant <i>Agave mckelveyana</i> AGMC	Buckhorn cholla <i>Cylindropuntia acanthocarpa</i> CYAC	Engelmann's hedgehog cactus <i>Echinocereus engelmannii</i> ECEN	Graham's nipple cactus <i>Mammillaria grahamii</i> MAGR	Sacahuista (beargrass) <i>Nolina microcarpa</i> NOMI	Beavertail pricklypear <i>Opuntia basilaris</i> OPBA	Dollarjoint pricklypear <i>Opuntia chlorotica</i> OPCH	Engelmann's prickly pear (cactus apple) <i>Opuntia engelmannii</i> OPEN	Tulip pricklypear <i>Opuntia phaeacantha</i> OPPH	Banana yucca <i>Yucca baccata</i> YUBA	HEADS	
296109	3826549	039	2m	0	1	3	0	0	1	0	0	17	0	0	0
295520	3826388	042	2m	0	2	1	0	0	0	0	0	8	0	0	0
295639	3826596	043	2m	0	3	1	0	0	0	0	0	9	0	0	0
295703	3826548	044	2m	0	1	1	0	0	0	0	0	14	0	0	0
295388	3826600	045	2m	0	3	9	0	0	0	0	0	10	0	0	0
295217	3826417	047	2m	0	6	0	0	0	0	0	0	6	0	1	4
295425	3826091	048	2m	0	4	3	0	0	0	0	0	13	0	0	0
295703	3826055	049	2m	0	0	0	0	0	0	0	0	7	0	0	0
297602	3825516	050	2	0	6	0	0	0	0	0	0	13	0	0	0
296183	3825254	055	2	0	4	5	0	0	0	0	0	18	0	0	0
295971	3825153	056	2b	0	6	16	1	0	0	0	0	8	0	3	28
295167	3825690	060	2m	0	3	0	0	0	0	0	0	10	0	0	0
Sum				0	56	75	1	0	2	1	0	323	3	7	122
Average				0.0	1.9	3.6	0.0	0.0	0.1	0.0	0.0	15.4	0.1	0.2	5.8

