USDA Forest Service
Tonto National Forest
Arizona

August 6, 2018

Process Memorandum to File

Wildlife Resource Analysis: Assumptions; Methodology Used; Relevant Regulations, Laws, and Guidance; and Key Documents

This document is deliberative and is prepared by the third-party contractor in compliance with the National Environmental Policy Act and other laws, regulations, and policies to document ongoing process and analysis steps. This document does not take the place of any Line Officer's decision space related to this project.

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Revision History

Date	Personnel	Revisions Made
08/06/18	Emily Newell	Process memorandum created
10/29/18	Emily Newell	Revisions to memorandum title, revision history table added, edits to purpose of process memorandum section, references and key documents section added
10/31/18	Emily Newell	Applicability of relevant laws updated
11/15/18	Emily Newell	Edits to references cited
12/13/18	Jeffery Johnson	Added in text from wildlife section
12/18/18	Emily Newell	Updated references, analysis area info
01/14/19	Emily Newell	Ready for project manager review
7/12/19	Donna Morey	Updated process memorandum to draft environmental impact statement section
8/6/19	Emily Newell	Final consistency review
8/14/19	Donna Morey	Addition of Appendix 2 – Literature Review of Artificial Light Effects on Wildlife Species
09/02/20	Stacy Campbell	Revisions to occurrence records, references updated
10/9/20	Sarah Epstein	Update management indicator species table
12/30/20	Chris Garrett	Final update for consistency prior to final environmental impact statement release

Purpose of Process Memorandum

In order to provide a concise and accessible summary of resource impacts, certain detailed information has not been included directly in the environmental impact statement (EIS). The purpose of this process memorandum is to describe additional supporting resource information in detail. The wildlife section of chapter 3 of the EIS includes brief summaries of the information contained in this process memorandum. This process memorandum covers the following topics:

- Resource analysis area
- Analysis methodology
- Regulations, laws, and guidance
- Key documents and references cited

Detailed Information Supporting Environmental Impact Statement Analysis

Resource Analysis Area

The analysis area covers the project footprint plus a 1-mile buffer, as well as areas along Queen Creek and Devil's Canyon where groundwater drawdown or reductions in surface water could change habitat (see figure 3.8.2-1 in section 3.8.2 of the EIS). Much of the impact on species and habitat is caused by direct disturbance of the land and vegetation. The 1-mile buffer and areas of Queen Creek and Devil's Canyon were determined by using the areas where the noise analyses, water analyses (i.e., groundwater and surface water quantity/quality analyses), fugitive dust distance affecting air quality, and noxious weed introduction and spread (Foxcroft et al. 2007) indicate the potential for impacts. The species considered in the analysis area are documented in Tables 1 through 3.

According to the air quality analysis, ambient air quality standards would be achieved at the project footprint boundaries; therefore, any potential air quality impacts are encompassed within the 1-mile buffer. The noise modeling shows that for all action alternatives, noise levels at 1 mile would be at or below the level of normal human conversation; as such, the 1-mile buffer is sufficient to address potential impacts from noise-producing activities. We also expect light associated with project construction and facilities to increase night-sky brightness from 1 to 9 percent on average (Dark Sky Partners LLC 2018). Light impacts would occur across the landscape, but available research suggests any substantial impacts would occur within the 1-mile buffer. Species' movement corridors include areas outside the 1-mile buffer; we address potential impacts on those corridors at a landscape level.

The Arizona Game and Fish Department (AGFD) is a cooperating agency and made species records and other information available to the U.S. Forest Service (Forest Service) for use in the analysis. AGFD searched for records within the project footprint plus a 5-mile buffer; this information was used to determine the likelihood of occurrence for each species. This search area is greater than the analysis area and thus errs on the side of including more species' records, rather than fewer. Although the analysis area is a 1-mile buffer, data provided by the AGFD were within a 5-mile buffer and could not be clipped to the 1-mile buffer. This larger 5-mile buffer is clearly noted when it has been used.

The temporal parameters for this analysis involved the time frames for (1) construction: mine years 1 through 9; (2) operation: mine years 6 through 46; and (3) post-closure/reclamation: mine years 46 through 51 to 56, plus any additional years that are identified in other resource analysis (e.g., the groundwater analysis used to inform this section predicts out to 200 years). Construction activities would overlap operations activities for approximately 6 years.

Analysis Methodology

The 1-mile buffer and areas of Queen Creek and Devil's Canyon were determined by using the areas where the noise analyses, water analyses (i.e., groundwater and surface water quantity/quality analyses), fugitive dust distance affecting air quality, and noxious weed introduction and spread (Foxcroft et al. 2007) indicate the potential for impacts. The 1-mile buffer is bolstered by available literature studying the response of various species to noise at various distances. Some examples include the following:

- Delaney et al. (1999) researched percent flushing of Mexican spotted owl (*Strix occidentalis lucida*) with distance and found little response beyond 250 meters (m).
- Grubb and King (1991) researched the response of over 4,000 human events on nesting bald eagles in Arizona. Their recommendation based on this research was a restricted primary buffer zone of 600 m, and a secondary buffer zone of 1,200 m. These researchers also report other buffer zones considered by various regulatory programs, ranging from 450 m to 1,600 m.
- Eigenbrod et al. (2009) examined pond habitats and found road-effect zones extending roughly 250 to 1,000 m from highways.
- Siemers and Schaub (2011) researched simulated highway noise effects on bat foraging and found that effects largely fell off after 25 m.

Additional light associated with project construction and facilities is anticipated to increase night-sky brightness by 1 to 9 percent on average (Dark Sky Partners LLC 2018). With the additional light increase of 1 to 9 percent over existing conditions, the 1-mile buffer would be sufficient to capture potential project-related impacts to wildlife from additional light. Although substantial research has been conducted on the ecological effects of night lighting, research identifying distance impacts with night lighting is more scarce, but some studies suggest a 1-mile buffer is sufficient, additional information in appendix 2. Bruce-White and Shardlow (2011) generally cite 500 m as the distance insects are attracted to an unshielded light source, or as buffer distance for water bodies.

In addition, we consider species' movement corridors that include areas outside the 1-mile buffer, and we address potential impacts to those corridors at a landscape level. AGFD is a cooperating agency and made species' records and other information available to the Forest Service for use in the analysis. AGFD searched for records within the project footprint plus a 5-mile buffer; this information was used to determine the likelihood of occurrence for each species. This search area is greater than the analysis area and thus errs on the side of including more species' records rather than less. This larger 5-mile buffer is clearly noted when it has been used.

The goal of this analysis is to identify the reasonably potentially foreseeable impacts to wildlife and special-status wildlife species and their habitat from all activities associated with each project alternative. Several elements constitute the core of this analysis: (1) the factors for analysis identified during the NEPA scoping process, (2) survey and records data provided as part of this project, and (3) a scientific examination using current literature on species and how environmental changes (human or natural) affect species and their habitat.

Important wildlife movement corridors throughout the state have been identified in recent years through the aid of resource management planning by agencies, organizations, stakeholders, academia, private citizens, and non-profit organizations. Detail on the identified wildlife movement corridors can be found in the wildlife connectivity section in table 1 and background documentation below.

Additionally, further information and details, including analysis methods, species accounts, occurrence records, etc., on wildlife resources discussed in section 3.8 of the draft EIS (DEIS) can be found in appendix 1 of this process memorandum.

Wildlife Connectivity

Table 1. Wildlife Connectivity Elements that Overlap the Analysis Area

Connectivity Element (Type)	Alternatives 2 and 3 Components	Alternative 4 Components	Alternative 5 Components	Alternative 6 Components
Modeled Linkage				
Superior–Miami U.S. Route 60 (Modelled Linkage)	East Plant Site/Subsidence Zones; Magma Arizona Railroad Company (MARRCO) Disturbance; Silver King Realignment; Tailings Storage Facility Tailings Corridor; West Plant Site	East Plant Site/Subsidence Zones; MARRCO Disturbance; Silver King Road Realignment with Filter Plant; Silver King 500 foot Pipeline Right-of-Way (ROW); Silver King Fence Line Polygon; Tailings Facility; West Plant Site	500 foot Pipeline ROW; East Plant Site/Subsidence Zones; MARRCO Disturbance; Silver King Realignment; West Plant Site; West Peg Leg 500 foot Pipeline ROW	Access Roads; East Plant Site/Subsidence Zones; MARRCO Disturbance; North Skunk Camp 500 foot Pipeline ROW, Silver King Realignment; Skunk Camp Transmission Line; West Plant Site; South Skunk Camp 500 foot Pipeline ROW
Barrier				
U.S. Route 60 (Barrier)	East Plant Site/Subsidence Zones; MARRCO Disturbance; Silver King Realignment; West Plant Site	East Plant Site/Subsidence Zones; MARRCO Disturbance; Silver King Road Realignment with Filter Plant; Tailings Facility; West Plant Site	500 foot Pipeline ROW; East Plant Site/Subsidence Zones; MARRCO Disturbance; Silver King Realignment; West Plant Site; West Peg Leg 500 foot Pipeline ROW	Access Roads; East Plant Site/Subsidence Zones; MARRCO Disturbance; North Skunk Camp 500 foot Pipeline ROW, Silver King Realignment; Skunk Camp Transmission Line; West Plant Site; South Skunk Camp 500 foot Pipeline ROW
State Route 177 (Barrier)	Inconceivables mitigation area, trail mitigation area	Inconceivables mitigation area, trail mitigation area	Inconceivables mitigation area, trail mitigation area	Inconceivables mitigation area, trail mitigation area
Central Arizona Project Canal (Barrier)	MARRCO Disturbance	MARRCO Disturbance	MARRCO Disturbance	MARRCO Disturbance

Connectivity Element (Type)	Alternatives 2 and 3 Components	Alternative 4 Components	Alternative 5 Components	Alternative 6 Components
Railroad Modification (Barrier)	MARRCO Disturbance; Filter Plant Disturbance; Near West fence line, Silver King Realignment; Tailings Facility; West Plant Site; Fence and tailings storage facility; Queen Creek waterline	Fence and tailings storage facility; Filter Plant Disturbance; MARRCO Disturbance; Near West fence line; Silver King Realignment; Tailings Facility; West Plant Site; Queen Creek waterline	500 foot Pipeline ROW; Filter Plant Disturbance; MARRCO Disturbance; Silver King Realignment; West Plant Site, West Peg Leg 500 foot Pipeline ROW; Queen Creek waterline	Filter Plant Disturbance; MARRCO Disturbance; Silver King Realignment; West Plant Site; South Skunk Camp 500 foot Pipeline ROW; Queen Creek waterline
State Route 79 (Barrier)	MARRCO Disturbance	MARRCO Disturbance	MARRCO Disturbance	MARRCO Disturbance
State Route 177 (Barrier)	N/A	N/A	500 foot Pipeline ROW	South Skunk Camp 500 foot Pipeline ROW
Diffuse Movement Area (DMA)				
Devil's Canyon (DMA)	East Plant Site/Subsidence Zones	East Plant Site/Subsidence Zones	East Plant Site/Subsidence Zones; 500 foot Pipeline ROW	East Plant Site/Subsidence Zones; Access Roads; North Skunk Camp 500 foot Pipeline ROW; Skunk Camp Transmission Line; South Skunk Camp 500 foot Pipeline ROW
Mineral Mountains (DMA)	Trail mitigation area	Trail mitigation area	500 foot Pipeline ROW; Pipeline Access Road; West Peg Leg 500 foot Pipeline ROW; trail mitigation area	South Skunk Camp 500 foot Pipeline ROW; Trail mitigation area
Landscape Movement Areas (LMA)				
Florence Military Reservation (LMA)	MARRCO Disturbance	MARRCO Disturbance	MARRCO Disturbance	MARRCO Disturbance
Galiuro Mountains – Santa Catalina Mountain	H&E compensatory mitigation parcel	H&E compensatory mitigation parcel	H&E compensatory mitigation parcel	H&E compensatory mitigation parcel
Queen Valley – Middle Gila/Mineral Mountains (LMA)	MARRCO Disturbance	MARRCO Disturbance	MARRCO Disturbance	MARRCO Disturbance