Appendix H Special Status Species – Potential to Occur

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Abert's towhee	<i>Melospiza aberti</i>			SGCN 1B	This species is native to Southwestern U.S. and northern Mexico, though primarily along the Lower Colorado and Gila River watersheds in Arizona. It prefers cottonwood and willow woodlands, with dense shrubs, along desert streams and rivers up to elevations of 4,265 feet (1,300 m). (Tweit 1994).	May occur. The project site has limited riparian woodlands, though point water sources do support small patches of cottonwood trees that would be suitable.
Allen's big-eared bat	<i>Idionycteris phyllotis</i>	X			The species occurs from the central highlands of Mexico to west-central New Mexico to the Colorado River Valley, Arizona, mostly at higher elevations. In Arizona, it has been found most often in ponderosa pine, pinyon-juniper, Mexican woodland and riparian areas of sycamores, cottonwoods and willows; also in white fir and in Mohave desertscrub. The species prefers boulder piles, cliffs, rocky outcrops or lava flows; roosts in caves and abandoned mineshafts; and has been typically netted near streams or ponds. The species occurs between 1,320 to 9,800 feet (403 to 3,225 m) amsl. (AGFD 2001c).	May occur.
American bittern	<i>Botaurus lentiginosus</i>			SGCN 1B	During the breeding season, the American Bittern ranges from the mid United States to northern Canada. The species is a rare transient in Arizona principally from April to mid-May and September to early October, and a rare, local winter visitor in large marshes in southern and western Arizona. (AGFD 2001b).	Does not occur. The project area has insufficient surface water resources to support this species.
American peregrine falcon	<i>Falco peregrinus anatum</i>	X		SGCN 1A	The species is found on every continent. In Arizona, peregrine falcons are found near steep, sheer cliffs overlooking woodlands, riparian areas or other habitats supporting abundant prey species in abundance (AGFD 2002g). Can be found nesting up to elevations of 12,000 feet (3,657 m).	Does not occur. The project area does not include sufficient suitable habitat of cliffs or riparian areas for this species.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
American pronghorn	<i>Antilocapra americana americana</i>			SGCN 1B	Pronghorn occur from southern Alberta and Saskatchewan south to northern Sonora and Chihuahua, Mexico; west to eastern Oregon, northeastern California, as well as east to mid-state regions of North Dakota, South Dakota, and Texas. Pronghorn primarily occur in grasslands and open shrub-grasslands, though they may occasionally be found in deserts and quaking aspen parkland (USFS 2015). In unit 18B, pronghorn are found at Goodwin Mesa, Bozarth Mesa, and north of the San Luis Maria Baca Float/ORO Ranch near the boundary with unit 18A. Several herds occur on Behm and Contreras Mesas outside of Bagdad. These areas are approximately 5 miles north, and separated from the project area, by the open pit and mine stockpile.	Low. The project area is not considered prime habitat for pronghorn. However, pronghorn may occasionally disperse through the area when migrating to other suitable areas.
Aquarius milkvetch ^(d)	<i>Astragalus newberryi</i> var. <i>aquaria</i>	X			The species occurs in Burro Creek, Mohave County, Arizona on Limey clay soil, at 2,000 to 2,600 feet (610 to 793 m) amsl. The seraphic islands on which this species grows do not support Sonoran Desert dominants such as creosote bush and foothill palo verde. Occurs with other rare plants, mostly in the BLM Clay Hills Area of Critical Environmental Concern (AGFD 2004a).	Does not occur. Lack of suitable habitat within the project area.
Aravaipa woodfern	<i>Thelypteris puberula</i> var. <i>sonorensis</i>	X			The species range spans Arizona and southwestern California to western Mexico. In Arizona, it is found in Coconino, Maricopa, Pima, Pinal and Yavapai counties on riverbanks, seepage areas, and meadow habitats, and in moist soil in the shade of boulders in mesic canyons at elevations from 2,220 to 4,500 feet (677 to 1,373 m) (AGFD 2004f).	Does not occur. Telesito did not find this species near any of the point water sources during field surveys.
Arizona bell's vireo	<i>Vireo bellii arizonae</i>			SGCN 1B	The species occurs throughout southwestern U.S. along the Colorado River from southern Arizona and California, into Mexico. Within Arizona, Arizona bell's vireo are found in central, southeastern and southwestern Arizona primarily in lowland riparian areas, with willows, mesquite and seep willows. The vireo prefers dense, low, shrubby vegetation in riparian areas (AGFD 2002m).	May occur.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Arizona black rattlesnake	<i>Crotalus cerberus</i>			SGCN 1B	Arizona Black Rattlesnakes are almost exclusively endemic to Arizona, with contiguous populations found in southwestern New Mexico. This species occurs at elevations ranging from 2,953 to 9,843 feet (900 to 3,000 m). Its range roughly follows the Mogollon Rim, with a patchy distribution of populations in isolated canyons and mountain ranges (Bergamini et al. 2014). They are found in mesic habitats as well as rocky slopes in a variety of biotic communities from desert scrub to coniferous forests.	May occur.
Arizona cliffrose ^(a)	<i>Purshia cowani subintegra</i>		E		Occurs on rolling, rocky, limestone hills and slopes within Sonoran desert scrub at elevations ranging from 2,120 to 4,000 feet (647 to 1,220 m). Requires white tertiary (Miocene and Pliocene) limestone lakebed deposits high in lithium, nitrates, and magnesium. Found in the Tonto and Verde basins.	Does not occur. Review of geologic maps and field observations confirm that there are no limestone hills within the project area. Critical habitat has not been designated for this species in Arizona.
Arizona myotis	<i>Myotis occultus</i>	X		SGCN 1B	<i>Myotis occultus</i> ranges from southern California to Arizona, New Mexico, and Colorado (USA), south to central Mexico. The species occurs at higher elevations in ponderosa pine and oak-pine woodland near water and along permanent water or in riparian forests in some desert areas such as along the lower Colorado and Verde rivers. The bat's elevation ranges from 3,200 feet (975 m) in the Verde Valley to 8,620 feet (2,627 m) in the San Francisco Mountains. There are some records from lower elevations between 150 and 1,000 feet (45 to 305 m) along the lower Colorado River (AGFD 2011a).	Unlikely to occur. The project area does not have sufficient riparian habitat and riparian obligate tree communities to support the species' roosting preferences.
Arizona pocket mouse	<i>Perognathus amplus</i>			SGCN 1B	The species is found western and central Arizona, extending southward to northwest Sonora, Mexico in various types of desert scrub habitats (greasewood, rabbitbrush, creosote bush, cactus, mesquite, palo verde, etc.) and along scattered scrub oak in some areas. Throughout their distribution, Arizona pocket mice are found where there are solid, stable, fine-textured soils. These soils are desirable for digging underground burrows, which is where they sleep, cache food, raise young, and periodically go torpid during the winter. Burrows can be detected by small openings and sand mounds, most often under a plant (Linzey et al. 2008c). Typically found from 3,904 to 5,423 feet (1,190 to 1,653 m) amsl.	May occur.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Arizona toad	<i>Anaxyrus microscaphus</i>			SGCN 1B	Arizona toads have a wide range of southern Utah and southern Nevada to northern Mexico. They occur in east to west-central Arizona, in canyons and flood plains south of the Mogollon Rim, and also in Clear Creek. This species is may be found rocky streams and canyons in the pine-oak belt and lower deserts (e.g., Agua Fria River area) in upland desert and evergreen woodland plant communities. The species prefers elevation ranges from 480 to 8,400 feet (146 to 2,560 m) (AGFD 2013a).	May occur.
Bald eagle	<i>Haliaeetus leucocephalus</i>	X		SGCN 1A	Bald eagles occur across North America, and may winter in Arizona. A small resident population can be found in Central Arizona, while a wintering population of bald eagles is found in both Central and Northern Arizona. Bald eagles inhabit areas with unimpeded views and high water-to-land edge. Arizona wintering habitat includes areas with an adequate food supply and open water such as river rapids, impoundments, dam spillways, lakes, and estuaries. Breeding habitat in Central AZ includes upper and lower Sonoran life zones (AGFD 2010b).	Does not occur. The project area does not have the surface water, cliffs, or abundant prey resources needed to support a nesting or wintering bald eagle.
Banded Gila monster	<i>Heloderma suspectum</i>			SGCN 1A	The species range is primarily northwestern Arizona (the Arizona Strip), with immediately adjacent isolated populations in Utah, Nevada and California. They have also been found in western Arizona in northwest Maricopa county and southwest Yavapai County. In Arizona, primarily in Sonoran Desert and extreme western edge of Mohave Desert, less frequent in desert-grassland and rare in oak woodland, to about 5,000 feet (1,524 m) amsl. Most common in undulating rocky foothills, bajadas and canyons.	May occur. Habitat in the project area consists primarily of chaparral and grassland, which are not considered prime habitat for this species.
Black-footed ferret ^(a)	<i>Mustela nigripes</i>		E/EXPN		The black-footed ferret is considered an experimental population in Arizona. This species is found at elevations ranging from 5,250 to 6,234 feet (1,600 to 1,900 m) in close association with prairie dog towns in Plains grassland and Great Basin desert grassland in Arizona, north of the Mogollon Plateau and south of the Colorado River. Dominant vegetation in these areas is blue grama, mixed with galleta grass, Indian rice, and other grasses.	Does not occur. Prairie dog towns and suitable grassland habitat for this species are not found in the project area or vicinity. There is no proposed or designated critical habitat designated for this species.
Blue sand lily	<i>Tritelelopsis palmeri</i>	X			The species occurs in southern California and Arizona, and Baja California and Sonora, in Mexico. It is only known from Pinta Sands, Cabeza Prieta National Wildlife Refuge, Yuma County, growing in sandy soil in desert dunes and Sonoran desert scrub at elevations less than 1,000 feet (305 m) (AGFD 2005a).	Does not occur. The project area is not located near the known range of this species and does not contain suitable habitat.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>			SGCN 1B	Northern range extends to southern Oregon, Nevada, northern Utah, northern Nebraska and throughout the southern U.S. to South America and Caribbean islands. The species occurs throughout Arizona in summer, and only in the southern half of the state in the winter, and in lesser numbers. Roost in man-made structures, caves, tree hollows. Often found in Lower Sonoran and Upper Sonoran life zones up to 9,200 feet (2,806 m) (AGFD 2004e).	May occur.
California black rail	<i>Laterallus jamaicensis coturniculus</i>	X			The California black rail occurs in California, Arizona, Baja California Norte, and the Colorado River delta in Sonora. In Arizona, a metapopulation lives at Mittry Lake, with additional occurrences along the Lower Colorado River from Bill Williams River to Laguna Dam. Suitable habitat generally includes salt marshes, freshwater marshes, and wet meadows located at elevations ranging from 155 to 475 feet (47 to 145 m).	Does not occur. The known range of this subspecies does not occur near the project area, and no suitable habitat exists to support the species.
California condor	<i>Gymnogyps californianus</i>		EXPN		Reintroduced to the Vermillion Cliffs and Hurricane Cliffs areas in Arizona. These populations are actively managed. The AZ populations are considered non-essential experimental (10j), and their range covers all of northern Arizona north of I-40 except extreme eastern Arizona. This large bird roosts and nests in steep terrain with rock outcroppings, cliffs, and caves. Forage over grasslands or savannahs. Habitat occurs from 2,000 to 6,500 feet (610 to 981 m) amsl.	Does not occur. The project area is south of I-40 and is considered outside of the range for this species. There is no designated critical habitat for this species in Arizona.
California flannelbush ^(d)	<i>Fremontodendron californicum</i>	X			The species ranges from Central Arizona and California to Baja California, Mexico. This species is found mainly in well-drained rocky hillsides and ridges, in chaparral and oak/pine woodland. In Arizona, usually on dry, north slopes in canyons at elevations from 3,500 to 6,500 feet (1,068 to 1,983 m) (AGFD 2005d).	Unlikely to occur. Suitable habitat may be present in the project area, though, species not known to occur in the project vicinity. This species was not observed during extensive vegetation mapping of the project area.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
California leaf-nosed bat	<i>Macrotus californicus</i>	X		SGCN 1B	The species ranges from northern Mexico and Baja California to southern Nevada and southern California. In Arizona, they are found south of the Mogollon Plateau; extreme southeastern and in summer extreme northwestern Mohave County. The bats are primarily found in the Sonoran desert scrub and roost in mines, caves, and rock shelters. Day roosts in mines are usually within about 80 feet of the entrance. Prefer roost sites with large areas of ceiling and flying space. Nocturnal roosts are found in places that provide overhead protection and an adequate flight approach. Such places including a variety of manmade structures, rock shelters and mines. Their elevation ranges from 160 to 3,980 feet. (49 to 1,214 m) (AGFD 2001d).	Unlikely to occur. The habitat on the project area is suitable for this species, but at the upper edge of its geographic and elevation range.
Cave myotis ^(d)	<i>Myotis velifer</i>	X		SGCN 1B	The species ranges from Honduras north to Kansas (USA), west to SE California. In Arizona, they occur south of Mogollon Plateau from Lake Mohave, Burro Creek, Montezuma Well, San Carlos Apache Reservation and the Chiricahua Mountains south to Mexico. This species roosts in caves, tunnels, and mineshafts, under bridges, and sometimes in buildings within a few miles of water in areas of desert scrub or creosote, brittlebush, palo verde and cacti. Winter roosts in Arizona are wet mine tunnels above 6,000 feet (1,829 m) amsl, where preferred temperatures reported as 8°-11°C (AZGF 2002j).	Unlikely to occur. Species not known to occur in the project vicinity, but marginal foraging habitat may be present in the project area, and suitable roost sites may be available in nearby abandoned mines.
Chiricahua leopard frog	<i>Lithobates chiricahuensis</i>		T		Currently restricted to springs, livestock tanks, and streams in upper portion of watersheds that are free from non-native predators or where marginal habitat for non-native predators exists. Critical habitat is designated for 10,346 acres in Apache, Cochise, Gila, Graham, Greenlee, Pima, Santa Cruz, and Yavapai counties in Arizona; and Catron, Hidalgo, Grant, Sierra, and Socorro counties in New Mexico. Habitat includes ponds, tanks, cienegas (wet meadows), and small streams that provide permanent water. Habitats with a variety of plants, depths, in-water structure, and other complexities are desired. Typically found between 3,281 and 8,890 feet (1,000 to 2,700 m) amsl.	Does not occur. There is no permanent surface water that would provide habitat for Chiricahua leopard frogs. Furthermore, the nearest critical habitat for this species is located approximately 88.7 miles to the west near Fossil Creek.
Colorado pikeminnow	<i>Ptychocheilus lucius</i>		E/EXPN		Considered eradicated in Arizona and are restricted to two experimental, non-essential populations that were stocked in the Salt River and Verde River drainages. Requires permanent streams that provide swift waters with cobbles, slack water and deep pools that are below 2,000 feet (600 m) amsl.	Does not occur. No perennial streams are located in the project areas or vicinity. Furthermore, there is no critical habitat designated for this species.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Common black-hawk	<i>Buteogallus anthracinus</i>			SGCN 1B	Riparian nester, dependent on mature, relatively undisturbed habitat supported by a permanent flowing stream. It may less commonly occur on intermittent streams if pools remain present. Typically found from 1,750 to 7,080 feet (533 to 2,158 m) amsl. The common nighthawk occurs from Canada to Central Mexico. The species is found in central and northern Arizona, from 4,800 to 7,600 feet (1,463 to 2,316 m) amsl. The species prefers habitats of open woodlands, forest clearings, grasslands, agricultural and or suburban areas (Wise-Gervais, n.d.).	Does not occur. Insufficient surface water resources to support this species lifecycle on or near the project area. May occur.
Common nighthawk	<i>Chordeiles minor</i>			SGCN 1B	There are no natural populations of this subspecies remaining in Arizona. Populations were introduced at Cold Springs in Graham County, AD wash in Yavapai County, and Finley Tank in Santa Cruz County. There are also several populations in private ponds and aquariums. This pupfish occupies shallow waters of springs, small streams, and marshes. Often associated with areas of soft substrates and clear water below 4,920 feet (1,500 m) amsl.	Does not occur. No warm water springs or streams exist within or near the project area, and no critical habitat is designated for this species in Arizona.
Desert pupfish	<i>Cyprinodon macularius</i>		E		There are no natural populations of this subspecies remaining in Arizona. Populations were introduced at Cold Springs in Graham County, AD wash in Yavapai County, and Finley Tank in Santa Cruz County. There are also several populations in private ponds and aquariums. This pupfish occupies shallow waters of springs, small streams, and marshes. Often associated with areas of soft substrates and clear water below 4,920 feet (1,500 m) amsl.	Does not occur. No warm water springs or streams exist within or near the project area, and no critical habitat is designated for this species in Arizona.
Desert purple martin	<i>Progne subis hesperia</i>	X		SGCN 1B	The species has a limited range in southern and central Arizona, northwestern Mexico and Baja California. In Arizona, desert purple martins nest in low elevation deserts in saguaro cacti (Wiggins 2005).	Unlikely to occur. The project area is located in the northern extent of the species' range and only small populations of saguaro cacti occur.
Desert sucker	<i>Catostomus clarkia</i>	X		SGCN 1B	The Desert Sucker occurs in the lower Colorado River downstream from the Grand Canyon, generally including the Bill Williams, Salt, Gila, and San Francisco River drainages. The species is found in rapids and flowing pools of streams and rivers primarily over bottoms of gravel-rubble with sandy silt in the interstices. Adults live in pools, moving at night to swift riffles and runs to feed. Young inhabit riffles throughout the day, feeding on midge larvae. Typical elevation range of 480 to 8,840 feet (146 to 2,696 meters) (AGFD 2002b).	Does not occur. The project area has insufficient perennial surface water resources to support this species.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Ferruginous hawk	<i>Buteo regalis</i>	X		SGCN 1B	Ferruginous Hawks occur throughout the western states of North America, southern Canada and down into central Mexico. The species breeds from southeast Alberta, south Saskatchewan, and southwest Manitoba, south through central and western portions of North and South Dakota between the Great Plains and Rocky Mountains all the way south to northern Arizona and New Mexico. The species prefers open environments, including agricultural fields, open scrublands and woodlands, grasslands, and semidesert grassland at elevations from 3,500 feet to 6,000 feet (1,068 to 1,830 m) (AGFD 2013b).	May occur.
Gila chub	<i>Gila intermedia</i>		E		The Gila chub is currently found in portions of the Santa Cruz River, Middle Gila River, San Pedro River, Agua Fria River, and Verde River in Arizona. Typically occur in headwater and larger streams, cienegas and springs or marshes that provide a variety of refugia such as deep pools, vegetated margins and undercut banks. Elevation ranges from 2,720 to 5,420 feet (830 to 1,653 m).	Does not occur. No permanent streams or cienegas exist within or near the project area, and the nearest designated critical habitat is located over 35 miles away in the Williamson Valley.
Gila longfin dace	<i>Agosia chryso-gaster chryso-gaster</i>	X		SGCN 1B	Native to the Gila and Bill Williams drainages in Arizona. Wide ranging, from intermittent low-desert streams to clear and cool brooks at higher elevations. They prefer small or medium size streams, with sandy or gravelly bottoms; eddies, pools near overhanging banks or other cover. Usually in water less than 0.6 feet (0.2 m) deep with moderate velocities of around 1.1 ft/s (0.3 m/s). Rarely abundant in large streams or above 5,000 feet (1,524 m) amsl. Generally found in water less than 75° F (24° C), but are tolerant of high temperatures and low dissolved oxygen. During low water, they may take refuge in moist detritus and algal mats (AGFD 2006).	Does not occur. The project area has insufficient surface water resources to support this species.
Gila spotted whiptail	<i>Aspidoscelis flagellicauda</i>			SGCN 1B	Gila Spotted Whiptails are distributed across central Arizona's Mogollon Rim country and the Sky Island ranges of southeastern Arizona, at elevations ranging from 4,000 to 6,500 feet (1,219 to 1,981 m). The lizard is primarily a species of Great Basin Conifer Woodland, Interior Chaparral, and Madrean Evergreen Woodland biotic communities, and follows drainages and riparian corridors down into semi-desert grassland. Individuals are usually found in relatively open and sunny areas, often along the banks of creeks and rivers (Brennan 2008).	May occur.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Gila topminnow	<i>Poeciliopsis occidentalis</i>		E		Habitat consists of headwater springs and vegetated margins and backwater areas of intermittent and perennial streams and rivers. Prefers shallow warm water with slow current and can live in a wide range of water chemistries. Found below 5,000 feet (1,525 m) amsl in perennial springs, streams, and vegetated margins of rivers in the Gila River drainage in Yavapai, Gila, Pinal, Maricopa, Graham, Greenlee, Cochise, Pima, Santa Cruz, and Yuma counties.	Does not occur. No perennial warm water streams exist within or near the project area, and no critical habitat is designated for this species in Arizona.
Gila trout	<i>Oncorhynchus gilae</i>		T		Historically have been found in the Verde and Agua Fria drainages and may have occupied tributaries of the San Francisco River drainage. Reintroductions have occurred in the 1970s through 1990s without success. Found in narrow and shallow cold water mountain streams from 5,446 to 9,220 feet (1,660 to 2,810 m) amsl.	Does not occur. No perennial cold water streams exist within or near the project area, and no critical habitat is designated for this species in Arizona.
Gila woodpecker	<i>Melanerpes uropygialis</i>			SGCN 1B	Gila woodpeckers range from central Mexico to extreme southwestern New Mexico, through southern Arizona to the Mogollon Rim, west to extreme southeast California. The species requires habitats with large boles for nesting substrate, either columnar cacti or large trees, including riparian woodlands, old-growth xeric-riparian wash woodlands, uplands with concentrations of large columnar cacti, dry subtropical forests, and urban residential areas.	May occur. The project area lies within the range of the species, but does not feature many large trees or columnar cacti needed for nesting.
Gilded flicker ^(d)	<i>Colaptes chrysoides</i>	X		SGCN 1B	The gilded flicker is non-migratory throughout its fairly limited range, which extends from the extreme southeastern corner of California and southern Arizona south to northwest Mexico (including most of Baja California, western Sonora and the tip of northwestern Sinaloa). This species prefers dry climates for nesting, and dwells in Southwestern desert woodlands including the giant cactus forests of the Sonoran Desert and other large saguaros of Arizona. This species also frequents spaces occupied by humans, having adapted well to urban, suburban, and rural areas, as well as parks, farms, woodlots, savannas and forest edges. Occurs at elevations of 200 to 3,200 feet (61 to 975 m), although some local populations may occupy higher sites (4,600 feet or 1,402 m) (Juarez n.d.)	Unlikely to occur. One small patch (>5 acres) and few widely scattered saguaro cacti are present on the project area. Furthermore, vegetation on the project area includes disclimax grassland and low desert scrub species, which is not similar to preferred cactus forest habitat. An expanded description of this species is provided in Section 3.4.6