Connectivity Element (Type)	Alternatives 2 and 3 Components	Alternative 4 Components	Alternative 5 Components	Alternative 6 Components
Tonto National Forest West of Superior through Gonzales Pass (LMA)	MARRCO Disturbance; Near West Fence line; Tailings Facility; Fence and tailings storage facility; Castleberry Campground; Inconceivables mitigation area; Trail mitigation area	MARRCO Disturbance; Castleberry Campground; Inconceivables mitigation area; Trail mitigation area	500 foot Pipeline ROW; MARRCO Disturbance; West Peg Leg 500 foot Pipeline ROW; Castleberry Campground; Inconceivables mitigation area; Trail mitigation area	MARRCO Disturbance; South Skunk Camp 500 foot Pipeline ROW; Castleberry Campground; Inconceivables mitigation area; Trail mitigation area
Valley north and east of the San Tan Mountains (LMA)	MARRCO Disturbance; Filter Plant Disturbance	Filter Plant Disturbance; MARRCO Disturbance	Filter Plant Disturbance; MARRCO Disturbance	Filter Plant Disturbance; MARRCO Disturbance
Canyon Passes between Superior and Globe (LMA)	Inconceivables mitigation area	Inconceivables mitigation area	500 foot Pipeline ROW; Inconceivables mitigation area	Access Roads; North Skunk Camp 500 foot Pipeline ROW; Skunk Camp Transmission Line; Skunk Camp Fence line; Tailings Facility; South Skunk Camp 500 foot Pipeline ROW; Inconceivables mitigation area
Tortilla Mountains – Ripsey Wash – Donnelly Wash (LMA)	N/A	N/A	500 foot Pipeline ROW; Fence line; Tailings Facility; Peg Leg Fence line	N/A
Tortolita Mountains – Tortilla Mountains (LMA)	N/A	N/A	Fence line; Tailings facility; Peg Leg Fence line; West Peg Leg 500 foot Pipeline ROW	N/A
El Capitan – Aravaipa Canyon (LMA)	N/A	N/A	N/A	Access Roads; North Skunk Camp 500 foot Pipeline ROW; Skunk Camp Transmission Line; Skunk Camp Fence line; Tailings Facility; South Skunk Camp 500 foot Pipeline ROW

Connectivity Element (Type)	Alternatives 2 and 3 Components	Alternative 4 Components	Alternative 5 Components	Alternative 6 Components
Queen Creek – Gila River Indian Community (RMA)	East Plant Site/Subsidence Zones; MARRCO Disturbance; Near West Fence line; Silver King Realignment; Tailings Facility; West Plant Site; Castleberry Campground; Inconceivables mitigation area; Trail mitigation area	East Plant Site/Subsidence Zones; MARRCO Disturbance; Silver King Road Realignment with Filter Plant; Tailings Facility; West Plant Site; Castleberry Campground; Inconceivables mitigation area; Trail mitigation area	500 foot Pipeline ROW, East Plant Site/Subsidence Zones, MARRCO Disturbance; Silver King Realignment; West Plant Site; West Peg Leg 500 foot Pipeline ROW; Castleberry Campground; Inconceivables mitigation area; Trail mitigation area	Access Roads; East Plant Site/Subsidence Zones; MARRCO Disturbance; North Skunk Camp 500 foot Pipeline ROW; Silver King Realignment; West Plant Site; South Skunk Camp 500 foot Pipeline ROW; Castleberry Campground; Inconceivables mitigation area; Trail mitigation area
Gila River (RMA)	Olberg/MAR-5 compensatory mitigation area	Olberg/MAR-5 compensatory mitigation area	500 foot Pipeline ROW; Pipeline Access Road; West Peg Leg 500 foot Pipeline ROW; Olberg/MAR-5 compensatory mitigation area	Olberg/MAR-5 compensatory mitigation area
Gila River – San Pedro River	H&E compensatory mitigation parcel	H&E compensatory mitigation parcel	H&E compensatory mitigation parcel	H&E compensatory mitigation parcel

Special-Status Species

Table 2. Special-Status Species Potentially Occurring within the Proposed Action Mining Component and Its Associated 5-Mile Analysis Area[1]

Common Name (*Scientific Name*)	Status*	Habitat Components	Alternatives 2 and 3	Alternative 4	Alternative 5	Alternative 6
Amphibians						
Lowland leopard frog (*Lithobates yavapaiensis*)	TNF: S, SCC AGFD: SGCN 1A	Aquatic systems in elevations ranging from 480–6,200 feet above mean sea level (amsl); species is found using a variety of habitats both natural and human made.	Known to occur (Heritage Data Management System [HDMS] 2018; WestLand 2009, 2018)	Known to occur (HDMS 2018; WestLand 2009, 2018)	Known to occur (HDMS 2018; WestLand, 2009, 2018)	Known to occur (HDMS 2018; WestLand 2009, 2018)
Birds						
Northern goshawk (*Accipiter gentilis*)	TNF: S, MBSC AGFD: SGCN 1B MBTA: Yes	Species is found in wide variety of forest associations, including deciduous, coniferous and mixed forests; prefers mature forests for breeding in elevations ranging from 4,750–9120 feet amsl.	Known to occur (WestLand 2012, 2015)	Known to occur (WestLand 2012, 2015)	Known to occur (WestLand 2012, 2015)	Known to occur (WestLand 2012, 2015)
Golden eagle (*Aquila chrysaetos*)	TNF: MBSC AGFD: SGCN 1B MBTA: Yes BGEPA: Yes	Species prefers mountainous areas; nesting occurs at elevations between 4,000–10,000 feet amsl.	Known to occur (HDMS 2018; WestLand 2012, 2015)	Known to occur (HDMS 2018; WestLand 2012, 2015)	Known to occur (HDMS 2018; WestLand 2012, 2015)	Known to occur (HDMS 2018; WestLand 2012, 2015)
Western burrowing owl (*Athene cunicularia hypugaea*)	BLM: S AGFD: SGCN 1B MBTA: Yes	Distribution is common across the western United States, south-central Canada, and Mexico. The species is found in open, dry grasslands, deserts, and agricultural lands at an elevation range between 650– 6.140 feet amsl (Klute et al. 2003).	Possible to occur	Possible to occur	Possible to occur	Possible to occur

[1] Please note, table 2 addresses the potential for species to occur within 5 miles of a project feature; however, in the EIS, potential for occurrence was further refined to address only species potentially occurring within 1 mile of project features as this was the area determined to be appropriate for analysis of potential impacts.

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Juniper titmouse (*Baeolophus ridgwayi*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	A year-round resident across the northern regions of Arizona and New Mexico, into southwestern Colorado, Utah, Nevada, and parts of California and Oregon. The species prefers middle elevation areas where oaks, junipers, and pinyon pine are present (Kaufman 2020).	Known to occur (WestLand 2010, 2012)	Known to occur (WestLand 2010, 2012)	Known to occur (WestLand 2010, 2012)	Known to occur (WestLand 2010, 2012)
Ferruginous hawk (*Buteo regalis*)	BLM: S AGFD: SGCN 1B MBTA: Yes	Species is found in open grasslands, scrublands, and woodlands in winter; ranges in elevation from 3,500–6,000 feet amsl.	Unlikely to occur	Unlikely to occur	Possible to occur	Possible to occur
Swainson's hawk (*Buteo swainsoni*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Largely found across the western U.S., western Canada, and Mexico, the species does breed in Arizona. Species prefers grasslands, semidesert grasslands and open desertscrub for nesting; elevational range of 1,890–5,650 feet amsl.	Known to occur (WestLand 2012)	Known to occur (WestLand 2012)	Known to occur (WestLand 2012)	Known to occur (WestLand 2012)
Common black hawk (*Buteogallus anthracinus*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Species only present during breeding season; riparian obligate found along streams between 1,750–7,080 feet amsl.	Known to occur (HDMS 2018; WestLand 2010, 2012, 2017)	Known to occur (HDMS 2018; WestLand 2010, 2012, 2017)	Known to occur (HDMS 2018; WestLand 2010, 2012, 2017)	Known to occur (HDMS 2018; WestLand 2010, 2012, 2017)
Costa's hummingbird (*Calypte costae*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Habitat for this species includes desert, semidesert, and brushy foothills.	Known to occur (WestLand 2012, 2015, 2018)	Known to occur (WestLand 2012, 2015, 2018)	Known to occur (WestLand 2012, 2015, 2018)	Known to occur (WestLand 2012, 2015, 2018)
Northern beardless-tyrannulet (*Camptostoma imberbe*)	TNF: MBSC AGFD: N/A MBTA: Yes	Habitat includes arid scrub, mesquite, and open riparian woodland often near streams.	Known to occur, Boyce Thompson (WestLand 2015)	Known to occur, Boyce Thompson (WestLand 2015)	Known to occur, Boyce Thompson (WestLand 2015)	Known to occur, Boyce Thompson (WestLand 2015)
Red-faced warbler (*Cardellina rubrifrons*)	TNF: SCC AGFD: SGCN 1C MBTA: Yes	Summer resident only; occurs in montane fir, pine, and pine-oak woodlands.	Unlikely to occur	Unlikely to occur	Unlikely to occur	Possible to occur

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Western yellow-billed cuckoo (distinct population segment) (*Coccyzus americanus*)	ESA: T (All Arizona counties) TNF: MBSC AGFD: SGCN 1A MBTA: Yes	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. This species is found in all counties in Arizona.	Known to occur (HDMS 2018; WestLand 2012, 2015, 2017, 2019)	Known to occur (HDMS 2018; WestLand 2012, 2015, 2017, 2019)	Known to occur (HDMS 2018; WestLand 2012, 2015, 2017, 2019) Proposed critical habitat at proposed pipeline crossings of the Gila River. Potential impacts on habitat and proposed critical habitat would occur on up to 17.9 acres of the 2,232.1 acres of proposed critical habitat within the analysis area	Known to occur (HDMS 2018; WestLand 2012, 2015, 2017, 2019) No ground disturbance within proposed critical habitat because proposed pipeline would be constructed using a trenchless crossing underneath Mineral Creek.
Gilded flicker (*Colaptes chrysoides*)	TNF: SCC, MBSC AGFD: SGCN 1B MBTA: Yes BLM : S	Habitat includes stands of large saguaros, Joshua trees, and low-elevation riparian groves.	Known to occur (WestLand 2012, 2015, 2017)	Known to occur (WestLand 2012, 2015, 2017)	Known to occur (WestLand 2012, 2015, 2017)	Known to occur (WestLand 2012, 2015, 2017)
Olive-sided flycatcher (*Contopus cooperi*)	TNF: SCC, MBSC AGFD: SGCN 1C MBTA: Yes	Species is only present in summer; breeding habitat includes mixed-conifer forests near open areas with lots of snags; in migration can be found in almost any habitat.	Known to occur (WestLand 2015; eBird 2009)	Known to occur, Boyce Thompson (WestLand 2015)	Known to occur, Boyce Thompson (WestLand 2015)	Known to occur, Boyce Thompson (WestLand 2015)
Broad-billed hummingbird (*Cynanthus latirostris*)	TNF: SCC AGFD: SGCN 1B MBTA: Yes BLM: S	Preferred habitat is rocky canyons in desert-like mountain habitats, can be found in foothills, canyons, arroyos, along streams, and in deserts.	Known to occur (WestLand 2012, 2017)	Known to occur (WestLand 2012, 2017)	Known to occur (WestLand 2012, 2017)	Known to occur (WestLand 2012, 2017)

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Cordilleran flycatcher (*Empidonax occidentalis*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Species breeds in high elevation riparian forests in mixed-conifer woodlands. Travels through low elevation habitats during migration.	Possible to occur	Possible to occur	Possible to occur	Possible to occur
Southwestern willow flycatcher (*Empidonax traillii extimus*)	ESA: E (All Arizona counties except Navajo) AGFD: SCGN 1A MBTA: Yes BLM: S	Found in dense riparian habitats along streams, rivers, and other wetlands where cottonwood, willow, boxelder (*Acer negundo*), tamarisk (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), buttonbush (*Cephalanthus* spp.), and arrowweed (*Pluchea sericea*) are present. Nests are found in thickets of trees and shrubs, primarily those that are 13–23 feet high, among dense, homogeneous foliage. Habitat occurs at elevations below 8,500 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, and Yuma Counties.	Known to occur (HDMS 2018; WestLand 2017)	Known to occur (HDMS 2018; WestLand 2017)	Known to occur (HDMS 2018; WestLand 2017) Designated critical habitat occurs where the proposed pipeline routes would cross the Gila River. Potential impacts on habitat and proposed critical habitat would occur on up to 12.8 acres of the 2,234.0 acres of designated critical habitat within the analysis area.	Known to occur (HDMS 2018; WestLand 2017)
Gray flycatcher (*Empidonax wrightii*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Species breeds in arid woodlands and brushy areas, particularly in pinyon-juniper woodlands. During nonbreeding, species can be found in arid scrub, riparian woodland and mesquite.	Known to occur (WestLand 2009, 2010, 2012, 2013, 2015)	Known to occur, Boyce Thompson (WestLand 2015)	Known to occur, Boyce Thompson (WestLand 2015)	Known to occur, Boyce Thompson (WestLand 2015)
Prairie falcon (*Falco mexicanus*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Preferred habitat includes open areas in mountainous, steppe, plains, or prairie regions.	Known to occur (WestLand 2012, 2015)	Known to occur, Boyce Thompson (WestLand 2015)	Known to occur, Boyce Thompson (WestLand 2015)	Known to occur, Boyce Thompson (WestLand 2015)

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
American peregrine falcon (*Falco peregrinus anatum*)	TNF: S, MBSC AGFD: SGCN 1A MBTA: Yes	Species is found near cliffs overlooking habitats that support large numbers of birds; range in elevations from 400–9,000 feet amsl.	Known to occur (HDMS 2018; WestLand 2004, 2009, 2012, 2015, 2017)	Known to occur (HDMS 2018; WestLand 2004, 2009, 2012, 2015, 2017)	Known to occur (HDMS 2018; WestLand 2004, 2009, 2012, 2015, 2017)	Known to occur (HDMS 2018; WestLand 2004, 2009, 2012, 2015, 2017)
MacGillivray's warbler (*Geothlypis tolmiei*)	TNF: SCC, MBSC AGFD: SGCN 1B MBTA: Yes	The species is primarily a migratory species in Arizona; however, during breeding season, the species is known to take residence over the higher, forested elevations of northern Arizona, especially along the Mogollon Rim. Preferred habitat during breeding season includes mixed-coniferous forests with riparian areas that have low shrubs; in migration species can be found in a variety of habitats.	Known to occur (WestLand 2010, 2012, 2015)	Known to occur (WestLand 2010, 2012, 2015)	Known to occur (WestLand 2010, 2012, 2015)	Known to occur (WestLand 2010, 2012, 2015)
Pinyon jay (*Gymnorhinus cyanocephalus*)	TNF: MBSC AGFD: SGCN 1B MBTA: Yes	Habitat consists of pinyon-juniper woodland, sometimes found in pine forests and in scrub oak or sagebrush areas.	Known to occur (WestLand 2015)	Known to occur, Boyce Thompson IBA (WestLand 2015)	Known to occur, Boyce Thompson IBA (WestLand 2015)	Known to occur, Boyce Thompson IBA (WestLand 2015)
Bald eagle (*Haliaeetus leucocephalus*)	TNF: MBSC AGFD: SGCN 1A MBTA: Yes BGEPA: Yes	Habitat components include large bodies of water with lots of coastline and tall perches above water to allow for hunting.	Possible to occur	Unlikely to occur	Possible to occur	Unlikely to occur
Yellow-eyed junco (*Setophaga petechia*)	TNF S, SCC AGFD: SGCN 1B MBTA: Yes	Habitat consists of open coniferous forest and pine-oak associations.	Unlikely to occur	Possible to occur	Unlikely to occur	Possible to occur

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Lewis's woodpecker (*Melanerpes lewis*)	TNF: SCC, MBSC AGFD: SGCN 1C MBTA: Yes	Distribution of the species is across the Four Corner states, the northern Rocky Mountains, and over the interior mountainous regions of Oregon and California. In Arizona, the species is common year-round across the higher, forested elevations of northern Arizona with some expansion of range into the southern Arizona deserts during the winter. Breeding habitats include open forests and woodlands that include oaks, ponderosa, pine, riparian woodlands, and orchards.	Known to occur	Known to occur	Known to occur	Known to occur
Gila woodpecker (*Melanerpes uropygialis*)	TNF: MBSC AGFD: SGCN 1B MBTA: Yes	Habitat includes arid lowland scrub, arid montane scrub, gallery forest, and deserts with large cacti or trees.	Known to occur (WestLand 2008, 2009, 2012, 2013, 2015, 2017 2018)	Known to occur (WestLand 2008, 2009, 2012, 2013, 2015, 2017 2018)	Known to occur (WestLand 2008, 2009, 2012, 2013, 2015, 2017 2018)	Known to occur (WestLand 2008, 2009, 2012, 2013, 2015, 2017 2018)
Canyon towhee (*Melozone fusca*)	TNF: MBSC MBTA: Yes	Habitat includes dense brush, riparian thickets and arid scrub near rocky areas.	Known to occur (WestLand 2008, 2009, 2010, 2012, 2013, 2015, 2018)	Known to occur (WestLand 2008, 2009, 2010, 2012, 2013, 2015, 2018)	Known to occur (WestLand 2008, 2009, 2010, 2012, 2013, 2015, 2018)	Known to occur (WestLand 2008, 2009, 2010, 2012, 2013, 2015, 2018)
Elf owl (*Micrathene whitneyi*)	TNF: SCC, MBSC AGFD: SGCN 1C MBTA: Yes	Species is present during breeding season only, found in desert-woodland washes, riparian forests, upland deserts, evergreen woodlands and canyon riparian forests.	Known to occur (WestLand 2012, 2015)	Known to occur (WestLand 2012, 2015)	Known to occur (WestLand 2012, 2015)	Known to occur (WestLand 2012, 2015)

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Lucy's warbler (*Oreothlypis luciae*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	An Arizona resident only during the breeding season. The species' preferred breeding habitat includes deserts, mesquites along streams, and riparian woodlands.	Known to occur (WestLand 2009, 2010, 2012, 2013, 2015, 2017)	Known to occur (WestLand 2017)	Known to occur (WestLand 2017)	Known to occur (WestLand 2017)
Phainopepla (*Phainopepla nitens*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Habitat includes desert scrub, oak or juniper woodlands, tall brush and riparian woodlands.	Known to occur (WestLand 2008, 2009, 2010, 2015, 2017)	Known to occur (WestLand 2008, 2009, 2010, 2015, 2017)	Known to occur (WestLand 2008, 2009, 2010, 2015, 2017)	Known to occur (WestLand 2008, 2009, 2010, 2015, 2017)
Desert purple martin (*Progne subis hesperia*)	TNF: SCC, MBSC AGFD: SGCN 1B MBTA: Yes	Habitat consists of Sonoran Desert with many large saguaros proximal to water.	Known to occur (WestLand 2009, 2012, 2013, 2015)	Known to occur (WestLand 2009, 2012, 2013, 2015)	Known to occur (WestLand 2009, 2012, 2013, 2015)	Known to occur (WestLand 2009, 2012, 2013, 2015)
Flammulated owl (*Psiloscops flammeolus*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Species prefers mixed-conifer, pine, and pine-oak associations at elevations of 5,000–8,000 feet amsl; species is tied to yellow pine and mixed-conifer forests.	Unlikely to occur	Unlikely to Occur	Unlikely to Occur	Possible to occur
Golden-crowned kinglet (*Regulus satrapa*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Species is found in coniferous forest and woodland, occasionally found in scrub and brush in winter.	Known to occur, Boyce Thompson IBA (WestLand 2015)	Known to occur, Boyce Thompson IBA (WestLand 2015)	Known to occur, Boyce Thompson IBA (WestLand 2015)	Known to occur, Boyce Thompson IBA (WestLand 2015)
Black-throated gray warbler (*Setophaga nigrescens*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Preferred breeding habitat includes a variety of semiarid woodlands, especially conifers, live oaks and mixed pinyon-juniper woodlands; species migrates through lower elevations in addition.	Known to occur (eBird 2009); Boyce Thompson IBA (WestLand 2015)	Known to occur, Boyce Thompson IBA (WestLand 2015)	Known to occur, Boyce Thompson IBA (WestLand 2015)	Known to occur, Boyce Thompson IBA (WestLand 2015)

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Yellow warbler (*Setophaga petechia*)	TNF: MBSC AGFD: SGCN 1B MBTA: Yes	Prevalent across much of North America, the species is only found in Arizona during the breeding season. Breeding habitat includes open scrub, second-growth woodland and riparian woodlands.	Known to occur (WestLand 2009, 2012, 2015, 2017)	Known to occur (WestLand 2009, 2012, 2015, 2017)	Known to occur (WestLand 2009, 2012, 2015, 2017)	Known to occur (WestLand 2009, 2012, 2015, 2017)
Red-naped sapsucker (*Sphyrapicus nuchalis*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Breeding habitat is coniferous forest that includes aspen and other hardwoods; migration and winter habitat includes open woodlands and parks.	Known to occur (WestLand 2008, 2012, 2015)	Known to occur (WestLand 2008, 2012, 2015)	Known to occur (WestLand 2008, 2012, 2015)	Known to occur (WestLand 2008, 2012, 2015)
Black-chinned sparrow (*Spizella atrogularis*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Habitat includes chaparral, sagebrush, and arid scrub on hillsides with steep rocky slopes or in brushy canyons.	Known to occur (WestLand 2008, 2009, 2010, 2012, 2015)	Known to occur (WestLand 2008, 2009, 2010, 2012, 2015)	Known to occur (WestLand 2008, 2009, 2010, 2012, 2015)	Known to occur (WestLand 2008, 2009, 2010, 2012, 2015)
Mexican spotted owl (*Strix occidentalis lucida*)	ESA: T (All Arizona counties except La Paz and Yuma) TNF: MBSC AGFD: SGCN 1A MBTA: Yes	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 (*Pinus ponderosa*)-Gambel oak (*Quercus gambelii*). Nests in live trees on natural platforms (e.g., dwarf mistletoe [*Arceuthobium* spp.] brooms), snags, and canyon walls at elevations between 4,100 and 9,000 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Unlikely to occur	Unlikely to occur	Unlikely to occur	Known to occur (HDMS 2018)