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Golden eagle	<i>Aquila chrysaetos</i>	X		SGCN 1B	Found throughout North America, Canada, south to Mexico. Usually found in open country in prairies, arctic and alpine tundra, open wooded country and barren areas, especially in hilly or mountainous regions at elevations ranging from 4,000 to 10,000 feet (1,219 to 3,048 m). Nest on rock ledges, cliffs or large trees (AGFD 2002a).	Unlikely to occur. Chaparral and disclimax grassland habitat within the project area are not considered optimal foraging and nesting habitat for this species.
Greater western mastiff (bonneted) bat ^(d)	<i>Eumops perotis californicus</i>	X		SGCN 1B	This species is widely distributed in arid and semiarid, rocky canyon country habitats in California, Arizona, Nevada, New Mexico, Texas and northern Mexico. The species is a year-round resident in Arizona and has been observed in all Arizona counties except Yavapai, Navajo, Apache and Santa Cruz. The species prefers lower and upper Sonoran desert scrub near cliffs in rugged rocky canyons with abundant crevices. Roosts are usually high above ground with unobstructed approach. Most roosts are not used throughout the year. May alternate between different day roosts. (AGFD 2002f). Elevation ranges from 240 to 8,475 feet (73 to 2,583 m).	Unlikely to occur. Species is not a migrant, and is not known to occur in project vicinity. Suitable foraging habitat may be present in the project area, and suitable roost sites may be available in nearby canyons and abandoned mines.
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>	X			The species occurs from central Colorado to central Arizona, including southeastern Utah and much of the northwestern New Mexico, from 6,000 to 12,000 feet (1,830 to 3,660 m) amsl. Habitat includes high desert and montane grasslands, in montane meadows, hillsides, broad alluvial valleys, floodplains, and playas (Linzey 2008a).	Does not occur. The project area does not contain suitable habitat for this species, and no evidence was found during field surveys.
Harris' antelope squirrel	<i>Ammospermophilus harrisi</i>			SGCN 1B	The species occurs below 1,350 meters elevation in the southwestern United States (Arizona and New Mexico) and adjoining portion of Sonora, Mexico. In the U.S., it occurs primarily in southern and western Arizona, where its range does not extend beyond the Colorado River. The species prefers desert habitat with cacti and shrubs (Timm et al. 2008).	May occur.
Headwater chub ^(e)	<i>Gila nigra</i>		C		Usually found in large pools or deep areas created by obstructions like trees or rocks. Occupies middle to headwater reaches of medium-size streams of the Gila River Basin at elevations of 3,035 to 6,651 feet (925 to 2,025 m).	Does not occur. No perennial streams are located in the project areas or vicinity. There is no proposed or designated critical habitat for this species in Arizona.
Hydrobiid spring snails	<i>Pyrgulopsis</i> spp.	X			More than 12 species in Arizona, many endemic to small localities. Typically occur on firm substrates such as rocks, vegetation, floating algal mats and submerged woody debris in association with slow to moderate flows of head springs, seeps and lateral spring runs. Occurs at low to mid elevations ranging from 1,870 to 1,900 feet (570 to 580 m).	Unlikely to occur. Many of the <i>pyrgulopsis</i> species require perennial, flowing spring habitats, which do not occur in the project area.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Jaguar	<i>Panthera onca</i>			SGCN 1A	Mexico to Brazil and northern Patagonia. Very rare in the United States: isolated individuals have been documented in southern Arizona, New Mexico and southern Texas. Jaguars occur in a variety of habitats, preferring lowland wet habitats, typically swampy savannas or tropical rain forests. In the northern and southern periphery, they may occur in warmer, more arid habitat types, including oak-pine woodland (AGFD 2004c).	Does not occur. The jaguar has not been recorded in north-central Arizona.
Kearny sumac ^(d)	<i>Rhus kearneyi</i>	X			The species occurs in Arizona and Baja California, Mexico. This species is found growing along steep canyons and drainages at elevations of 1,000 to 2,000 feet (305 to 610 m). There is only a single population known in the U.S. from one canyon in the Tinajas Altas Mountains on the Barry Goldwater Bombing Range (AGFD 2005f).	Does not occur. Species not known to occur in the project vicinity, and suitable habitat is not present in the project area.
Kingman spring snail	<i>Pyrgulopsis conica</i>	X			The species is known from Burns, Dripping, and Cool Springs in the Black Mountains near Kingman, and from springs in Mohave County in northwestern Arizona. Typical elevation ranges from 2,640 to 3,600 feet (805 to 1,098 m). (AGFD 2003g).	Does not occur. This species is isolated to a few springs and pools, and is not known near the project area.
Kit fox	<i>Vulpes macrotis</i>			SGCN 1B	Kit foxes occur in the southwestern U.S., north to southern Oregon and Idaho, and south to northern Mexico. They occur in arid regions and inhabit mixed-grass shrublands, shrublands, grasslands, and margins of pinyon-juniper woodlands. Kit foxes may also occur in agricultural areas and urban environments. They occur at elevations of 1,312 to 6,233 (400 to 1,900 meters) (Meaney et al. 2006).	May occur.
Kofa Mt. Barberry	<i>Berberis harrisioniana</i>	X			The species is found in southwestern Arizona (Yuma, La Paz, and Maricopa counties) and the Whipple Mountains in San Bernardino County, California. The species inhabits the bottoms of deep, shady, rocky canyons at elevations of 2,200 to 3,500 feet (760 to 1,070 m) (AGFD 2004b).	Does not occur. The project area is not located near the known range of this species.
Le Conte's thrasher	<i>Toxostoma lecontei</i>	X			A non-migratory bird endemic to four Southwestern states and northwestern Mexico. Although widespread, they are uncommon to rare residents in desert scrub habitats. The species prefers open desert with scattered shrubs and sandy and/or alkaline soil to elevations of 5,250 feet (1,600 m) (Blackman et al. 2013).	May occur.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuena</i>		E		Migrates from central Mexico and arrives in Arizona and adjoining portions of Sonora, Mexico in April. Move from the southwestern part of the state to the southeastern part over the summer, and returns to central Mexico by September. Foraging flights may be as much as 30 km from the roost site, and foraging areas are selected based on past and present signs of high resource availability (many cacti or agaves in an area) and utilized over several nights until the pollen and nectar resources are depleted. Requires caves and mines for roost sites (maternity, male-only, late-summer, and night roosts are used differently) and access to healthy stands of saguaro cactus and paniculate agaves for foraging. The Sonoran desert scrub vegetation community provides the early summer forage base, with bats found in southwestern Arizona. The semi-desert grassland and oak woodlands provide the late summer agave resources in the southeastern portion of the state. Typically found below 3,500 feet (1,068 m) but may range from 1,190 to 7,320 feet (363 to 2,233 m) amsl.	Does not occur. The low number of saguaro cacti found on the project area would not support populations of this species. Critical habitat as not been designated for this species in Arizona.
Lincoln's sparrow	<i>Melospiza lincolni</i>			SGCN 1B	The species wintering range stretches from the northeastern U.S., down the Pacific coast, the southwest and southern U.S. to southern Mexico. The species prefers high-elevation riparian-willow habitats for breeding, approximately 4,920 to 11,155 feet (1,500 to 3,400 m) throughout the western United States. The species' wintering habitat in Arizona includes brushy areas, thickets, hedgerows, the understory of open woodlands, forest edges, clearings, and scrubby areas (Stephens and Anderson 2003).	May occur.
Loach minnow	<i>Tiaroga cobitis</i>		E		Habitat that is occupied is relatively shallow, has a moderate to swift current, with gravel to cobble dominated substrates. The depth, velocity, and substrate of occupied habitats can, and is expected to, vary seasonally and geographically. Endemic to the Gila River Basin of Arizona, New Mexico, and Sonora, Mexico. Currently persists in Arizona in the White River of Gila County, the north and east forks of the White River in Navajo County, Aravaipa Creek in Graham and Pinal Counties, San Francisco and Blue Rivers and Campbell Blue Creek in Greenlee County. Habitat consists of turbulent, rocky riffles of mainstream rivers and tributaries at or less than 8,240 feet (2,513 m) amsl.	Does not occur. No perennial streams are located on the project area or vicinity. The nearest designated critical habitat for this species is located over 46 miles away in the Verde River drainage.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Lowland leopard frog	<i>Lithobates yavapaiensis</i>	X		SGCN 1A	Found at elevations between 480 to 8,200 feet (146 to 2,499 m) in central and southeastern part of Arizona below the Mogollon Rim, with most (~60%) occurring in Gila, Maricopa, and Yavapai counties. Currently, absent from the lower Colorado River and nearly absent from southeastern Arizona. The species prefers lotic systems, including small to medium-sized streams and occasionally small ponds. The species will often concentrate near deep pools in association with root masses of large riparian trees (AGFD 2006b; 2006c).	Unlikely to occur. Insufficient surface water resources to support this species lifecycle on or near the project area.
Mexican spotted owl	<i>Strix occidentalis lucida</i>		T		Most of these owls occur within the 11 national forests of Arizona and New Mexico. This owl is frequently associated with mature mixed-conifer (Douglas-fir, hite fir, limber pine or blue spruce, pine-oak (ponderosa pine and Gambel oak, and riparian forests (various species of broadleaved deciduous trees and shrubs). Typically found between 4,100 and 9,000 feet (1,250 to 2,750 m) amsl.	Does not occur. Designated critical habitat is located more than 35 miles east of the project area.
Mohave fringe-toed lizard	<i>Uma scoparia</i>	X			This lizard occurs in the Mojave Desert in California, southeast to just over the Arizona border. Restricted to fine, windblown sands and dunes, flats, riverbanks and washes of very arid desert, with low-growing vegetation. These areas are generally within the creosote scrub desert habitat from 425 to 2,905 feet (130 to 886 m) amsl (AGFD 2003f).	Does not occur. The project area is not near the known range of this species.
Northern goshawk	<i>Accipiter gentilis atricapillus</i>	X			The species is widespread through the U.S., from Canada to Mexico; it prefers mature or old-growth conifer, mixed hardwood-conifer, birch, or aspen forest with high canopies for nesting. They have also been found in younger forests intermingled with mature trees with high canopies for nesting (Stone 2013). This species has been located in these habitats ranging from 4,750 to 9,120 feet (1,448 to 2,780 m) amsl.	Does not occur. The project area has not suitable forest habitat for this species.
Northern leopard frog	<i>Lithobates pipiens</i>	X			Historically well-distributed across northern and central Arizona, including wetlands in wooded areas and meadows above and below the Mogollon Rim, and arid country on the Colorado Plateau. Northern leopard frogs have declined, often dramatically, across the western United States, and currently inhabit a few isolated pods, cattle tanks and springs in the Coconino National Forest. It may be found in streams, riverside channels, springs, ponds, stock ponds in desert scrub, grassland, woodland, and pinyon juniper, from 3,120 to 9,150 feet (950 to 2,788 m) amsl (Brennan 2008).	Unlikely to occur. Insufficient surface water resources to support this species lifecycle occur on or near the project area. The nearest known populations occur in cattle tanks located on the Coconino National Forest north of the project area.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Northern Mexican gartersnake ^(a)	<i>Thamnophis eques megalops</i>		T		The core populations for this species in Arizona are found in the Verde River drainage, Tonto Creek, and San Rafael Valley. This snake inhabits cienegas, stock tanks, and riparian areas located between 130 and 8,500 feet (40 to 2,590 m) amsl.	Does not occur. Proposed critical habitat for this snake does not occur within 30 miles of the project area, and there are no cienegas or other aquatic habitats located on or near the project area.
Pacific wren	<i>Troglodytes pacificus</i>			SGCN 1B	The Pacific Wren is primarily a coastal forest species from California to British Columbia, but may be found far inland. The species prefers wet, closed forests or forest edges of coniferous or mixed forests. It occurs in dense, shaded woodland underbrush or shrubby riparian corridors (Peterson et al. 2001). Can be found breeding at elevations ranging from 328 to 4,265 feet (100 to 1,300 m).	Unlikely to occur. The project area does not have any dense coniferous or mixed forests and the riparian vegetation is limited to the point water sources.
Page springsnail ^(a)	<i>Pyrgulopsis morrisoni</i>		C		Typically occurs on firm substrates such as rocks, vegetation, floating algal mats, and submerged woody debris in association with slow to moderate flows of head springs, seeps and lateral spring runs. Throughout the Southwest, <i>Pyrgulopsis</i> is found associated with <i>Hyalella azteca</i> and <i>Physella virgata</i> . This species occurs at elevations ranging from 3,300 to 3,600 feet (1,007 to 1,098 m).	Does not occur. No springs with appropriate characteristics or associated species were identified on the property. Critical habitat has not been designated for this species in Arizona.
Pale Townsend's big-eared bat ^(d)	<i>Corynorhinus townsendii pallascens</i>	X		SGCN 1B	The species is widespread across Arizona. The species seeks summer roosts in caves and mines from desertscrub up to woodlands and coniferous forests. In winter, they hibernate in cold caves, lava tubes and mines in uplands and mountains from 550 to 8,437 ft (168 to 2,294 m), though most records come from above 3,000 feet (915 m) amsl (AGFD 2003a).	Unlikely to occur. Species not known to occur in the project vicinity, but suitable foraging habitat may be present in the project area, and suitable roost sites may be available in nearby abandoned mines.
Parish phacelia	<i>Phacelia parishii</i>	X			California (San Bernardino Co.), Nevada (Clark, Lincoln, Nye, and White Pine counties), and Arizona (Mohave and Yavapai counties-specifically in Hualapai Valley and Burro Creek). The species occurs at elevations from 2,300 to 2,800 feet. (700 to 850 m) on clay or alkaline soils, dry lake margins; at the edge of barren playa surrounded by semi-desert grassland and Mohave Desert; gypsum beds in lacustrine deposits of the Sonoran Desert. In Burro Creek it occurs on edaphic islands (AGFD 2005e).	Does not occur. Habitat and environmental conditions are not suitable for this species.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Parish wild onion ^(d)	<i>Allium parishii</i>	X			The species occurs in Western Arizona (Kofa Mountains, Yuma County) and southeast California. This species habitat is described as rocky, sandy desert slopes in the Mojave Desert from 2,720 to 2,900 feet (830 to 885 m) amsl in Arizona. Species not known to tolerate Calcium carbonate in soils or temperatures above 94 °F, and requires 9 to 27 inches or rain annually (AGFD 2005a).	Does not occur. Habitat and environmental conditions are not suitable for this species and the project area is not located near its known range.
Pinto beardtongue	<i>Penstemon bicolor</i>	X			The species is known from southern Nevada to northwestern Arizona and California; in Arizona, it occurs in Mohave County in the Black Mountains and near Wilson Ridge. The species preferred habitat is gravel washes and disturbed roadsides, to outwash fans and plains from 1,970 to 5,480 feet (600 to 1,670 m) amsl (AGFD 2003f).	Does not occur. The project area is not located near the known range of this species.
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	X			The pinyon jay is a permanent resident of pinyon-juniper (<i>Pinus-Juniperus</i> spp.) woodlands and low-elevation ponderosa pine (<i>P. ponderosa</i>) forests in the southwestern United States (Ulev 2006). This species is found from 4,000 to 8,000 feet (1,219 to 2,438 m) elevation.	Does not occur. No suitable pinyon-juniper or pine forest habitat exists in or near the project area.
Pocketed free-tailed bat	<i>Nyctinomops femorosaccus</i>			SGCN 1B	The species total range is from Southern California to the Big Bend, Texas, to central Mexico. In Arizona, they are found in Cochise, Gila, Graham, La Paz, Maricopa, Mohave, Pima, Pinal, Yavapai, and Yuma counties from 190 to 7,520 feet (58 to 2,292 m) amsl. The species reaches the northern limits of its distribution in desert scrub and arid lowland habitats, roosting in crevices high on cliff faces in canyons. Roosts in rock crevices and caves during the day, may roost in buildings. Habitat features include water tanks, stock tanks, creek pools, rivers and washes, ephemeral pools, mountain lakes, water troughs, gravel pits, irrigation ditches, caves, and crevices (AGFD 2011c).	May occur.
Razorback sucker	<i>Xyrauchen texanus</i>		E		Presently natural adult populations exist only in Lake Mohave, Lake Mead, and Lake Havasu. Habitat varies from mainstream channels to slow backwaters of medium and large streams and rivers, sometimes around cover. In impoundments they prefer depths of a meter or more over sand, mud or gravel substrates. Historically razorback suckers inhabited the Colorado, Gila, Salt, Verde, and San Pedro rivers from 181 to 5,000 feet (55 to 1525 m) amsl.	Does not occur. No large perennial river system is located on or near the project area. The Colorado River and portions of the Gila, Salt and Verde rivers are designated critical habitat for this species.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Regal horned lizard	<i>Phrynosoma solare</i>			SGCN 1B	This lizard is distributed across southeastern Arizona and along the southern transition zone of the central mountains region at elevations from 900 to about 4,500 feet (274 to 1,371 m). Habitat preferences include Arizona Upland Sonoran desert scrub, Chihuahuan deser tscrub, and semidesert grassland communities. The species inhabits valleys, rocky bajadas, and low foothills, and is usually found in open areas with low shrubs, and sunny patches (Brennan 2008).	May occur.
Roundtail chub ^(e)	<i>Gila robusta</i>		C	SGCN 1A	<i>Gila robusta</i> occupies cool to warm waters of rivers and streams, often occupying the deepest pools and eddies of large streams. Historically, this species has been found in both the upper and lower Colorado River basins at elevations ranging from 1,210 to 7,220 feet (369-2200 m).	Does not occur. No warm water rivers or other surface water resources needed to support this species lifecycle are located on or near the project area.
Sand food	<i>Pholisma sonorae</i>	X			The species occurs in Southwestern Arizona, southeastern California (Imperial County), Baja Norte in northwestern Sonora, Mexico, and Baja California, Mexico. In Arizona, it has only been found in the Yuma Desert, Southern Yuma County in drifting sandy soil and other sandy areas, in low desert below 500 feet (150 m) amsl (AGFD 2004d).	Does not occur. The project area is not located near the known range of this species and does not contain suitable habitat.
Savannah sparrow	<i>Passerculus sandwichensis</i>			SGCN 1B	The species breeds from central Arizona and central northern New Mexico (11 miles northeast of Chama, Taos) south to central Chihuahua, Mexico at elevations ranging from 2,800 to 7,500 feet (853 to 2,286 m). The species is common in open habitats, marshes, and grasslands and breeds in grassland, meadow, tundra, marsh, bogs, and cultivated grassy areas. Winter habitat includes grasslands, fields, roadsides, dunes, and salt marshes (AGDF 2002k).	May occur.
Scaly sand food	<i>Pholisma arenarium</i>	X			The species is found in Arizona, in La Paz County, and in the Mojave and Colorado deserts of California in sandy soil, edges of washes and low sand dunes, 470 to 900 feet (143 to 274 m) amsl (AGFD 1999).	Does not occur. The project area is not located near the known range of this species and does not contain suitable habitat.
Schott wire-lettuce	<i>Stepanomeria schottii</i>	X			The species range is primarily in Sonora, Mexico, though also found in Yuma and Maricopa Counties in Arizona. A sand dune endemic of the Gran Desierto Region, its habitat includes semi-stabilized sand dunes 350 to 800 feet (107 to 245 m) amsl (AGFD 2005g).	Does not occur. The project area is not located near the known range of this species and does not contain suitable habitat.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Sonora sucker	<i>Catostomus insignis</i>	X		SGCN 1B	The Sonora sucker is found in the Gila and Bill Williams systems (Colorado River drainage) New Mexico and Arizona, and northern Sonora, Mexico. The species tolerates a range of habitats from warm water rivers to trout streams, though prefers gravely or rocky pools (AGFD 2002c). Occupied habitat occurs from 1,210 to 8,730 feet (369 to 2,663 m) amsl.	Does not occur. The project area has insufficient perennial surface water resources to support this species.
Sonoran coral snake	<i>Micruroides euryxanthus</i>			SGCN 1B	The species occurs across most of southern Arizona and southwestern New Mexico to northern Mexico, below approximately elevations of 6,000 feet (1,829 m). In Arizona, they are usually encountered above flats in or near rocky or gravelly drainages, mesquite lined washes, and canyons. Most abundant in rocky Arizona upland desert and bajadas where there are diverse soil types, from loose sand to rock (AGFD 2008).	May occur.
Sonoran Desert mud turtle	<i>Kinosternon sonoriense sonoriense</i>	X		SGCN 1B	The desert mud turtle has the most extensive range of the Arizona mud turtles; they are found in streams, ponds, stock tanks and reservoirs in central and southern Arizona at elevations ranging from 1,500 to over 6,100 feet (460 to 1,860 m). Their range also extends into western New Mexico and north-central Mexico (AGFD n.d.).	Unlikely to occur. During field survey, Telesto did not find any evidence of this species in the few point water sources in the project area.
Sonoran Desert toad	<i>Incilius alvarezi</i>			SGCN 1B	This species occurs from southeastern California, southern Arizona and southern New Mexico, south into Mexico from sea level to 5,800 feet (1,767 m). Sonoran Desert toads prefer arid mesquite/creosotebush lowlands and arid grasslands to oak/sycamore/walnut groves in mountain canyons. They are often near permanent water but may also be found near temporary water or far from water. They take refuge in rodent burrows. They breed and lays eggs in ponds, slow-moving streams (Hammerson and Santos-Barrera 2004, Brennan, 2008).	May occur.
Sonoran Desert tortoise ^{(a) (d)}	<i>Gopherus morafkai</i>	X	C	SGCN 1A	The Sonoran desert tortoise is found south and east of the Colorado River, in the central and western parts of Arizona and into northwestern Mexico. This tortoise is found below 7,800 feet (2,377 m) amsl on rocky, steep, hillsides and bajadas of Mohave and Sonoran desert scrub. Occasionally found in wash bottoms that can be used for dispersal (AGFD 2015).	Unlikely to occur. See Section 3.4.6 for a detailed analysis of the potential for this species to occur in the project area.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Sonoran whipsnake	<i>Coluber bilineatus</i>			SGCN 1B	Sonoran whipsnakes may be found in most of the sub-Mogollon Rim mountain ranges of south-central and southeastern Arizona at elevations ranging from 1,000 to 7,000 feet (305 to 2,133 m). Its habitat includes Arizona upland Sonoran desert scrub, semi-desert grassland, interior chaparral, Madrean Evergreen Woodland, and the lower reaches of Great Basin Conifer Woodland. This snake is usually found above the flats on mountain slopes and canyons, in foothills, along ridges, and on steep rocky bajadas (Brennan 2008).	Does occur.
Southwestern willow flycatcher ^(a)	<i>Empidonax traillii eximius</i>		E	SGCN 1A	The Southwestern willow flycatcher occurs in the U.S. Southwest. The species breeds locally along Colorado River in Grand Canyon and Little Colorado River headwaters, very locally along the middle Gila, Salt, and Verde rivers; middle to lower San Pedro River; and upper San Francisco River near Alpine. The species is a riparian obligate and prefers dense canopy cover, a large volume of foliage, and surface water during midsummer from 75 to 9,180 feet (23 to 2,798 m) amsl in Arizona. (AGFD 2002d)	Does not occur. No designated critical habitat for this species occurs on or near the project area. There are a few scattered riparian trees and shrubs along the ephemeral drainages; these are widely spaced and would not be considered suitable breeding or nesting habitat for this species. Furthermore, there is only a low potential that SWFL would migrate through the project area, as the ephemeral drainages are narrow, isolated, and distant from the larger Big Sandy drainage located over twenty miles to the west and Boulder Creek located nearly 4 miles to the north on the opposite side of the mine facility.
Speckled dace	<i>Rhinichthys osculus</i>	X		SGCN 1B	Native to all major western drainages from the Columbia and Colorado rivers south to Sonora, Mexico. In Arizona, found in Colorado, Bill Williams, and Gila River drainages, except slower and warmer portions of Colorado River mainstream. The species is a bottom dweller, found in rocky riffles, runs, and pools of headwaters, creeks, and small to medium rivers, and rarely in lakes, in water less than 1.6 feet (0.5 m) deep, with current averaging about 1.3ft/sec (0.4 m/sec), and at altitudes of 1,550 to 8,920 feet (473 to 2,721 m) (AGFD 2002).	Does not occur. The project area has insufficient surface water resources to support this species.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Spikedace	<i>Meda fulgida</i>		E		Found in a 15 mile reach of Aravaipa Creek in Graham and Pinal counties, Eagle Creek in Greenlee County, and 35 miles of the Verde River in Yavapai County, Arizona. Spikedace occur in midwater habitats of runs, pools, and swirling eddies of perennial streams and rivers. This species has been reported from 1,620 to 4,500 feet (494 to 1,373 m), but historically may have occupied a much more extensive elevation range.	Does not occur. No perennial streams are located on the project area or vicinity. The nearest designated critical habitat for this species is located over 46 miles away in the Verde River drainage.
Spotted bat	<i>Euderma maculatum</i>	X		SGCN 1B	The Spotted Bat is locally distributed throughout central western North America. In AZ, this species has been captured from near Yuma, Roll, Maricopa Junction, Tempe and Littlefield, Kaibab Plateau, and SE of Seligman. This bat has been found from low desert in southwestern Arizona to high desert and riparian habitats in northwestern Arizona and Utah, and conifer forests in northern Arizona and other western states (AGFD 2003b). Elevation ranges from 985 to 2,952 feet (300 to 900 m).	May occur.
Stephen's woodrat	<i>Neotoma stephensi</i>			SGCN 1B	This species occurs from western New Mexico from Grant County north, and from central Arizona north to southern Utah and as far west as Mohave County south of the Colorado River. It occurs in rocky areas (usually not cliffs) in pinyon-juniper woodland. Sometimes among yellow pines or among cacti and agave. Dens are built of debris among rocks or around base of tree. Dens are sometimes above ground in juniper (Jones and Hildreth 1989; Linzey 2008b).	May occur.
Succineid snails	<i>Succineidae</i> spp.	X			Succineid snails live on reed and other plants standing near the water, on constantly humid meadows, in alluvial forests and in forests on swampy ground. Two subspecies, <i>Oxyloma haydeni kanabensis</i> and <i>Oxyloma haydeni haydeni</i> are endemic to northern Arizona and southern Utah. These snails are found at elevations ranging from 3,120 to 3,780 feet (950 to 1,152 m).	Unlikely to occur. Populations of two subspecies are endemic to northern Arizona and Utah, but none know from project vicinity.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Western burrowing owl	<i>Athene cunicularia hypugaea</i>	X			The Western Burrowing Owl occurs throughout western North America, from southern British Columbia to Manitoba, south to the tip of Baja California. In Arizona, it occurs locally in open areas, generally year-round, with only a few winter records on the Colorado Plateau in the northeastern part of the state. From the Navajo Nation, broad valleys near Seligman, along the bottomlands of the Colorado River, the lower Colorado River valley, the Yuma area, southern and southeastern Arizona, and agricultural areas of Maricopa and Pinal Counties. The species occurs in open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands, often associated with burrowing mammals, from 650 to 6,140 feet. (198 to 1,873 m) amsl in AZ (Howard 1996; AGFD 2001a).	Unlikely to occur. No populations of the Western Burrowing Owl have been found near the project area.
Western red bat	<i>Lasiurus blossevillii</i>			SGCN 1B	The species ranges from extreme southern Canada through the western United States south to Panama and South America. Individuals have been recorded across Arizona, in riparian and other wooded habitats. The bat roosts by day in trees, primarily in cottonwood trees. Summer roosts in tree foliage, sometimes in leafy shrubs or herbs. Often found in trees of fruit orchards. May also roost in saguaro boots and occasionally in cave-like situations. 1,900 to 7,200 feet. (580 to 2,196 m) amsl. Cottonwood tree distribution throughout the range of this species is thought to determine its ability to complete annual migration (AGFD 2003c).	Unlikely to occur. The chaparral and disclimax grassland biotic communities of the site are not the bat's ideal habitat, though it could roost in the isolated trees communities around the point water sources, the saguaros, or mineshaft features.
Western yellow bat	<i>Lasiurus xanthinus</i>			SGCN 1B	The species is found in Southern California to the Baja California peninsula, the southern half of Arizona, extreme southwestern New Mexico, extreme southern Nevada, west and central Mexico. Known primarily from Tucson and Phoenix, though also taken in Yuma, Sasabe, along the Bill Williams River and in the Chiricahua Mountains up to elevations of 6,500 feet (1,981 m). The habitat is not clearly understood; the bat may be associated with Washington fan palms, other palms or other leafy vegetation such as sycamores, hackberries and cottonwoods, which provide roost sites (AGFD 2003d).	Unlikely to occur. The chaparral and disclimax grassland biotic communities of the site are not the species' ideal habitat, though it could roost in the isolated cottonwood and willow trees around the point water sources.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
White-margined penstemon	<i>Penstemon albomarginatus</i>	X			The species occurs in southeastern California, southern Nevada, and northwestern Arizona, specifically in the Dutch Flat and Sacramento Valley areas, southeast of Yucca, Mohave County. The species' preferred habitat is coarse sandy and silty soil in Mohave desert scrub communities. Sometimes found in the open, but often near creosote bushes, Joshua trees, or other large shrubs from 1,500 to 3,000 feet (457 to 914 m) amsl (AGFD 2003e).	Does not occur. The project area is not located near the known range of this species and does not contain suitable habitat.
Wood duck	<i>Aix sponsa</i>			SGCN 1B	Wood Ducks are a winter visitor to Arizona, though have been known to breed in Yavapai County on the upper Verde River; along lower Oak Creek from near Sedona; and in Prescott area along Granite Creek when water levels are sufficient. The species prefers riparian habitats of permanent ponds, marshes, and lakes as well as slower sections of streams and rivers lined by large trees for nesting (AGFD 2010a).	Does not occur. The project area has insufficient surface water resources to support this species.
Woundfin	<i>Plagopterus argenteus</i>		EXPN		Found sporadically throughout the Arizona portion of the Virgin River in Mohave County. Occupies main channel of seasonally swift, highly turbid, and extremely warm streams, with sandy, constantly shifting bottoms. Current velocities and depths preferred by adults are one or two feet per second and eight to 18 inches. Young seek quiet backwaters with sandy substrates. Found between 1,902 to 10,000 feet (580 to 3,050 m) amsl.	Does not occur. No large, turbid rivers or other surface water resources needed to support this species lifecycle are located on or near the project area.
Yellow warbler	<i>Setophaga petechia</i>			SGCN 1B	In the western U.S., yellow warblers nest in riparian woodland or forest dominated by cottonwoods and willows, and in disturbed and early successional habitats. Found at elevations up to 9,000 feet (2,743 m). Migration habitats are semi-open scrub or shrublands and second-growth forests, often associated with wetlands (Lowther et al. 1999).	May occur.

Common Name	Scientific Name	Status			Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)	AGFD ^(c)		
Yellow-billed cuckoo ^(e)	<i>Coccyzus americanus</i>		T		The Yellow-billed cuckoo ranges from Canada to South America, and may be found in southern, central, and northeastern Arizona. The species prefers habitats of streamside cottonwood, willow groves, and mesquite bosques for migrating and breeding from 90 to 6,710 feet (27 to 2,045 m) amsl in AZ.	Does not occur. No proposed critical habitat for this species occurs on or near the project area. There are a few scattered riparian trees and shrubs along the ephemeral drainages; these are widely spaced and would not be considered suitable breeding or nesting habitat for this species. Furthermore, there is a low potential that yellow billed cuckoo would migrate through the project area, as the ephemeral drainages are narrow, isolated, and distant from the larger Big Sandy drainage located over twenty miles to the west and Boulder Creek located nearly 4 miles to the north, on the opposite side of the mine facility.
Yuma myotis	<i>Myotis yumanensis</i>			SGCN 1B	The species' total range reaches from Canada to central Mexico, and it is found through most of Arizona except the extreme northeastern and southwestern corners, at elevation ranges from 180 to 4,940 feet (55 to 1506 m). The species is found in a wide variety of upland and lowland habitats, including riparian, desert scrub, moist woodlands and forests. They prefer cliffs and rocky walls near water. They are a colonial species, hanging in closely grouped clumps, utilizing caves, mines, cliff crevices, attics, buildings, underneath bridges, and similar structures (AGFD 2011b).	May occur.
Yuman Desert fringe-toed lizard	<i>Uma rufopunctata</i>			X	The species occurs in southwestern Arizona and adjacent Mexico. The species is restricted to sparsely vegetated fine, windblown sand dunes, flats, riverbanks and washes of very arid desert from sea level to around 600 feet (183 m). Vegetation is sparse, consisting of creosote bush (<i>Larrea tridentata</i>), burrowweed, croton, mesquite, or other scrubby growth (AGFD 2003h).	Does not occur. The project area does not lie within the specie's range.