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Bendire's thrasher (*Toxostoma bendirei*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	Habitat consists of a variety of desert habitats with large shrubs or cacti and open ground.	Possible to occur	Possible to occur	Possible to occur	Possible to occur
Arizona Bell's vireo (*Vireo bellii arizonae*)	TNF: MBSC AGFD: SGCN 1B MBTA: Yes	Species prefers lowland riparian areas consisting of willows, mesquite and seepwillow with dense vegetation below 3,500 feet amsl in elevation.	Known to occur (WestLand 2009, 2012, 2013, 2015, 2017, 2018)	Known to occur (WestLand 2009, 2012, 2013, 2015, 2017, 2018)	Known to occur (WestLand 2009, 2012, 2013, 2015, 2017, 2018)	Known to occur (WestLand 2009, 2012, 2013, 2015, 2017, 2018)
Gray vireo (*Vireo vicinior*)	TNF: MBSC AGFD: SGCN 1C MBTA: Yes	A migratory species that winters in northern Sonora, Mexico and breeds across much of the U.S. Southwest. Habitat consists of brushy mountain slopes, open chaparral, scrub oak, and junipers at an elevational range between 3,000–6,500 feet amsl.	Known to occur (WestLand 2009, 2012, 2013, 2015)	Known to occur (WestLand 2009, 2012, 2013, 2015)	Known to occur (WestLand 2009, 2012, 2013, 2015)	Known to occur (WestLand 2009, 2012, 2013, 2015)
Gila longfin dace (*Agosia chrysogaster chrysogaster*)	TNF: SCC AGFD: SGCN 1B	Habitat varies from intermittent hot low-desert stream to clear, cool streams at higher elevations; prefers medium to small sized streams with sandy/gravely bottoms and pools with some cover. Species is normally found below 4,900 feet amsl.	Known to occur (WestLand 2009, 2018)	Known to occur (HDMS 2018; WestLand 2009, 2018)	Known to occur (HDMS 2018; WestLand 2009, 2018)	Known to occur (HDMS 2018; WestLand 2009, 2018)
Desert sucker (*Catostomus clarki*)	TNF: S BLM: S AGFD: SGCN 1B	Species is found in flowing pools of streams and rivers with a gravel substrate; elevational range of 480– 8,840 feet amsl.	Unlikely to occur	Unlikely to occur	Known to occur (HDMS 2018)	Known to occur (HDMS 2018)
Sonora sucker (*Catostomus insignis*)	TNF: S AGFD: SGCN 1B	Found in a variety of habitats from warm rivers to cool streams, prefers gravelly or rocky pools in elevations ranging from 1,210–8,730 feet amsl.	Unlikely to occur	Unlikely to occur	Known to occur (HDMS 2018)	Known to occur (HDMS 2018)

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Desert pupfish (*Cyprinodon macularius*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Santa Cruz, and Yavapai Counties) AGFD: SGCN 1A	Restricted to three natural populations in California and the non-natural irrigation drains around the Salton Sea. Also found in restricted locations in Sonora and Baja California, Mexico. One natural population still occurs in Quitobaquito Spring and pond in Pima County and reintroductions have been made in Pima, Pinal, Maricopa, Graham, Cochise, La Paz, and Yavapai Counties, Arizona. Found in shallow water of desert springs, small streams, and marshes below 5,000 feet amsl elevation. The species tolerates high salinities and high water temperatures.	Known to occur (HDMS 2018)	Known to occur (HDMS 2018)	Known to occur (HDMS 2018)	Known to occur (HDMS 2018)
Gila chub (*Gila intermedia*)	ESA: E (Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties) BLM: S AGFD: SGCN 1A	Found in pools, springs, cienegas, and streams at elevations between 2,000 and 5,500 feet amsl. The species is dependent on undercut banks, terrestrial vegetation, boulders, root wads, fallen logs, and thick overhanging or aquatic vegetation for cover. This species occurs in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Unlikely to occur	Unlikely to occur	Known to occur (HDMS 2018)	Known to occur (HDMS 2018) The pipeline will avoid disturbance within the ordinary high water mark or within designated critical habitat by using a trenchless crossing under Mineral Creek.

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Spikedace (*Meda fulgida*)	ESA: E (Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties) BLM: S AGFD: SGCN 1A	Mid-water habitats, including runs, pools, and swirling eddies, below 4,500 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties.	Unlikely to occur	Unlikely to occur	Known to occur (HDMS 2018)	Unlikely to occur
Gila topminnow (including Yaqui) (*Poeciliopsis occidentalis*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties) AGFD: SGCN 1A	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. This species is found in Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Known to occur (HDMS 2018)	Known to occur (HDMS 2018)	Known to occur (HDMS 2018)	Known to occur (HDMS 2018)
Monarch butterfly (*Danaus plexippus* pop. 1)	TNF: SCC	This species is designated as the California Overwintering Population. Overall, the monarch butterfly spends the spring and summer months across much of North America breeding, returning to Mexico during the fall and winter. The California Overwintering Population resides near the coastal regions of California. Species prefers riparian habitats with milkweed present.	Possible to occur	Possible to occur	Possible to occur	Possible to occur

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)	TNF: S AGFD: SGCN 1B	This bat occurs in most of Arizona except the low-elevation deserts of the southwestern portion of the state. In summer, the species is found in caves and mines in elevations ranging from 550–7,520 feet amsl; in winter, the species is found in cold caves, lava tubes and mines in higher elevations than summer.	Known to occur (WestLand 2012, 2018)	Known to occur (WestLand 2012, 2018)	Known to occur (WestLand 2012, 2018)	Known to occur (HDMS 2018; WestLand 2012, 2018)
Spotted bat (*Euderma maculatum*)	TNF: S AGFD: SGCN 1B	Habitat can vary widely from dry deserts to conifer forest, prefer to roost in crevices and cracks in cliff faces; elevational range of 110–8,670 feet amsl.	Unlikely to occur	Possible to occur	Possible to occur	Possible to occur
Greater western mastiff bat (*Eumops perotis californicus*)	BLM: S AGFD: SGCN 1B	Species prefers lower and upper Sonoran Desertscrub near cliffs with lots of crevices; elevational range of 240–8,475 feet amsl.	Known to occur (WestLand 2012, 2018)	Known to occur (WestLand 2012, 2018)	Known to occur (WestLand 2012, 2018)	Known to occur (WestLand 2012, 2018)
Allen's lappet-browed or big-eared bat (*Idionycteris phyllotis*)	TNF: S, SCC AGFD: SGCN 1B	Found in ponderosa pine, pinyon-juniper, Mexican woodland and riparian areas with cottonwoods, sycamores and willows; also have records from desertscrub and white fir habitats; elevational range of 1,320–9,800 feet amsl.	Possible to occur	Unlikely to occur	Unlikely to occur	Possible to occur

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Western red bat (*Lasiurus blossevillii*)	TNF: S, SCC AGFD: SGCN 1B	Distribution in Arizona is from the southeast corner of the state northwest along the Mogollon Rim to near Flagstaff, with outlier records in Grand Canyon and at the Bill Williams River near its confluence with the Colorado River. Habitat consists of riparian and wooded areas; typically roosts in cottonwood trees; elevational range of 1,900–7,200 feet amsl.	Known to occur (HDMS 2018; WestLand 2012)	Known to occur (HDMS 2018; WestLand 2012)	Known to occur (WestLand 2012)	Known to occur (HDMS 2018; WestLand 2012)
Western yellow bat (*Lasiurus xanthinus*)	(Added per request from AGFD) AGFD: SGCN 1B	Species may be associated with palm trees, sycamores hackberries and cottonwoods. Habitat consists of riparian and wooded areas; typically roosts in cottonwood trees; elevational range of 1,900–7,200 feet amsl.	Possible to occur	Possible to occur	Possible to occur	Possible to occur
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	BLM: S AGFD: SGCN 1A	Habitat consists of desert grasslands and shrublands in elevations ranging from 1,190–7,320 feet amsl; present only in summer.	Unlikely to occur	Unlikely to occur	Possible to occur	Unlikely to occur
California leaf-nosed bat (*Macrotus californicus*)	TNF: SCC AGFD: SGCN 1B	Species prefers Sonoran Desertscrub, roosts in mines, caves and rockshelters that have large areas of ceiling and flying space; elevational range of 160–3,980 feet amsl.	Known to occur (WestLand 2012, 2018)	Known to occur (WestLand 2012, 2018)	Known to occur (HDMS 2018; WestLand 2012, 2018)	Known to occur (HDMS 2018; WestLand 2012, 2018)

Common Name (*Scientific Name*)	**Status***	**Habitat Components**	**Alternatives 2 and 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Cave myotis (*Myotis velifer*)	BLM: S AGFD: SGCN 1B	Found in Arizona, south-central U.S., and throughout the interior mountainous regions of Mexico. Habitat consists of creosote, brittlebush, palo verde and cacti; roosts on caves, tunnels, mineshafts, under bridges and sometimes in buildings. Elevational range of 300–5,000 feet amsl.	Known to occur (WestLand 2012, 2018)	Known to occur (WestLand 2012, 2018)	Known to occur (HDMS 2018; WestLand 2012, 2018)	Known to occur (WestLand 2012, 2018)
Brazilian free-tailed bat (*Tadarida brasiliensis*)	(Added per request from AGFD) AGFD: SGCN 1B	A species that is distributed across much of the southern United States with the largest concentrations residing in the western United States. Preferred habitat is the Upper and Lower Sonoran life zones and commonly roosts in caves, abandoned mines, under bridges, buildings, and hollow trees. Elevational range between 450–8,475 feet amsl.	Known to occur (HDMS 2018; WestLand 2012, 2018)	Known to occur (HDMS 2018; WestLand 2012, 2018)	Known to occur (HDMS 2018; WestLand 2012, 2018)	Known to occur (HDMS 2018; WestLand 2012, 2018)
Sonoran Desert tortoise (*Gopherus morafkai*)	Candidate Conservation Agreement (CCA); TNF: S AGFD: SGCN 1A BLM: S	The range of the species in Arizona is most of the southwest half of the state, below the Mogollon Rim, and north to Lake Mead. Habitat includes desertscrub to semidesert grassland and interior chaparral; elevational range of 510–5,300 feet amsl.	Known to occur (HDMS 2018; WestLand 2013, 2014, 2018)	Known to occur (HDMS 2018; WestLand 2013, 2014, 2018)	Known to occur (HDMS 2018; WestLand 2013, 2014, 2018)	Known to occur (HDMS 2018; WestLand 2013, 2014, 2018)
Desert ornate box turtle (*Terrapene ornata*)	BLM: S AGFD: SGCN 1A	This species' range is from southern Texas to southern New Mexico, and into parts of southern Arizona as well as in the states of Chihuahua and Sonora in Mexico. Species prefers grasslands but is also occasionally found in desertscrub; elevational range of 2,000–7,100 feet amsl.	Unlikely to occur	Unlikely to occur	Known to occur (HDMS 2018)	Possible to occur

Common Name (*Scientific Name*)	Status*	Habitat Components	Alternatives 2 and 3	Alternative 4	Alternative 5	Alternative 6
Bezy's night lizard (*Xantusia bezyi*)	TNF: S, SCC AGFD: SGCN 1B	Species prefers rocky slopes in upland Sonoran Desertscrub and chaparral vegetation types; elevational range of 2,400–5,800 feet amsl.	Known to occur (HDMS 2018)	Known to occur (HDMS 2018)	Possible to occur	Known to occur (HDMS 2018)

Sources: Unless otherwise noted, range or habitat information is from AGFD abstracts (2020); Heritage Data Management System (2018); Kaufman (2001); NatureServe (2017); Tonto National Forest Final Assessment (Forest Service 2017); Tonto National Forest Threatened, Endangered, and Sensitive Species Abstracts (Forest Service 2000); U.S. Fish and Wildlife Service Arizona Ecological Services Field Office (U.S. Fish and Wildlife Service 2020).

* Status definitions are as follows:

Arizona Game and Fish Department (AGFD):

SGCN 1A = Species of Greatest Conservation Need Tier 1A. Species for which the AGFD has entered into an agreement or has legal or other contractual obligations or species that warrant the protection of a closed season.

SGCN 1B = Species of Greatest Conservation Need Tier 1B. Vulnerable species.

SGCN 1C = Species of Greatest Conservation Need Tier 1C. Species for which insufficient information is available to fully assess the vulnerabilities and, therefore, need to be watched for signs of stress.

Not all species with an SGCN status are addressed as part of these analyses; however, Brazilian free-tailed bat and western yellow bat were added to the analysis at the request of the AGFD, a cooperating agency.

Bald and Golden Eagle Protection Act (BGEPA):

A U.S. Federal statute that protects two species of eagle.

Bureau of Land Management (BLM):

S = Sensitive. Species that could easily become endangered or extinct in the state.

Endangered Species Act (ESA):

E = Endangered. Endangered species are those in imminent jeopardy of extinction. The 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.

T = Threatened. Threatened species are those that are likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

ENE = Reintroduced populations designated as Experimental – Nonessential, under the ESA.

Migratory Bird Treaty Act (MBTA): An international treaty intended to ensure the sustainability of populations of all protected migratory bird species.

Tonto National Forest (TNF):

S = Sensitive. Species identified by a regional forester for which population viability is a concern, as evidenced by 1) significant current or predicted downward trend in population number or density; or 2) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

SCC = Species of conservation concern.[2] A plant or animal for which we have concerns about its ability to remain on a landscape for a long time.

MBSC = Migratory bird species of concern.

[2] Note that species of conservation concern is not considered a valid designation at this time and will not be until the revision of the Tonto Forest Plan is complete. This designation does not appear in the EIS and was included at the request of the cooperating agencies and categorized as other species of interest in the DEIS. A new draft list of species of conservation concern came out in 2019. Some species on the 2019 list overlap with other special-status designations and are analyzed in this document; however, the following species are included in that list but are not analyzed here: Ancha mountainsnail (*Oreohelix anchana*), Galiuro talussnail (*Sonorella galiurensis*), Milk Ranch talussnail (*Sonorella micromphala*), Richinbar talussnail (*Sonorella ashmuni*), Roosevelt talussnail (*Sonorella rooseveltiana*), Sierra Ancha talussnail (*Sonorella anchana*), and Verde Rim springsnail (*Pyrgulopsis glandulosa*).

Management Indicator Species

Table 3. Tonto National Forest Management Indicator Species Habitat Acreages and Trends in the Project Area

Vegetation Type/Species	Tonto National Forest Management Indicator Species Population Trend*	Key Habitat Components Trend†	Total Forest Acres	Acres in Action Alternative 2 (% change)	Acres in Action Alternative 3 (% change)	Acres in Action Alternative 4 (% change)	Acres in Action Alternative 5 (% change)	Acres in Action Alternative 6 (% change)
Ponderosa Pine/Mixed Conifer			283,204	0	0	0	0	0
Elk	S	S	283,204	0	0	0	0	0
Wild turkey	S	S	283,204	0	0	0	0	0
Pygmy nuthatch	D	S	283,204	0	0	0	0	0
Violet-green swallow	D	S	283,204	0	0	0	0	0
Western bluebird	S	S	283,204	0	0	0	0	0
Hairy woodpecker	S	S	283,204	0	0	0	0	0
Northern goshawk	D	S	283,204	0	0	0	0	0
Abert's squirrel	D	S	283,204	0	0	0	0	0
Pinyon-Juniper (Woodland)			1,155,722	0	0	0	0	0
Ash-throated flycatcher	S	S	1,155,722	0	0	0	0	0
Gray vireo	D	S	1,155,722	0	0	0	0	0
Townsend's solitaire	S	S	1,155,722	0	0	0	0	0
Juniper (plain) titmouse	D	S	1,155,722	0	0	0	0	0
Northern flicker	S	S	1,155,722	0	0	0	0	0
Spotted towhee	S	S	1,155,722	0	0	0	0	0
Interior Chaparral			265,480	1,237.3	1,237.3	1,364.0	1,242.4	1,848.0

Vegetation Type/Species	Tonto National Forest Management Indicator Species Population Trend*	Key Habitat Components Trend†	Total Forest Acres	Acres in Action Alternative 2 (% change)	Acres in Action Alternative 3 (% change)	Acres in Action Alternative 4 (% change)	Acres in Action Alternative 5 (% change)	Acres in Action Alternative 6 (% change)
Spotted towhee	S	S	265,480	1,237 0.5	1,237 0.5	1,364.0 0.5	1,242.4 0.5	1,848.0 0.7
Black-chinned sparrow	S	S	265,480	1,237 0.5	1,237 0.5	1,364.0 0.5	1,242.4 0.5	1,848.0 0.7
Desert Grassland			316,894	92.1	92.1	1,410.4	108.6	7,329.4
Savannah sparrow	S	U/S	316,894	92.1 0.03	92.1 0.03	1,410.4 0.4	108.6 0.03	7,329.4 2.3
Horned lark	D	U/S	316,894	92.1 0.03	92.1 0.03	1,410.4 0.4	108.6 0.03	7,329.4 2.3
Desert Communities			774,220	7,827.5	7,827.5	6,954.0	14,740.3	4,120.5
Black-throated sparrow	S	D/S	774,220	7,827.5 1.0	7,827.5 1.0	6,954.0 0.8	14,740.3 1.9	4,120.5 0.5
Canyon towhee	D	D/S	774,220	7,827.5 1.0	7,827.5 1.0	6,954.0 0.8	14,740.3 1.9	4,120.5 0.5
Riparian low elevation (1,500–3,500 feet)			31,147	57.9	57.9	84.7	82.6	43.6
Bald eagle	S	NC	31,147	57.9 0.2	57.9 0.2	84.7 0.3	82.6 0.3	43.6 0.1
Bell's vireo	D	NC	31,147	57.9 0.2	57.9 0.2	84.7 0.3	82.6 0.3	43.6 0.1
Summer tanager	D	NC	31,147	57.9 0.2	57.9 0.2	84.7 0.3	82.6 0.3	43.6 0.1

Vegetation Type/Species	Tonto National Forest Management Indicator Species Population Trend*	Key Habitat Components Trend†	Total Forest Acres	Acres in Action Alternative 2 (% change)	Acres in Action Alternative 3 (% change)	Acres in Action Alternative 4 (% change)	Acres in Action Alternative 5 (% change)	Acres in Action Alternative 6 (% change)
Hooded oriole	S	NC	31,147	57.9 0.2	57.9 0.2	84.7 0.3	82.6 0.3	43.6 0.1
Riparian (>3,500 feet)			10,232	0	0	0	0	0
Hairy woodpecker	S	NC	10,232	0	0	0	0	0
Arizona gray squirrel	S	NC	10,232	0	0	0	0	0
Warbling vireo	S	NC	10,232	0	0	0	0	0
Western wood-pewee	D	NC	10,232	0	0	0	0	0
Common black hawk	D	NC	10,232	0	0	0	0	0
Aquatic			29,000	14.7	14.7	14.7	14.7	14.7
Macroinvertebrates	N/A	N/A	29,000	14.7 0.05	14.7 0.05	14.7 0.05	14.7 0.05	14.7 0.05

Note: N/A = not applicable

* Management indicator species (MIS) population trend column key (from Tonto National Forest 2016):

S = Stable trend for MIS population forest wide

D = Decreasing trend for MIS population forest wide

† Key habitat components (KHC) trend column key (from TNF 2016):

U = Upward trend for KHC forest wide

D = Downward trend for KHC forest wide

S = Stable trend for KHC forest wide

NC = No change for KHC forest wide

Regulations, Laws, and Guidance

Mine operations are subject to a wide range of Federal, State, and local requirements. Table 4 provides a summary of wildlife laws, regulations, policies, and plans at the Federal, State, and local level.

Table 4. Wildlife Laws, Regulations, Policies, and Plans

Laws, Ordinances, Regulations, and Standards	Description	Applicability
Endangered Species Act of 1973, as amended (ESA) (16 U.S. Code [U.S.C.] 1531 et seq.)	Requires Federal agencies (e.g., Forest Service and U.S. Army Corps of Engineers) to use their authority to conserve endangered and threatened species.	ESA-listed wildlife species having the potential to occur within the analysis area include the yellow-billed cuckoo, southwestern willow flycatcher, and Gila chub.
Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703–711)	Provides Federal protection to all migratory birds, including nests and eggs. Under this act, it is unlawful to take, kill, or possess migratory birds.	Species protected under the Migratory Bird Treaty Act are known to occur within the analysis area and were analyzed for each of the action alternatives.
Executive Order 13186	States that a memorandum of understanding must occur between the Forest Service and U.S. Fish and Wildlife Service. This order places procedural requirements on the analysis of 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.	Migratory birds may experience impacts as a result of artificial night lighting, noise and vibrations, changes in surface water or groundwater quality or availability, exposure to process ponds or canals, exposure to a potential pit lake, erosion, loss of vegetation or open water habitat, and the spread of pathogens or noxious or invasive weeds.
Executive Order 13443	Facilitation of Hunting Heritage and Wildlife Conservation. The emphasis is on hunting and conservation, and the Federal government is required to address its activities on these natural resource components.	The footprint of the analysis area is located within AGFD's Game Management Unit 24A and 24B where game species are present. Those species include Gambel's quail, javelina, cottontail, mule deer, white-tailed deer, black bear, mountain lion, elk, bighorn sheep, and tree squirrel. Additionally, there are 10 Species of Economic and Regional Importance with predicted occurrences within 5 miles of the GPO footprint. These species include mule deer, white-tailed deer, javelina, elk, black bear, mountain lion, Gambel's quail, mourning dove, white-winged dove, and band-tailed pigeon.

Laws, Ordinances, Regulations, and Standards	Description	Applicability
Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. 668–668c)	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.	Bald and golden eagle habitat occurs within the Resolution Copper Project analysis area for wildlife.
Fish and Wildlife Coordination Act of 1934	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.	Resolution Copper must mitigate potential losses of wildlife resource caused by project-related activities that impound, divert, or otherwise modify a stream or other natural body of water.
National Forest Management Act implementing regulations (36 Code of Federal Regulations 219.19(a)(1))	Under this 1976 act, the Secretary of Agriculture "provides for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives."	In addition to federally listed species (see section on ESA, above), this law has regulatory implementation requirements for "management indicator species" and "sensitive species" that appear as directives in the Forest Service Manual.
Management Indicator Species	The role of management indicator species in national forest planning is described in the 1982 implementing regulations for the National Forest Management Act (36 Code of Federal Regulations 219.19(a)(1)). Forest Service Manual 2620.5 requires that certain vertebrate and/or invertebrate species present in the area be identified as management indicator species within the planning area (Tonto and Coconino National Forests).	The forest plan identifies 29 wildlife species and one macroinvertebrate species group as management indicator species for the Tonto National Forest.
Forest Service Sensitive Species	As described in Forest Service Manual 2670.12 (Forest Service 2005), the Forest Service will do the following: 1) manage "habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least viable populations of such species;" and 2) avoid actions that "may cause a species to become threatened or endangered."	Eleven Forest Service Sensitive Species were identified as known to occur and/or possible to occur within at least one of the alternative tailings storage facility footprints analyzed.