Common Name	Scientific Name	Status		Preferred Habitat	Potential for Occurrence in the Project Area
		BLM	USFWS ^(b)		
<p>^(a)From the official species list obtained from USFWS IPaC report.</p> <p>^(b)USFWS status definitions:</p> <ul style="list-style-type: none"> • E - Endangered species are those species in danger of extinction throughout all or a significant portion of their range. • T - Threatened species are those species likely to become endangered in the foreseeable future. • EXPN - Experimental, nonessential population designations imply the experimental population is not essential for the continued existence of the species. • C - Candidate species are those species for which USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species are not protected under the ESA. <p>Range or habitat information is from the following sources:</p> <ul style="list-style-type: none"> • Heritage Data Management System (2015); • USFWS Arizona Ecological Services Field Office (2015); • <i>Arizona Rare Plant Field Guide</i> (Arizona Rare Plant Committee); and • Corman and Wise-Gervais (2005). <p>^(c) AGFDSpecies of Greatest Conservation Need (SGCN) Tier Definitions:</p> <ul style="list-style-type: none"> • 1A - Scored "1" for Vulnerability in at least one of the eight categories and matches at least one of the following: <ul style="list-style-type: none"> ○ Federally listed as endangered or threatened under the Endangered Species Act (ESA); ○ Candidate species under ESA; ○ Is specifically covered under a signed conservation agreement (CCA) or a signed conservation agreement with assurances (CCAA); ○ Recently removed from ESA and currently requires post-delisting monitoring; ○ Closed season species (i.e. no take permitted) as identified in Arizona Game and Fish Commission Orders 40, 41, 42 or 43. • 1B - Scored "1" for Vulnerability in at least one of the eight categories, but match none of the above criteria. <p>Range or habitat information is from the following sources:</p> <ul style="list-style-type: none"> • Heritage Data Management System (2015); • USFWS Arizona Ecological Services Field Office (2015); • <i>Arizona Rare Plant Field Guide</i> (Arizona Rare Plant Committee); and • Corman and Wise-Gervais (2005). <p>^(d) Species having a noted potential to occur in the project area, as indicated by the BLM KFO.</p>					

Appendix E

ADDITIONAL BIOLOGICAL RESOURCES INFORMATION

Table E-1. Estimated Number of ANPL Species in the Project Areas

ANPL Species	Per Acre in Chaparral	Per Acre in Disclimax Grassland	Approx. No. of Plants in 396 Acres of Chaparral	Approx. No. of Plants in 131 Acres of Disclimax Grassland
McKelvey's century plant	7	0	2,772	0
Buckhorn cholla	38	39	15,048	5,109
Hedgehog cactus	55	72	21,780	9,432
Pincushion cactus	0	1	0	131
Beargrass	14	0	5,544	0
Beavertail cactus	0	2	0	262
Pancake prickly pear cactus	4	1	1,584	131
Engelmann's prickly pear	257	311	101,772	40,741
Desert prickly pear	3	3	1,188	393
Banana yucca	37	5	14,652	655
<i>Totals</i>			<i>164,340</i>	<i>56,854</i>
Approximate Total				221,194

Table E-2. Estimated Number of Other ANPL Species in the Project Areas

Other ANPL Species	Percent Cover Chaparral	Percent Cover Disclimax Grassland
Ocotillo	0.2	0.2
Buckhorn cholla	0	0.1
Velvet mesquite	0.09	0.3
Saguaro	No Data	No Data
Christmas cactus	No Data	No Data
Barrel cactus	No Data	No Data
Graham's nipple cactus	No Data	No Data
Greenflower nipple cactus	No Data	No Data
Bigelow's nolina	No Data	No Data

Table E-3. Distance to Designated or Proposed Critical Habitat from the Project Areas

Common Name	Scientific Name	Distance (miles) to Critical Habitat from Project Areas
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	8.2
Chiricahua leopard frog	<i>Lithobates chiricahuensis</i>	89.0
Desert pupfish	<i>Cyprinodon macularius</i>	179.9
Mexican spotted owl	<i>Strix occidentalis lucida</i>	34.1
Gila chub	<i>Gila intermedia</i>	36.9
Razorback sucker	<i>Xyrauchen texanus</i>	54.9
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	19.0
Northern Mexican gartersnake	<i>Thamnophis eques megalops</i>	31.1
Spikedace	<i>Meda fulgida</i>	47.1