Laws, Ordinances, Regulations, and Standards	Description	Applicability
Bureau of Land Management (BLM) Sensitive Species	BLM Manual 6840 (BLM 2008) defines BLM sensitive species as those "species that require special management consideration to avoid potential future listing under the ESA and that have been identified in accordance with procedures set forth in this manual."	Thirteen BLM sensitive species are known to occur and/or possibly occur in at least one of the alternative tailings storage facility footprints analyzed.
Arizona Revised Statues Title 17 (AGFD determinations of Species of Greatest Conservation Need (SGCN) occurring within the wildlife analysis area)	Specifies State regulations regarding fish and game species, including management on State lands, hunting, and take of individuals. Arizona Revised Statutes 17-102 states that wildlife, both resident and migratory, native or introduced, found in this state (with certain exceptions) are property of the State and may be taken at such times, in such places, in such manner, and with such devices as provided by law or rule of the commission. In addition, SGCN is an AGFD status listing defined as wildlife of conservation priority—described nationally as Wildlife of Greatest Conservation Need.	SGCN are species of vertebrates, crustaceans, and mollusks that rank high in the vulnerability category and have been identified for immediate action (AGFD 2012). Seventy-five species listed as SGCN by AGFD were evaluated for likelihood of occurrence in Alternatives 2 and 3. Alternative 4 addressed the likelihood of occurrence for 72 SGCN listed species. 73 species on the SGCN list were evaluated for likelihood of occurrence in Alternative 5. Finally, 75 species listed on the SGCN list were evaluated for likelihood of occurrence in Alternative 6.
BLM – Phoenix Resource Management Plan, Las Cienegas National Conservation Area Resource Management Plan, and San Pedro Riparian National Conservation Area Resource Management Plan	BLM resource management plans serve to allocate resources and determine appropriate multiple uses for the public lands; provide strategies to manage and protect resources and establish systems to monitor and evaluate the health of resources and effectiveness of management practices over time.	The analysis area includes lands managed by the BLM and thus are applicable under the Phoenix Resource Management Plan, Las Cienegas National Conservation Area Resource Management Plan, and San Pedro Riparian National Conservation Area Resource Management Plan.

Key Documents and References Cited for Wildlife

The following list is meant to highlight key process or analysis documents available in the project record. It should not be considered a full list of all available documentation considered within this process memorandum or the EIS analysis. Occurrence records reports and other sources of habitat or range information can be found on file and have been incorporated into the project record.

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Appendix 1 - Wildlife Screening Tables

Table A1. Special-Status Wildlife Species Analyzed for Alternative 2 – Near West Proposed Action and Alternative 3 – Near West – Ultrathickened

Table A2. Special-Status Wildlife Species Analyzed for Alternative 4 – Silver King

Table A3. Special-Status Wildlife Species Analyzed for Alternative 5 – Peg Leg

Table A4. Special-Status Wildlife Species Analyzed for Alternative 6 – Skunk Camp

Table A1. Special-Status Wildlife Species Analyzed for Alternative 2 – Near West Proposed Action and Alternative 3 – Near West – Ultrathickened

Common Name (*Scientific Name*)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Proposed Action Analysis Area	Likelihood of Occurrence in Selected Lands Analysis Area
Western barking frog (*Craugastor augusti cactorum*)	TNF: S				Species prefers outcrops or caves on rocky slopes in oak/pine-oak associations; elevational range of 4,200–6,200 feet above mean sea level (amsl).	Occurs in rocky outcrops in Cochise and southern Pima and Santa Cruz Counties, in the Quinlan, Santa Rita, Patagonia, Huachuca, and Pajarito Mountain ranges.	Unlikely to occur	Unlikely to occur
Chiricahua leopard frog (*Rana chiricahuensis*)	ESA: T (All Arizona counties except La Paz, Mohave, Pinal, Yuma Counties)				Headwater streams, springs, and livestock tanks. An important characteristic of habitat is that it be free or have low levels of nonnative species, including nonnative fish, crayfish, bull frogs (*Lithobates catesbeianus*), and barred tiger salamanders (*Ambystoma mavortium*). This species occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs in all Arizona counties except La Paz, Mohave, Pinal, and Yuma Counties. Occurs along the Mogollon Rim and in mountainous areas of southeastern Arizona.	Unlikely to occur	Unlikely to occur
Northern leopard frog (*Lithobates pipiens*)	TNF: S				Range of habitats that includes grasslands, brush land, and forests, usually in permanent water; elevational range of 2,640–9,155 feet amsl.	Occurs in northern and central Arizona.	Unlikely to occur	Unlikely to occur
Lowland leopard frog (*Lithobates yavapaiensis*)	TNF: S, SCC	Arnett Creek (2010), Telegraph Canyon (2016), Rio Rancho Creek (2017), Queen Creek (1992), Pinal Mountains: west of Iron Canyon (2010)	Tailings corridor; East Plant; Devil's Canyon; Queen Creek; Oak Flat; Mineral Creek (WestLand 2009, 2018)		Aquatic systems in elevations ranging from 480–6,200 feet amsl; species is found using a variety of habitats both natural and human made.	Occurs in central and southeastern Arizona.	Known to occur	Known to occur
Northern goshawk (*Accipiter gentilis*)	TNF: S		Oak Flat/Boyce Thompson IBA (WestLand 2012, 2015)		Species is found in wide variety of forest associations, including deciduous, coniferous and mixed forests; prefers mature forests for breeding in elevations ranging from 4,750–9120 feet amsl.	Occurs in high elevation mountain ranges throughout Arizona.	Known to occur	Possible to occur
Clark's grebe (*Aechmophorus clarkia*)	TNF: SCC				Requires large, deep bodies of water for fishing.	Occurs throughout the state in winter; breeding occurs in Mohave and La Paz Counties.	Unlikely to occur	Unlikely to occur
Western grebe (*Aechmophorus occidentalis*)	TNF: SCC				Requires large, deep bodies of water for fishing.	Occurs throughout the state in winter; breeding occurs in Coconino, Yavapai, Maricopa, Pinal, and Pima Counties.	Unlikely to occur	Unlikely to occur
Golden eagle (*Aquila chrysaetos*)	BGEPA: Yes	Superstition Mountains: Hewitt Ridge (2014)	Devil's Canyon; Queen Creek; Boyce Thompson IBA (WestLand 2012, 2015)	eBird: Arnett Creek (2011), Oak Flat (2013, 2014)	Species prefers mountainous areas; nesting occurs at elevations between 4,000–10,000 feet amsl.	Occurs in mountainous and occasionally rural areas throughout Arizona.	Known to occur	Possible to occur
Red-faced warbler (*Cardellina rubrifrons*)	TNF: SCC				Summer resident only; occurs in montane fir, pine and pine-oak woodlands	Occurs in mountain ranges from southeastern Arizona to Mogollon Rim.	Unlikely to occur	Unlikely to occur
American dipper (*Cinclus mexicanus*)	TNF: SCC				Requires fast-flowing streams in high elevation forests.	Occurs in central and northern Arizona.	Unlikely to occur	Unlikely to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Proposed Action Analysis Area**	**Likelihood of Occurrence in Selected Lands Analysis Area**
Western yellow-billed cuckoo (distinct population segment) (*Coccyzus americanus*)	ESA: T (All Arizona counties)	Dripping Springs Mountains: vicinity of Government Mountain (2011), Dripping Springs Mountains: Devil's Canyon (2011), Queen Creek: Whitlow Dam (2000)	Devil's Canyon; Queen Creek; Whitlow Dam; Apache Leap; Oak Flat; Rancho Rio Creek; Mineral Creek; Pinto Creek (WestLand 2012, 2013, 2015, 2017, 2019)		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. This species is found in all counties in Arizona.	Occurs in all Arizona Counties, from below Mogollon Rim to southeast Arizona and along the Colorado River.	Known to occur	Unlikely to occur
Gilded flicker (*Colaptes chrysoides*)	TNF: SCC		Devil's Canyon; Queen Creek; Rancho Rio Creek; Mineral Creek; Apache Leap; East Plant Site (WestLand 2012, 2015, 2017)	Devil's Canyon (2012), Apache Leap (2015), Arnett Creek (2017)	Habitat includes stands of large saguaros, Joshua trees, and low-elevation riparian groves.	Occurs in southern, central, and western Arizona.	Known to occur	Known to occur
Olive-sided flycatcher (*Contopus cooperi*)	TNF: SCC		Boyce Thompson (WestLand 2015)	eBird: Oak Flat (2017), Devil's Canyon (2014), Arnett Creek (2015)	Species is only present in summer; breeding habitat includes mixed-conifer forests near open areas with lots of snags; in migration can be found in almost any habitat.	Occurs throughout Arizona.	Known to occur	Known to occur
Broad-billed hummingbird (*Cynanthus latirostris*)	TNF: SCC		Apache Leap; Queen Creek; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2012); Queen Creek (2017)	eBird: Oak Flat (2017), Arnett Creek (2016)	Preferred habitat is rocky canyons in desert-like mountain habitats, can be found in foothills, canyons, arroyos, along streams and in deserts.	Occurs in southeast and central Arizona.	Known to occur	Unlikely to occur
Southwestern willow flycatcher (*Empidonax traillii extimus*)	ESA: E (All Arizona counties except Navajo)	Robles Butte: Queen Creek (2005)	Queen Creek near Boyce Thompson (WestLand 2017)		Found in dense riparian habitats along streams, rivers, and other wetlands where cottonwood, willow, boxelder (*Acer negundo*), tamarisk (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), buttonbush (*Cephalanthus* spp.), and arrowweed (*Pluchea sericea*) are present. Nests are found in thickets of trees and shrubs, primarily those that are 13–23 feet high, among dense, homogeneous foliage. Habitat occurs at elevations below 8,500 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, and Yuma Counties.	Occurs in all counties except Navajo County, in lower elevation riparian areas.	Known to occur	Unlikely to occur
American peregrine falcon (*Falco peregrinus anatum*)	TNF: S	East Plant Site (2015)	East Plant; West Plant; Devil's Canyon; Queen Creek; Rancho Rio Creek; Apache Leap; Boyce Thompson IBA (WestLand 2004, 2009, 2012, 2015, 2017)	eBird: Oak Flat (2017), Arnett Creek (2014)	Species is found near cliffs overlooking habitats that support large numbers of birds; range in elevations from 400–9,000 feet amsl.	Occurs throughout Arizona.	Known to occur	Known to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Proposed Action Analysis Area**	**Likelihood of Occurrence in Selected Lands Analysis Area**
MacGillivray's warbler (*Geothlypis tolmiei*)	TNF: SCC		Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2010, 2012, 2015)	eBird: Oak Flat (2017), Arnett Creek (2017)	The species is primarily a migratory species in Arizona; however, during breeding season, the species is known to take residence over the higher, forested elevations of northern Arizona, especially along the Mogollon Rim. Preferred habitat during breeding season includes mixed-coniferous forests with riparian areas that have low shrubs; in migration species can be found in a variety of habitats.	Occurs throughout Arizona.	Known to occur	Known to occur
Bald eagle (*Haliaeetus leucocephalus*)	BGEPA: Yes				Habitat components include large bodies of water with lots of coastline and tall perches above water to allow for hunting.	Occurs in central and northern Arizona.	Possible to occur	Unlikely to occur
Yellow-eyed junco (*Junco phaeonotus*)	TNF: S, SCC				Habitat consists of open coniferous forest and pine-oak associations.	Occurs in central and southeastern Arizona.	Unlikely to occur	Unlikely to occur
Lewis's woodpecker (*Melanerpes lewis*)	TNF: SCC		Oak Flat (WestLand 2012)	eBird: Oak Flat (2007)	Distribution of the species is across the Four Corner states, the northern Rocky Mountains, and over the interior mountainous regions of Oregon and California. In Arizona, the species is common year-round across the higher, forested elevations of northern Arizona with some expansion of range into the southern Arizona deserts during the winter. Breeding habitats include open forests and woodlands that include oaks, ponderosa, pine, riparian woodlands, and orchards.	Occurs throughout Arizona.	Known to occur	Known to occur
Elf owl (*Micrathene whitneyi*)	TNF: SCC		Magma Arizona Railroad Company Corridor, Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2012, 2015)		Species is present during breeding season only, found in desert-woodland washes, riparian forests, upland deserts, evergreen woodlands, and canyon riparian forests.	Occurs in the southern half of Arizona.	Known to occur	Possible to occur
Sulphur-bellied flycatcher (*Myiodynastes luteiventris*)	TNF: SCC, S				Preferred habitat includes sycamore-walnut canyons; species only present in Arizona during its breeding season. They are cavity nesters in broad-leaved riparian trees or occasionally use provided nest boxes (Corman and Wise-Gervais 2005).	Occurs in southeast and central Arizona.	Unlikely to occur	Unlikely to occur
Desert purple martin (*Progne subis Hesperia*)	TNF: SCC		Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2009, 2012, 2013, 2015)		Habitat consists of Sonoran Desert with many large saguaros proximal to water.	Occurs in southern and central Arizona.	Known to occur	Possible to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Proposed Action Analysis Area**	**Likelihood of Occurrence in Selected Lands Analysis Area**
Yuma Ridgeway's rail (*Rallus longirostris yumanensis*)	ESA: E (Gila, La Paz, Maricopa, Mohave, Pinal, and Yuma Counties)				Found in freshwater and brackish marshes below 4,500 feet amsl. This species is found in Gila, La Paz, Maricopa, Mohave, Pinal, and Yuma Counties.	Occurs in Gila, La Paz, Maricopa, Mohave, Pinal, and Yuma Counties.	Unlikely to occur	Unlikely to occur
Mexican spotted owl (*Strix occidentalis lucida*)	ESA: T (All Arizona counties except La Paz and Yuma)				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 (*Pinus ponderosa*)–Gambel oak (*Quercus gambelii*). Nests in live trees on natural platforms (e.g., dwarf mistletoe [*Arceuthobium* spp.] brooms), snags, and canyon walls at elevations between 4,100 and 9,000 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs in all counties in Arizona, except La Paz and Yuma Counties.	Unlikely to occur	Unlikely to occur
Pacific wren (*Troglodytes pacificus*)	TNF: SCC				Commonly found from the coastal islands of Alaska southward to the northern Rockies and northern California, the species has been known to winter near the Mogollon Rim. Wintering habitat in Arizona consists of woodlands and brushy vegetation.	Occurs along the Mogollon Rim.	Unlikely to occur	Unlikely to occur
Gila longfin dace (*Agosia chrysogaster chrysogaster*)	TNF: SCC	Mineral Creek (2010)	Mineral Creek WestLand 2009, 2018)		Habitat varies from intermittent hot low-desert stream to clear, cool streams at higher elevations; prefers medium to small sized streams with sandy/gravely bottoms and pools with some cover. Species is normally found below 4,900 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Known to occur	Possible to occur
Desert sucker (*Catostomus clarki*)	TNF: S				Species is found in flowing pools of streams and rivers with a gravel substrate; elevational range of 480–8,840 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Unlikely to occur	Unlikely to occur
Sonora sucker (*Catostomus insignis*)	TNF: S				Found in a variety of habitats from warm rivers to cool streams, prefers gravelly or rocky pools in elevations ranging from 1,210–8,730 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Unlikely to occur	Unlikely to occur
Desert pupfish (*Cyprinodon macularius*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Santa Cruz, and Yavapai Counties)	Queen Creek (2003)			Restricted to three natural populations in California and the non-natural irrigation drains around the Salton Sea. Also found in restricted locations in Sonora and Baja California, Mexico. One natural population still occurs in Quitobaquito Spring and pond in Pima County and reintroductions have been made in Pima, Pinal, Maricopa, Graham, Cochise, La Paz, and Yavapai Counties, Arizona. Found in shallow water of desert springs, small streams, and marshes below 5,000 feet amsl elevation. The species tolerates high salinities and high water temperatures.	Occurs in Cochise, Gila, Graham, Maricopa, Pima, Santa Cruz, and Yavapai Counties.	Known to occur	Unlikely to occur

Common Name (*Scientific Name*)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Proposed Action Analysis Area	Likelihood of Occurrence in Selected Lands Analysis Area
Gila chub (*Gila intermedia*)	ESA: E (Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties)				Found in pools, springs, cienegas, and streams at elevations between 2,000 and 5,500 feet amsl. The species is dependent on undercut banks, terrestrial vegetation, boulders, root wads, fallen logs, and thick overhanging or aquatic vegetation for cover. This species occurs in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Unlikely to occur	Unlikely to occur
Headwater chub (*Gila nigra*)	TNF: S				Species is found in the middle to headwater reaches of medium-sized streams with large pools and cover; elevational range of 3,030–6,560 feet amsl.	Occurs in Gila, Graham, and Yavapai Counties.	Unlikely to occur	Unlikely to occur
Roundtail chub (*Gila robusta*)	TNF: S				Species prefers cool to warm water in mid-elevation streams and rivers with pools up to 6.6 feet deep near flowing water. Cover consists of boulders, tree roots, deep water and submerged vegetation. Elevational range of 1,210–7,220 feet amsl.	Occurs in Apache, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pinal, and Yavapai Counties.	Unlikely to occur	Unlikely to occur
Spikedace (*Meda fulgida*)	ESA: E (Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties)				Mid-water habitats, including runs, pools, and swirling eddies below 4,500 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties.	Occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties.	Unlikely to occur	Unlikely to occur
Gila topminnow (including Yaqui) (*Poeciliopsis occidentalis*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties)	Refugium population at Boyce Thompson Arboretum (2003)			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. This species is found in Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs in Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties. Species is a refugia population in Ayer Lake at Boyce Thompson Arboretum.	Known to occur	Unlikely to occur
Colorado pikeminnow (nonessential experimental) (*Ptychocheilus lucius*)	ESA: E, ENE (Gila, Maricopa, and Yavapai Counties)				Juveniles prefer slack water, backwater, and side channels with little or no flow and silty substrates; adults utilize turbid, deep and fast flowing waters. Species was reintroduced at an elevation of 1,960 feet amsl. Nonessential experimental populations of this fish in Arizona are located in the Salt and Verde River drainages. This species is found in Coconino, Gila, Maricopa, and Yavapai Counties.	Occurs in Gila, Maricopa, and Yavapai Counties.	Unlikely to occur	Unlikely to occur
Loach minnow (*Tiaroga cobitis*)	ESA: E (Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties)				At elevations below 8,000 feet amsl in small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrography are important. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties.	Occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties.	Unlikely to occur	Unlikely to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Proposed Action Analysis Area**	**Likelihood of Occurrence in Selected Lands Analysis Area**
Razorback sucker (*Xyrauchen texanus*)	ESA: E (Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties)				Found in riverine and lacustrine areas, generally not in fast-moving water, and may use backwaters at elevations below 6,000 feet amsl. This species is found in Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties.	Occurs in Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties.	Unlikely to occur	Unlikely to occur
Netwing midge (*Agathon arizonicus*)	TNF: S				Confined to areas in the immediate vicinity of rapidly flowing streams.	Disjunct populations present in Gila and Graham counties. Recorded from Workman Creek in the Sierra Ancha Mountains, and from 6,000 to 9,300 feet in the Pinaleño Mountains.	Unlikely to occur	Unlikely to occur
Parker's cylloepus riffle beetle (*Cylloepus parkeri*)	TNF: S, SCC				Habitat consists of small, rocky streams between 2,800 and 4,000 feet amsl.	Known only from creeks in the Bloody Basin, Yavapai County, Arizona.	Unlikely to occur	Unlikely to occur
Monarch butterfly (*Danaus plexippus* pop. 1)	TNF: SCC				This species is designated as the California Overwintering Population. Overall, the monarch butterfly spends the spring and summer months across much of North America breeding, returning to Mexico during the fall and winter. The California Overwintering Population resides near the coastal regions of California. Species prefers riparian habitats with milkweed present.	Occurs throughout Arizona.	Possible to occur	Possible to occur
A mayfly (*Fallceon eatoni*)	TNF: S				Aquatic areas. Rediscovered in 2005 from a single specimen taken in the Salt River Canyon, Gila County, Arizona (McCafferty 2006).	Rediscovered in Salt River Canyon, Gila County.	Unlikely to occur	Unlikely to occur
Fossil springsnail (*Pyrgulopsis simplex*)	TNF: S, SCC				Habitat is only present at headsprings and upper section of the outflow, generally found on rocks or aquatic macrophytes in moderate current.	The known distribution of this species is limited to an unnamed spring near Strawberry, Arizona, and at Fossil Springs in Yavapai County.	Unlikely to occur	Unlikely to occur
Phoenix talussnail (*Sonorella allynsmithi*)	TNF: SCC				Species prefers talus slopes in mid-elevation areas of the Sonoran Desert.	Occurs in Maricopa County, Arizona.	Unlikely to occur	Unlikely to occur
A caddisfly (*Wormaldia planae*)	TNF: S				This species is primarily a neotropical species, with a limited distribution in Arizona (Muñoz-Quesada and Holzenthal 2008). Occurs in central Arizona, near Camp Verde, Beaver Creek, Sycamore Creek, and Fossil Creek. Typically occur in mountainous regions, in cooler, spring fed streams. Has been found in upper portion of slow speed streams with rocky substrate.	Occurs in Gila and Yavapai Counties, recently found in Line Fossil Creek, Fossil Creek, Beaver Creek, below the outlet of Montezuma Well, and an unnamed stream at Ward Ranch.	Unlikely to occur	Unlikely to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Proposed Action Analysis Area**	**Likelihood of Occurrence in Selected Lands Analysis Area**
Sonoran pronghorn (*Antilocapra americana sonoriensis*)	ESA: ENE (La Paz, Maricopa, Pima, Pinal, Santa Cruz and Yuma Counties)				Found in Sonoran desertscrub within broad, intermountain, alluvial valleys with creosote (*Larrea tridentata*)-bursage (*Ambrosia* spp.) and palo verde-mixed cacti associations at elevations between 2,000 and 4,000 feet amsl. The only extant U.S. population is in southwestern Arizona; however, reintroductions have occurred in La Paz County. This species is found in La Paz, Maricopa, Pima, Pinal, Santa Cruz, and Yuma Counties.	Occurs in southwestern Arizona.	Unlikely to occur	Unlikely to occur
Mexican gray wolf (*Canis lupis baileyi*)	ESA: E (Apache and Greenlee Counties) TNF: ENE				Found in variety of vegetation types, except low deserts. Cover, water, and sufficient prey, such as deer and elk, are important. Reintroduction areas are typically rugged lands in coniferous forest. Elevational range of 3,000–12,000 feet amsl. This species is found in Apache, Coconino, Gila, Greenlee, and Navajo Counties.	Occurs in Apache and Greenlee Counties, reintroductions are occurring in Apache County. All packs are currently located on the Apache-Sitgreaves National Forest (AGFD 2018).	Unlikely to occur	Unlikely to occur
Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)	TNF: S AGFD: SGCN 1B		Tailings corridor; East Plant; Devil's Canyon; Queen Creek; Oak Creek (vicinity); near west vicinity (WestLand 2018)		This bat occurs in most of Arizona except the low-elevation deserts of the southwestern portion of the state. In summer, the species is found in caves and mines in elevations ranging from 550–7,520 feet amsl; in winter, the species is found in cold caves, lava tubes and mines in higher elevations than summer.	Occurs throughout Arizona.	Known to occur	Known to occur
Spotted bat (*Euderma maculatum*)	TNF: S AGFD: SGCN 1B				Habitat can vary widely from dry deserts to conifer forest; prefers to roost in crevices and cracks in cliff faces; elevational range of 110–8,670 feet amsl.	Occurs in Yuma and Maricopa Counties, and in eastern Arizona.	Unlikely to occur	Unlikely to occur
Allen's lappet-browed or big-eared bat (*Idionycteris phyllotis*)	TNF: S, SCC				Found in ponderosa pine, pinyon-juniper, Mexican woodland and riparian areas with cottonwoods, sycamores and willows; also have records from desertscrub and white fir habitats; elevational range of 1,320–9,800 feet amsl.	Occurs throughout Arizona except for deserts in southwestern Arizona.	Possible to occur	Unlikely to occur
Western red bat (*Lasiurus blossevillii*)	TNF: S, SCC	Queen Creek: Whitlow Dam (1965)	East Plant; Devil's Canyon; Queen Creek; near west vicinity (WestLand 2012)		Distribution in Arizona is from the southeast corner of the state northwest along the Mogollon Rim to near Flagstaff, with outlier records in Grand Canyon and at the Bill Williams River near its confluence with the Colorado River. Habitat consists of riparian and wooded areas, typically roosts in cottonwood trees; elevational range of 1,900–7,200 feet amsl.	Distribution in Arizona is from the southeast corner of the state northwest along the Mogollon Rim to near Flagstaff, with outlier records in Grand Canyon and at the Bill Williams River near its confluence with the Colorado River.	Known to occur	Known to occur
Western yellow bat (*Lasiurus xanthinus*)	(Added per request from AGFD) AGFD: SGCN 1B				Species may be associated with palm trees, sycamores, hackberries, and cottonwoods. Habitat consists of riparian and wooded areas; typically roosts in cottonwood trees; elevational range of 1,900–7,200 feet amsl.	Occurs throughout Arizona, historically found near Phoenix and Casa Grande.	Possible to occur	Unlikely to occur