Table E-4. Game Species Potentially Occurring in the Project Areas

Common Name	Scientific Name	Potential for Occurrence	Potential Impacts
American pronghorn	<i>Antilocapra americana americana</i>	May occur in the project areas or analysis area. The project areas could be used for dispersal by American pronghorn.	May impact dispersing individuals and remove dispersal habitat. Impacts would be limited to the project areas.
Bighorn sheep	<i>Ovis canadensis</i>	Known to occur in the project areas or analysis area. The project areas could be used for dispersal by bighorn sheep.	May impact dispersing individuals and remove dispersal habitat. Impacts would be limited to the project areas.
Gambel's quail	<i>Callipepla gambelii</i>	Known to occur in the project areas or analysis area. The project areas are breeding, foraging, and dispersal habitat.	May impact breeding, foraging, and dispersing individuals and remove habitat. Impacts would be limited to the project areas.
Javelina	<i>Pecari tajacu</i>	Known to occur in the project areas or analysis area. The project areas provide foraging, breeding, and dispersal habitat for javelina.	May impact breeding, foraging, and dispersing individuals and remove habitat. Impacts would be limited to the project areas.
Mountain lion	<i>Puma concolor</i>	Likely to occur in the project areas or analysis area. The project areas could be used for dispersal by mountain lions.	May impact dispersing individuals and remove dispersal habitat. Impacts would be limited to the project areas.
Black bear	<i>Ursus americanus</i>	Likely to occur in the project areas or analysis area. The project areas could be used for foraging or dispersal by black bears.	May impact dispersing individuals and remove foraging habitat. Impacts would be limited to the project areas.
Mule deer	<i>Odocoileus hemionus</i>	Known to occur in the project areas or analysis area. The project areas are foraging habitat for mule deer.	May impact individuals and remove foraging habitat. Impacts would be limited to the project areas.
Waterfowl	Various species	May occur in the analysis area. Water ponding at the existing mine site would likely attract waterfowl. Also, Coors Lake, which is north of the project areas but within the analysis area, is likely to attract waterfowl.	May impact individuals through noise disturbance during project activities.

Table E-5. Federally Listed and Non-Essential Experimental Population Species Potentially Occurring in Yavapai County, Arizona

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Analysis Area	Potential Impacts
Black-footed ferret (<i>Mustela nigripes</i>)	E/NEP	Dependent on medium to large prairie dog (<i>Cynomys</i> spp.) towns (>190 acres and ≥50 burrows/acre)—for food, denning, and rearing young—in low- to mid-elevation (3,900–6,500 feet above mean sea level [amsll]) plains, desert grassland, and desertscrub habitats. In Arizona, reintroduced on tribal ranch lands of Big Boquillas in Aubrey Valley, Coconino County.	Unlikely to occur. The nearest known population of the species is located in the Aubrey Valley, and the project areas are not suitable habitat for the species.	No impact.

Table E-5. Federally Listed and Non-Essential Experimental Population Species Potentially Occurring in Yavapai County, Arizona (Continued)

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Analysis Area	Potential Impacts
California condor (<i>Gymnogyps californianus</i>)	E/NEP	Scrubby chaparral to forested montane regions at low and moderate elevations, especially rocky and brushy areas with cliffs available for nest sites, with foraging habitat encompassing open grassland regions. Most important habitat requirements may be adequate food supplies, open habitat, and reliable air movements. Arizona populations in the Grand Canyon region are considered NEPs, and their range covers northern Arizona north of Interstate 40 except extreme eastern Arizona, i.e., 10(j) area.	Unlikely to occur. Suitable habitat for this species is not present in the project areas, and the project areas are not within the 10(j) area.	No impact.
Chiricahua leopard frog (<i>Lithobates chiricahuensis</i>)	T	Restricted to springs, livestock tanks, and streams in the upper portions of watersheds at elevations between 3,281 and 8,890 feet amsl in central, east-central, and southeastern Arizona. Populations in central and east-central Arizona are disjunct from those in southeastern Arizona and may be distinct species.	Unlikely to occur. There are no permanent water sources suitable for this species in the project areas.	No impact.
Colorado pikeminnow (<i>Ptychocheilus lucius</i>)	E, NEP	Turbid, deep, and strongly flowing rivers with cobble/gravel substrates and side channels with low or no current velocity and silt/sand substrates. Considered extirpated from Arizona; restricted to two 10(j) areas: the Salt and Verde River drainages.	Unlikely to occur. There are no permanent water sources suitable for this species in the project areas, and the project areas are outside the Salt and Verde River drainage 10(j) areas.	No impact.
Desert pupfish (<i>Cyprinodon macularius</i>)	E	Found in shallow waters of desert springs, small streams, and marshes at elevations below 5,000 feet amsl. One natural population still occurs in Quitobaquito Spring and Quitobaquito Pond in Pima County, and reintroductions have been made in Pima, Pinal, Maricopa, Graham, Cochise, La Paz, and Yavapai Counties.	Unlikely to occur. There are no permanent water sources suitable for this species in or adjacent to the project areas.	No impact.
Gila chub (<i>Gila intermedia</i>)	E	Normally found in smaller headwater streams, cienegas, and springs or marshes of the Gila River Basin at elevations between 2,720 and 5,420 feet amsl.	Unlikely to occur. There are no permanent water sources suitable for this species in the project areas.	No impact.
Gila topminnow (<i>Poeciliopsis occidentalis occidentalis</i>)	E	Occurs in small streams, springs, and cienegas at elevations below 4,500 feet amsl, primarily in shallow areas with aquatic vegetation and debris for cover. In Arizona, most of the remaining native populations are in the Santa Cruz River system.	Unlikely to occur. There are no permanent water sources suitable for this species in the project areas.	No impact.
Gila trout (<i>Oncorhynchus gilae</i>)	T	Small mountain headwater streams. Natural populations considered to be extirpated from Arizona; however, the species has been reintroduced in the Blue River, lower Gila River, and Grapevine Creek.	Unlikely to occur. There are no water sources suitable for this species in the project areas.	No impact.

Table E-5. Federally Listed and Non-Essential Experimental Population Species Potentially Occurring in Yavapai County, Arizona (Continued)

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Analysis Area	Potential Impacts
Headwater chub (<i>Gila nigra</i>)	PT	Middle to headwater reaches of medium-sized streams of the Gila River basin at elevations of 3,035 to 6,651 feet amsl. Current range includes 13 streams in the Verde River basin, Tonto Creek subbasin, and San Carlos River basin in Yavapai, Gila, and Graham Counties, Arizona.	Unlikely to occur. There are no water sources suitable for this species in the project areas.	No impact.
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	T	Found in mature, montane forests and woodlands and steep, shady, wooded canyons. Can also be found in mixed-conifer and pine-oak vegetation types. Generally nests in older forests of mixed conifers or ponderosa pine (<i>Pinus ponderosa</i>)–Gambel oak (<i>Quercus gambelii</i>). Nests in live trees on natural platforms (e.g., dwarf mistletoe [<i>Arceuthobium</i> spp.] brooms), snags, and canyon walls at elevations between 4,100 and 9,000 feet amsl.	Unlikely to occur. The project areas do not contain suitable habitat for this species, and the project areas are below the known elevational range of this species.	No impact.
Northern Mexican gartersnake (<i>Thamnophis eques megalops</i>)	T	Ponds, cienegas, lowland riparian forests and woodlands, and upland stream gallery forest between 3,000 and 5,000 feet amsl.	Unlikely to occur. There is no suitable habitat for the species in the project areas. The nearest known population is from the Verde River.	No impact.
Razorback sucker (<i>Xyrauchen texanus</i>)	E	Found in riverine and lacustrine areas, generally not in fast-moving water, and may use backwaters at elevations below 6,000 feet amsl.	Unlikely to occur. There are no permanent water sources suitable for this species in or adjacent to the project areas.	No impact.
Roundtail chub (<i>Gila robusta</i>)	PT	Found in cool to warm waters of rivers and streams at elevations from 1,000 to 7,500 feet amsl.	Unlikely to occur. There are no permanent water sources suitable for this species in or adjacent to the project areas.	No impact.

Table E-5. Federally Listed and Non-Essential Experimental Population Species Potentially Occurring in Yavapai County, Arizona (Continued)

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Analysis Area	Potential Impacts
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	E	Found in dense riparian habitats along streams, rivers, and other wetlands where cottonwood, willow, boxelder (<i>Acer negundo</i>), saltcedar (<i>Tamarix</i> spp.), Russian olive (<i>Elaeagnus angustifolia</i>), buttonbush (<i>Cephalanthus</i> spp.), and arrowweed (<i>Pluchea sericea</i>) are present. Nests are found in thickets of trees and shrubs, primarily those that are 13 to 23 feet high, among dense, homogeneous foliage. Habitat occurs at elevations below 8,500 feet amsl.	May occur. Limited stopover or migratory habitat for this species is present in the project areas and analysis area. However, this habitat covers a small area and is not suitable for breeding. Removal of this habitat would be discountable and insignificant due to the minimal amount of riparian habitat to be lost. The nearest record of the species is at the Big Sandy River confluence with Burro Creek, approximately 19 miles west of the project areas.	Negligible, long-term impact due to removal of possible migratory and dispersal habitat for the species.
Spikedace (<i>Meda fulgida</i>)	E	Found in streams in mid-water habitats of runs, pools, and eddies at elevations below 4,500 feet amsl.	Unlikely to occur. There are no permanent water sources suitable for this species in or adjacent to the project areas, and the project areas are outside the known range of the species.	No impact.
Woundfin (<i>Plagopterus argentissimus</i>)	E/NEP	Found in shallow, warm, turbid, fast-flowing water below 4,500 feet amsl. Tolerates high salinity. In Maricopa County, it has been reintroduced to the Hassayampa River.	Unlikely to occur. There are no permanent water sources suitable for this species in or adjacent to the project areas.	No impact.

Table E-5. Federally Listed and Non-Essential Experimental Population Species Potentially Occurring in Yavapai County, Arizona (Continued)

Common Name (Species Name)	Status*	Range or Habitat Requirements	Potential for Occurrence in Analysis Area	Potential Impacts
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	T	Typically found in riparian woodland vegetation (cottonwood, willow, or saltcedar) at elevations below 6,600 feet amsl. Dense understory foliage appears to be an important factor in nest site selection. The highest concentrations in Arizona are along the Agua Fria, San Pedro, upper Santa Cruz, and Verde River drainages and Cienega and Sonoita Creeks.	May occur. Limited stopover or migratory habitat for this species is present in the project areas and analysis area. However, this habitat covers a small area and is not suitable for breeding. Removal of this habitat would be discountable and insignificant due to the minimal amount of riparian habitat to be lost. The nearest record of the species is at the Santa Maria River between U.S. Route 93 and State Route 96, approximately 8.2 miles south of the project areas.	Negligible, long-term impact due to removal of possible migratory and dispersal habitat for the species.

* U.S. Fish and Wildlife Service Status Definitions

E = Endangered. Endangered species are those in imminent jeopardy of extinction. The Endangered Species Act (ESA) specifically prohibits the take of a species listed as endangered. Take is defined by the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct.

NEP = Non-Essential Experimental Population. Experimental populations of a species designated under Section 10(j) of the ESA for which the U.S. Fish and Wildlife Service, through the best available information, believes is not essential for the continued existence of the species. Regulatory restrictions are considerably reduced under an NEP designation.

PT = Proposed Threatened. Proposed threatened species are those that are not currently federally protected under the ESA but are eligible to be listed as threatened under the ESA.

T = Threatened. Threatened species are those in imminent jeopardy of becoming endangered. The ESA prohibits the take of a species listed as threatened under Section 4d of the ESA. Take is defined by the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct.

MIGRATORY BIRD NEST BUFFERS RESEARCH AND RECOMMENDED BUFFERS

From U.S. Fish and Wildlife Service (USFWS) on a recent project in southern Arizona: “If project activities must occur during migratory bird nesting season, we recommend that active nests of migratory birds be avoided or buffered by a distance of 100 to 300 feet, depending on the bird species.”

In the end on the same project, the following distances were used, as approved by USFWS:

- Raptors had a 1,200-foot buffer
- Passerines/Songbirds had a 50-foot buffer

Burrowing owls or ground nesters: 100-foot radius buffer

Source: http://www.azgfd.gov/pdfs/w_c/owl/BurrowingOwlClearanceProtocol.pdf

Arizona Burrowing Owl Working Group. 2009. *Burrowing Owl Project Clearance Guidance for Landowners*. Dated January 2009. Phoenix: Arizona Game and Fish Department.

Raptors: From Table B.3, recommended spatial buffers for nests of breeding raptors on p. 65 has buffers for raptor species that might occur in Bagdad EA project areas. Range between 400 and 1,600 meters, i.e., 1,312 and 5,249 feet.

Source:

http://www.blm.gov/pgdata/etc/medialib/blm/ut/lands_and_minerals/oil_and_gas/february_20120.Par.52166.File.dat/FWSRaptorGuidelines.pdf

Whittington, D.M., and G.T. Allen. 2008. *Guidelines for Raptor Conservation in the Western United States*. Washington, D.C.: Division of Migratory Bird Management, Region 9, U.S. Fish and Wildlife Service.

For the Bagdad Project, the following buffers are recommended:

Ground/Burrow Nesters: 100 feet

Raptors: 1,200 feet

All others: 50 feet

Appendix F

NATIVE PLANT SEED MIX

EXHIBIT D AZA 005961 SEED MIX AND RATES

Table 1. Seed Mix*

Species	Rate per Acre, Pure Live Seed
Purple threeawn (<i>Aristida purpurea</i>)	2.5 lb.
Sideoats grama (<i>Bouteloua curtipendula</i>)	9 lb.
Needle and thread (<i>Hesperostipa comate</i>)	14 lb.
Desert marigold (<i>Baileya multiradiata</i>)	2 lb.
Desert globemallow (<i>Sphaeralcea ambigua</i>)	4 lb.
False mesquite (<i>Calliandra eriophylla</i>)	1 lb.
Flattop buckwheat (<i>Eriogonum fasciculatum</i>)	2 lb.
Rayless brittlebush (<i>Encelia frutescens</i>)	3 lb.

* If seed is unavailable, substitutes for the seed mix would be used upon coordination and approval by the BLM authorized officer.

Appendix G

**ARIZONA DEPARTMENT OF AGRICULTURE (ADA) NOTICE
OF INTENT TO CLEAR LAND (NOI) FORM**



Arizona Department of Agriculture (ADA)
 Licensing and Registration Section
 1688 West Adams, Phoenix, Arizona 85007
 Phone: (602) 542-6408
 Fax: (602) 542-0466

Notice of Intent to Clear Land

ARS § 3-904

Pursuant to A.R.S. § 3-904 the undersigned, as Owner of the Property described herein, gives this Notice of Intent to Clear Land of protected native plants.

1. **Owner/landowner's agent.** The owner or landowner's agent of the Property upon which protected native plants will be affected:

Owner's Name _____ Phone _____

Address _____

Agent's Name _____ Phone _____

Address _____

2. **Property.** The description and location of the Property upon which protected native plants will be affected:

County _____

Name of Property/Project _____

Address _____

Physical Location (attach map) _____

(Note: Map must also show surrounding land for 1/2 mile in each direction)

Tax Parcel ID Nos. _____

Legal Description (or attach copy) _____

Number of Acres to be Cleared _____

3. **Owner's Intent.** Landowner's intentions when clearing private land of protected native plants.

Owner intends to allow salvage of the plants, and agrees to be contacted by native plant salvagers.

Owner intends to transplant the plants onto the same property, or to another property he also owns.

Owner has already arranged for salvage of the plants.

Owner does not intend to allow salvage of the plants.

Other _____

4. **Approximate starting date.** _____

(See notice period listed on reverse side)

The information contained in this application is true and accurate to the best of my knowledge. I understand that providing false information is a felony in Arizona

Signature _____ Date _____

Notice to salvagers: Consent of the landowner is required before entering any lands described in this notice.

Explanation Of This Form

1. Notice of Intent to Clear Land.

The majority of the desert plants fall into one of four groups specially protected from theft, vandalism or unnecessary destruction. They include all of the cacti, the unique plants like Ocotillo, and trees like Ironwood, Palo Verde and Mesquite. In most cases the destruction of these protected plants may be avoided if the private landowner gives prior notice to the Arizona Department of Agriculture.

2. Notice Period.

When properly completed, this form is to be sent to the Department within the time periods described below. Landowners/ developers are encouraged to salvage protected native plants whenever possible.

3. Information to Interested Parties.

The information in this notice will be posted in the applicable state office of the Department and mailed to those parties (salvage operators, revegetation experts) who have an interest in these plants and may approach the landowner with the possibility of saving the plant(s) from unnecessary destruction.

Notice to Landowner:

1. The owner may not begin destruction of protected native plants until he receives confirmation from the Arizona Department of Agriculture and the time prescribed below has elapsed. The "Confirmed" stamp only verifies that the Notice has been filed.

Size of area over which the Destruction of Plants will occur

Length of Notice Period

Less than one acre

20 days, oral or written

One acre or more, but less than 40 acres

30 days, written

40 acres or more

60 days, written

2. If you are clearing land over an area of less than one acre, oral notice may be given by calling the applicable state office at the telephone number given below.
3. If the land clearing or plant salvage does not occur within one year, a new Notice is required.
4. This Notice must be sent to the applicable state office of the Department of Agriculture at the address given below:

Phoenix Office
1688 W. Adams
Phoenix, AZ 85007
(602) 364-0935

Tucson Office
400 W. Congress Ste. 124
Tucson, AZ 85701
(520) 628-6317
M-F 8a.m. - 11:30a.m.

Notice to salvagers: Consent of the landowner is required before entering any lands described in this notice.

Appendix H

**AGFD GUIDELINES FOR HANDLING SONORAN DESERT
TORTOISES**

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES ENCOUNTERED ON DEVELOPMENT PROJECTS

Arizona Game and Fish Department
Revised September 22, 2014

The Arizona Game and Fish Department (Department) has developed the following guidelines to reduce potential impacts to desert tortoises, and to promote the continued existence of tortoises throughout the state. These guidelines apply to short-term and/or small-scale projects, depending on the number of affected tortoises and specific type of project.

The Sonoran desert tortoise occurs south and east of the Colorado River. Tortoises encountered in the open should be moved out of harm's way to adjacent appropriate habitat. If an occupied burrow is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow or other appropriate shelter, as determined by a qualified biologist. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim. Tortoises should be moved quickly, kept in an upright position parallel to the ground at all times, and placed in the shade. Separate disposable gloves should be worn for each tortoise handled to avoid potential transfer of disease between tortoises. Tortoises must not be moved if the ambient air temperature exceeds 40° Celsius (105° Fahrenheit) unless an alternate burrow is available or the tortoise is in imminent danger.

A tortoise may be moved up to one-half mile, but no further than necessary from its original location. If a release site or alternate burrow is unavailable within this distance, and ambient air temperature exceeds 40° Celsius (105° Fahrenheit), contact the Department for guidance. Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and highway projects), or those requiring removal during long-term (longer than one week) construction projects, may be placed in the Department's tortoise adoption program. *Managers of projects likely to affect desert tortoises should obtain a [scientific collecting license](#) from the Department to facilitate handling or temporary possession of tortoises.* Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- Use the Department's [Environmental On-Line Review Tool Department](#) during the planning stages of any project that may affect desert tortoise habitat.
- Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.
- Take is prohibited by state law.
- These guidelines do not apply to Mojave desert tortoises (north and west of the Colorado River). Mojave desert tortoises are listed as threatened under the Endangered Species Act, administered by the U.S. Fish and Wildlife Service.
- These guidelines are subject to revision at the discretion of the Department.

Appendix I

VISUAL SIMULATIONS AND VRM WORKSHEETS

SECTION D. (Continued)

Comments from item 2.

The visual impacts to the existing viewshed from this KOP would include increased color, line, form, and texture contrasts created between the proposed stockpile extension and the characteristic landscape of the area. These modifications to the existing landform are allowable under VRM Class IV. These contrasts would increase incrementally over time as mining activities continue and ultimately be viewable from a variety of locations such as this KOP. However, due to existing viewshed (current mining operation dominates view), these impacts would be minimized.

Visual simulations were completed from this KOP to show the difference between the current view, the approved action (*1996 Cyprus Bagdad Cooper Corporation Proposed Tailing and Waste Rock Storage Areas*), and the proposed action.

Additional Mitigating Measures (See item 3)

The 1996 MPO and EIS for the Cyprus Bagdad Cooper Corporation reduced visual impacts of the approved stockpile, which is viewable from this KOP, through the following mitigation:

“To help reduce visual contrasts, clearing of land for the proposed project facilities should be limited to the minimum required for operations, and where practical, should create curvilinear edges rather than straight lines. All foliage adjacent to the site should remain undisturbed to provide visual screening, and re-vegetation of side slopes should be carried out as soon as possible.”

Due to the visibility of the currently approved operation from this KOP, the same mitigation as recommended above would be utilized for the current proposed action to be in conformance with previous management decisions based on the viewshed (meaning the approved action and proposed action are both viewable from KOP 1; this is the only KOP where this exists).



KOP 1 - Bagdad, AZ Existing Condition



KOP 1 - Bagdad, AZ with Approved Stockpile



KOP 1 - Bagdad, AZ with Proposed Stockpile Extension



BAGDAD MINE
BAGDAD, AZ
VISUAL RESOURCE ANALYSIS

HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE
This plan is conceptual and subject to change through the planning and development process.
45° 18'00" N 102° 11'52" W D10 — Metro (etwms, LLC) \ADMIN\BAGDAD\PROJECTS\B04_70117.dwg 7/18/2016 4:26 PM

SECTION D. (Continued)

Comments from item 2.

The visual impacts to the existing viewshed from this KOP would include increased color, line, form, and texture contrasts created between the proposed stockpile extension and the characteristic landscape of the area. These modifications to the existing landform are allowable under VRM Class IV. These contrasts would increase incrementally over time as mining activities continue and ultimately be viewable from a variety of locations such as this KOP. The form, line, and texture of the stockpile extension will be curvilinear and have smooth non-geometric edges that are consistent with the characteristic landscape. Some inconsistencies with the line of vegetation may be visible from the KOP due to the viewing distance. However, erosion and natural process will mute this over time.

Visual simulations were completed from this KOP to show the difference between the current view and the proposed action.

Additional Mitigating Measures (See item 3)

Re-vegetation of side slopes will generally mute the contrast in color created by the stockpile extension. ***A rock stain (chemical process by which the waste-rock will gain a natural patina)*** would also be recommended to mitigate color contrast from this KOP.



KOP 2 - Kellis Ranch Existing Condition



BAGDAD MINE
BAGDAD, AZ

VISUAL RESOURCE ANALYSIS

HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE
This plan is conceptual and subject to change through the planning and development process.
45°18'00"N 102°11'52"W D10 — Nairo (elevation: 1,020.00) BAGDAD, AZ 8/18/2016 4:26 PM



KOP 2 - Kellis Ranch with Proposed Stockpile Extension



HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE
This plan is conceptual and subject to change through the planning and development process.
45°18'00"N 102°11'52"W D10 — Nairo (elevation: 1,021.00) BAGDAD, AZ 85301-5206



I-10



KOP 2 - . H00/5DOFK Panoramic View Existing Condition and with Proposed Stockpile Extension

August 2016

SECTION D. (Continued)

Comments from item 2.

The visual impacts to the existing viewshed from this KOP would include increased color, line, form, and texture contrasts created between the proposed stockpile extension and the characteristic landscape of the area. These modifications to the existing landform are allowable under VRM Class IV. These contrasts would increase incrementally over time as mining activities continue and ultimately be viewable from a variety of locations such as this KOP. The form, line, and texture of the stockpile extension will be curvilinear and have smooth non-geometric edges that are consistent with the characteristic landscape. Some inconsistencies with the line of vegetation may be visible from the KOP due to the viewing distance. However, erosion and natural process will mute this over time.

Visual simulations were completed from this KOP to show the difference between the current view and the proposed action.

Additional Mitigating Measures (See item 3)

Re-vegetation of side slopes will generally mute the contrast in color created by the stockpile extension. ***A rock stain (chemical process by which the waste-rock will gain a natural patina)*** would also be recommended to mitigate color contrast from this KOP.



. 23 O RXQM Q 6SUQJ \$UHD \$ QDUJ%JXFHO IQH 5RDG Road Existing Condition



BAGDAD MINE
BAGDAD, AZ

VISUAL RESOURCE ANALYSIS

HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE
This plan is conceptual and subject to change through the planning and development process.
45°18'00"N 102°11'52"W D10 — Natick, Vermont, U.S.A. PHONE: 802.882.1854 FAX: 802.882.1855



. 23 0RXOMQ6SUQJ \$UHD \$ QDU%KXFO IQH5RDG Z ith Proposed Stockpile Extension



BAGDAD MINE
BAGDAD, AZ

VISUAL RESOURCE ANALYSIS

HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE
This plan is conceptual and subject to change through the planning and development process.
45°18'00"N 102°11'52"W D10 — Nairo (elev. 1,021.7) BAGDAD, AZ 8/18/2016 4:26 PM



August 2016



KOP 3 - Mountain Spring Area A, Panorama View



BAGDAD MINE
BAGDAD, AZ

VISUAL RESOURCE ANALYSIS

HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE
This plan is conceptual and subject to change through the planning and development process.
45°18'00"N 102°11'52"W D10 - Maricopa County, AZ
11077 Ave - Phoenix, AZ 85026

SECTION D. (Continued)

Comments from item 2.

Stockpile is not viewable from KOP. Visual simulation was completed due to cultural concerns of the landscape.

Additional Mitigating Measures (See item 3)

None.



KOP 4 - Mountain Spring Area B Existing Condition

BAGDAD MINE
BAGDAD, AZ



VISUAL RESOURCE ANALYSIS

HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE
This plan is conceptual and subject to change through the planning and development process.
45-1800-16211-1524-010 - Maricopa County, AZ - 11/17/2016 - 11/17/2016 4:28 PM

PROPOSED STOCKPILE EXTENSION NOT VISIBLE



KOP 4 - Mountain Spring Area B with Proposed Stockpile Extension

BAGDAD MINE
BAGDAD, AZ



VISUAL RESOURCE ANALYSIS

HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE

This plan is conceptual and subject to change through the planning and development process.
45°18'00"N 102°11'52"W D10 — Maricopa County, Arizona (300000, 160000) 7/18/2016 4:26 PM

SECTION D. (Continued)

Comments from item 2.

The visual impacts to the existing viewshed from this KOP would include increased color, line, form, and texture contrasts created between the proposed stockpile extension and the characteristic landscape of the area. These modifications to the existing landform are allowable under VRM Class IV. These contrasts would increase incrementally over time as mining activities continue and ultimately be viewable from a variety of locations such as this KOP. The form, line, and texture of the stockpile extension will be curvilinear and have smooth non-geometric edges that are consistent with the characteristic landscape. Some inconsistencies with the line of vegetation may be visible from the KOP due to the viewing distance. However, erosion and natural process will mute this over time.

Visual simulations were completed from this KOP to show the difference between the current view and the proposed action.

Additional Mitigating Measures (See item 3)

Re-vegetation of side slopes will generally mute the contrast in color created by the stockpile extension. ***A rock stain (chemical process by which the waste-rock will gain a natural patina)*** would also be recommended to mitigate color contrast from this KOP.



KOP 5 - Mountain Spring Area C ([IWMU] & RQGLWRO

BAGDAD MINE
BAGDAD, AZ

VISUAL RESOURCE ANALYSIS



HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE

This plan is conceptual and subject to change through the planning and development process.
AS-1800-16211-1524-010 - Maricopa County, Arizona, Bagdad Mine, Bagdad, AZ
11/17/16 11:28 AM



KOP 5 - Mountain Spring Area C Z LM 3URSRVHG 6VRFNSI0H ([MCMRO

BAGDAD MINE
BAGDAD, AZ

VISUAL RESOURCE ANALYSIS



HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE
This plan is conceptual and subject to change through the planning and development process.
45°18'00"N 102°11'52"W D10 — Metro | Irvine, CA | P.O. BOX 10000 | IRVINE, CA 92618-0000 | 949.251.1000

SECTION D. (Continued)

Comments from item 2.

The visual impacts to the existing viewshed from this KOP would include increased color, line, form, and texture contrasts created between the proposed stockpile extension and the characteristic landscape of the area. These modifications to the existing landform are allowable under VRM Class IV. These contrasts would increase incrementally over time as mining activities continue and ultimately be viewable from a variety of locations such as this KOP. The form, line, and texture of the stockpile extension will be curvilinear and have smooth non-geometric edges that are consistent with the characteristic landscape. Some inconsistencies with the line of vegetation may be visible from the KOP due to the viewing distance. However, erosion and natural process will mute this over time.

Visual simulations were completed from this KOP to show the difference between the current view and the proposed action.

Additional Mitigating Measures (See item 3)

Re-vegetation of side slopes will generally mute the contrast in color created by the stockpile extension. ***A rock stain (chemical process by which the waste-rock will gain a natural patina)*** would also be recommended to mitigate color contrast from this KOP.



Bruce Mine Road
(east)

Existing road to north
(alignment of proposed
APS Segment 1)



KOP 5 Alternate - Mountain Spring Area C Panorama ([WMOJ & RCGWRO DOG Z LMK

3URSRVHG 6WRFNSLOH ([WCMVRO

BAGDAD MINE
BAGDAD, AZ



VISUAL RESOURCE ANALYSIS

HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE

This plan is conceptual and subject to change through the planning and development process.
45°38'00"N 102°11'52"W-010 — Metro (etwms, LLC) \ADMIN\BAGDAD\PROJECTS\1804_70_1107.dwg 7/18/2016 4:26 PM

SECTION D. (Continued)

Comments from item 2.

The visual impacts to the existing viewshed from this KOP would include increased color, line, form, and texture contrasts created between the proposed stockpile extension and the characteristic landscape of the area. These modifications to the existing landform are allowable under VRM Class IV. These contrasts would increase incrementally over time as mining activities continue and ultimately be viewable from a variety of locations such as this KOP. The form, line, and texture of the stockpile extension will be curvilinear and have smooth non-geometric edges that are consistent with the characteristic landscape. Some inconsistencies with the line of vegetation may be visible from the KOP due to the viewing distance. However, erosion and natural process will mute this over time.

Visual simulations were completed from this KOP to show the difference between the current view and the proposed action.

Additional Mitigating Measures (See item 3)

Re-vegetation of side slopes will generally mute the contrast in color created by the stockpile extension. ***A rock stain (chemical process by which the waste-rock will gain a natural patina)*** would also be recommended to mitigate color contrast from this KOP.



KOP 6 - State Route 97 with Proposed Stockpile Extension

BAGDAD MINE
BAGDAD, AZ

VISUAL RESOURCE ANALYSIS



HILGARTWILSON
ENGINEER | PLAN | SURVEY | MANAGE
This plan is conceptual and subject to change through the planning and development process.
45°18'00"N 102°11'52"W D10 — Maricopa County, Arizona, Bagdad Mine, Bagdad, AZ 85301

Appendix J

**BLM TRIBAL CONSULTATION ON THE PROPOSED
PROJECTS**

Table J-1. Bagdad Mine Stockpile Extension and APS ROW Amendment Tribal Consultation (Formal and Informal)

Date	Type	Bagdad Stockpile Extension	APS ROW Amendment	From	To	Content
May 22, 2013	Letter		X	Ruben Sanchez, BLM	Multiple	Consultation on APS access roads ROW amendment re: multicomponent site in APE for access road and report will be forthcoming for review. Sherry Counts, Hualapai Tribe Chris Coder, Yavapai-Apache Nation David Kwait, Yavapai-Apache Nation David Watahomigie, Havasupai Tribe Travis Hamidreek, Havasupai Tribe Ernest Jones, Sr., Yavapai-Prescott Indian Tribe Gregory Glassco, Yavapai-Prescott Indian Tribe Le Roy Shingoitewa, Hopi Tribe Leigh Kuwanwisiwma, Hopi Tribe
May 23, 2013	Email		X	Tim Watkins, BLM	Peter Bungart, Hualapai Tribe	New information regarding multicomponent site for access roads
June 3, 2013	Letter		X	Leigh Kuwanwisiwma, Hopi Tribe	Ruben Sanchez, BLM	Request for continuing consultation
July 9, 2013	Email		X	Tim Watkins, BLM	Loretta Jackson-Kelley, Hualapai Tribe	CD and hard copy of Class III survey by URS Corporation given to Peter Bungart
July 9, 2013	Letter		X	Ruben Sanchez, BLM	Loretta Jackson-Kelley, Hualapai Tribe Gregory Glassco, Yavapai-Prescott Indian Tribe Leigh Kuwanwisiwma, Hopi Tribe	Draft survey report for review for proposed APS line
August 15, 2013	Letter		X	Ruben Sanchez, BLM	Linda Ogo, Yavapai-Prescott Indian Tribe	Reply regarding survey report
October 29, 2013	Email	X	X	Tim Watkins, BLM	Gregory Glassco, Yavapai-Prescott Indian Tribe	Update on progress of NEPA for APS line and Bagdad stockpile extension

Table J-1. Bagdad Mine Stockpile Extension and APS ROW Amendment Tribal Consultation (Formal and Informal), Continued

Date	Type	Bagdad Stockpile Extension	APS ROW Amendment	From	To	Content
January 31, 2014	Letter	X	X	Ruben Sanchez, BLM	Multiple	Invitation to government-to-government scoping meeting for NEPA for mine waste rock extension and APS line/roads. Sherry Counts, Hualapai Tribe Loretta Jackson-Kelley, Hualapai Tribe Peter Bungart, Hualapai Tribe Dawn Hubbs, Hualapai Tribe LeRoy Shingoitewa, Hopi Tribe Leigh Kuwanwisiwma, Hopi Tribe Ernest Jones, Sr., Yavapai-Prescott Indian Tribe Gregory Glassco, Yavapai-Prescott Indian Tribe Linda Ogo, Yavapai-Prescott Indian Tribe
February 6, 2014	Letter	X	X	Leigh Kuwanwisiwma, Hopi Tribe	Ruben Sanchez, BLM	Request for continuing consultation
March 6, 2014	Meeting	X	X	BLM multiple	Peter Bungart, Hualapai Tribe	Meeting regarding Bagdad Proposed Action. Attendees: Tim Watkins, Ruben Sanchez, Andy Whitefield, Buzz Todd, Peter Bungart, Maria Troche
April 2, 2014	Letter	X	X	Loretta Jackson-Kelley, Hualapai Tribe	Ruben Sanchez, BLM	Request for ethnographic study from the Hualapai Tribe to the BLM
April 29, 2014	Letter	X	X	Loretta Jackson-Kelley, Hualapai Tribe	Ruben Sanchez, BLM	Withdrawal of request for ethnographic study
May 13, 2014	Email	X	X	Tim Watkins, BLM	Loretta Jackson-Kelley, Hualapai Tribe	Discussion of email sent to Loretta Jackson-Kelly from Chris Watkins re: relationship between the APS line (not ROW amendment) and stockpile expansion projects
June 13, 2014	Phone call	X		Peter Bungart, Hualapai Tribe	Tim Watkins, BLM	Ethnographic study – FMFI will be funding independent of the NEPA process
September 16, 2014	Letter	X	X	Leigh Kuwanwisiwma, Hopi Tribe	Ruben Sanchez, BLM	Defer to Hualapai Tribe regarding Cooperating Agencies and Memorandum of Understanding
October 17, 2014	Letter	X	X	Ruben Sanchez, BLM	Multiple	MPO and APS amendment for review. Sherry Counts, Hualapai Tribe Timothy Williams, Fort Mojave Indian Tribe LeRoy Shingoitewa, Hopi Tribe Ernest Jones, Sr., Yavapai-Prescott Indian Tribe Brad Stone, ASLD James Garrison, SHPO
October 28, 2014	Letter	X	X	Leigh Kuwanwisiwma, Hopi Tribe	Ruben Sanchez, BLM	Receipt of materials and request for continuing consultation

Table J-1. Bagdad Mine Stockpile Extension and APS ROW Amendment Tribal Consultation (Formal and Informal), Continued

Date	Type	Bagdad Stockpile Extension	APS ROW Amendment	From	To	Content
November 18, 2014	Letter	X	X	Ruben Sanchez, BLM	Sherry Counts, Hualapai Tribe	Offer for Peach Spring scoping meeting
March 28, 2015	Meeting	X	X	Ruben Sanchez	Hualapai Tribal Council	Update on Bagdad stockpile extension and APS ROW amendment
September 23, 2015	Meeting	X	X	BLM Multiple	Hualapai Tribe Multiple	Field meeting regarding APS Segment 3 application
March 24, 2016	Meeting	X	X	Shane Rumsey, BLM	Dawn Hubbs, Hualapai Tribe	Update on Bagdad stockpile extension and APS ROW amendment
May 12, 2016	Meeting	X	X	Shane Rumsey, BLM	Hualapai Tribe Multiple	Delivery of poster-size visual simulations, and update on Bagdad stockpile extension and APS ROW amendment
June 29, 2016	Meeting	X	X	BLM Multiple	Hualapai Tribe Multiple	Discussion of HPTP and MOA development details. Attendees: Amanda Dodson, Shane Rumsey, Dawn Hubbs, Kerry Christensen