Common Name (*Scientific Name*)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Proposed Action Analysis Area	Likelihood of Occurrence in Selected Lands Analysis Area
Ocelot (*Leopardus* [*Felis*] *pardalis*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Pinal, and Santa Cruz Counties)	Devil's Canyon (2011)			Habitats preferred by ocelots are variable, from tropical semiarid deserts to brushy forests and semiarid deserts in the northern part of its range. Densely vegetated movement corridors and small, semi-isolated habitat patches are important for facilitating dispersal movements in fragmented habitats. The current distribution extends into southern Arizona; dispersing individuals range more widely, as evidenced by the 2010 roadkill (on U.S. Route 60) near Top-of-the-World, Gila County. Little is known about ocelot habitat use in Arizona and Sonora, Mexico. Current information is lacking to draw conclusions about ocelot populations in Arizona, although more sightings have been substantiated recently in southern Arizona, in the vicinity of the U.S.-Mexico border. No information exists as to any established or breeding populations in Arizona. The individual killed near Top-of-the-World, between Superior and Globe along U.S. Route 60, is considered by some to be an extreme occurrence and well beyond its reasonable range.	Occurs in Cochise, Gila, Graham, Maricopa, Pima, Pinal, and Santa Cruz Counties.	Unlikely to occur	Unlikely to occur
California leaf-nosed bat (*Macrotus californicus*)	TNF: SCC		Oak Flat (immediate vicinity), Near West (WestLand 2012, 2018)		Species prefers Sonoran Desertscrub, roosts in mines, caves and rockshelters that have large areas of ceiling and flying space; elevational range of 160–3,980 feet amsl.	Occurs south of the Mogollon Plateau and in Mohave County.	Known to occur	Known to occur
Brazilian free-tailed bat (*Tadarida brasiliensis*)	(Added per request from AGFD) AGFD: SGCN 1B	Picketpost Mountain: Pott's Canyon (2017)	Oak Flat (immediate vicinity), Near West (WestLand 2012, 2018)		A species that is distributed across much of the southern United States with the largest concentrations residing in the western United States. Preferred habitat is the Upper and Lower Sonoran life zones and commonly roosts in caves, abandoned mines, under bridges, buildings, and hollow trees. Elevational ranges between 450–8,475 feet amsl.	Occurs throughout the state during summer, only southern half of state during winter.	Known to occur	Possible to occur
Sonoran Desert tortoise (*Gopherus morafkai*)	TNF: S	Cottonwood Canyon (2007), Arnett Creek (2017), Telegraph Canyon (1990), Belmont Canyon (1990), Picketpost Mountain (1990), Raymert Wash (1990), Queen Creek (2016), Whitlow Ranch (2014), Whitlow Canyon (2014), Hewitt Canyon (2016)	Tailings Area, Far West Parcel, Near West (WestLand 2013, 2014, 2018)	Picketpost Mountain (TNF 2016)	The range of the species in Arizona is most of the southwest half of the state, below the Mogollon Rim, and north to Lake Mead. Habitat includes desertscrub to semidesert grassland and interior chaparral; elevational range of 510–5,300 feet amsl.	Occurs in the southern and southwest part of Arizona.	Known to occur	Unlikely to occur

Common Name (*Scientific Name*)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Proposed Action Analysis Area	Likelihood of Occurrence in Selected Lands Analysis Area
Northern Mexican gartersnake (*Thamnophis eques megalops*)	ESA: T (All Arizona counties except Maricopa and Yuma) TNF: S				Inhabits streams, rivers, cienegas, and ponds with dense shoreline vegetation from Sonoran desertscrub up into Petran montane conifer forest. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Mohave, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs throughout Arizona except Maricopa and Yuma Counties.	Unlikely to occur	Unlikely to occur
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)	ESA: T (Apache, Coconino, Gila, Graham, Greenlee, Navajo and Yavapai Counties) TNF: S				Species prefers pinyon-juniper and pine-oak woodlands, ranging into ponderosa pine at elevations between 2,440–8,080 feet amsl; species needs a permanent water source.	Occurs in Apache, Coconino, Gila, Graham, Greenlee, Navajo, and Yavapai Counties.	Unlikely to occur	Unlikely to occur
Bezy's night lizard (*Xantusia bezyi*)	TNF: S, SCC	Queen Creek Canyon (2008)			Species prefers rocky slopes in upland Sonoran desertscrub and chaparral vegetation types; elevational range of 2,400–5,800 feet amsl.	Occurs in Gila, Pinal and Maricopa Counties.	Known to occur	Possible to occur

Sources: Unless otherwise noted, range or habitat information is from the following sources: AGFD abstracts (2020); Heritage Data Management System (2018); Kaufman (2001); NatureServe (2017); Tonto National Forest Final Assessment (Forest Service 2017); Tonto National Forest Threatened, Endangered, and Sensitive Species Abstracts (Forest Service 2000); U.S. Fish and Wildlife Service Arizona Ecological Services Field Office (U.S. Fish and Wildlife Service 2020).

Note: Occurrence evaluation is based on the proposed action mining component and its associated 5-mile analysis area.

* Status definitions are as follows:

Arizona Game and Fish Department (AGFD):

SGCN 1A = Species of Greatest Conservation Need Tier 1A. Species for which the AGFD has entered into an agreement or has legal or other contractual obligations or species that warrant the protection of a closed season.

SGCN 1B = Species of Greatest Conservation Need Tier 1B. Vulnerable species.

SGCN 1C = Species of Greatest Conservation Need Tier 1C. Species for which insufficient information is available to fully assess the vulnerabilities and, therefore, need to be watched for signs of stress.

Not all species with an SGCN status are addressed as part of these analyses; however, Brazilian free-tailed bat and western yellow bat were added to the analysis at the request of the AGFD, a cooperating agency.

Bald and Golden Eagle Protection Act (BGEPA):

A U.S. Federal statute that protects two species of eagle.

Endangered Species Act (ESA):

E = Endangered. Endangered species are those in imminent jeopardy of extinction. The 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.

T = Threatened. Threatened species are those that are likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

ENE = Reintroduced populations designated as Experimental – Nonessential, under the ESA.

Tonto National Forest (TNF):

S = Sensitive. Species identified by a regional forester for which population viability is a concern, as evidenced by 1) significant current or predicted downward trends in population number or density; or 2) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

SCC = Species of conservation concern.[3] A plant or animal for which we have concerns about its ability to remain on a landscape for a long time.

[3] Note that species of conservation concern is not considered a valid designation at this time and will not be until the revision of the Tonto Forest Plan is complete. This designation does not appear in the EIS and was included at the request of the cooperating agencies and categorized as other species of interest in the DEIS. A new draft list of species of conservation concern came out in 2019. Some species on the 2019 list overlap with other special-status designations and are analyzed in this document; however, the following species are included in that list, but are not analyzed here: Ancha Mountainsnail (*Oreohelix anchana*), Galiuro talussnail (*Sonorella galiurensis*), Milk Ranch talussnail (*Sonorella micromphala*), Richinbar talussnail (*Sonorella ashmuni*), Roosevelt talussnail (*Sonorella rooseveltiana*), Sierra Ancha talussnail (*Sonorella anchana*), and Verde Rim springsnail (*Pyrgulopsis glandulosa*).

Table A2. Special-Status Wildlife Species Analyzed for Alternative 4 – Silver King

Common Name (*Scientific Name*)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Silver King Analysis Area
Western barking frog (*Craugastor augusti cactorum*)	TNF: S				Species prefers outcrops or cave on rocky slopes in oak/pine-oak associations; elevational range of 4,200–6,200 feet above mean sea level (amsl).	Occurs in rocky outcrops in Cochise and southern Pima and Santa Cruz Counties, and in the Quinlan, Santa Rita, Patagonia, Huachuca, and Pajarito mountain ranges.	Unlikely to occur
Chiricahua leopard frog (*Rana chiricahuensis*)	ESA: T (All Arizona counties except La Paz, Mohave, Pinal, and Yuma Counties)				Headwater streams, springs, and livestock tanks. An important characteristic of habitat is that it be free or have low levels of nonnative species, including nonnative fish, crayfish, bull frogs (*Lithobates catesbeianus*), and barred tiger salamanders (*Ambystoma mavortium*). This species occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs along the Mogollon Rim and in mountainous areas of southeastern Arizona.	Unlikely to occur
Northern leopard frog (*Lithobates pipiens*)	TNF: S				Range of habitats that includes grasslands, brush land, and forests, usually in permanent water; elevational range of 2,640–9,155 feet amsl.	Found in northern and central Arizona.	Unlikely to occur
Lowland leopard frog (*Lithobates yavapaiensis*)	TNF: S, SCC	Arnett Creek (2010), Telegraph Canyon (2016), Rio Rancho Creek (2017), Queen Creek (1992), Pinal Mountains: west of Iron Canyon (2010); Happy Camp Tank (2017)	Tailings corridor; East Plant; Devil's Canyon; Queen Creek; Oak Flat; Mineral Creek (WestLand 2009, 2018)		Aquatic systems in elevations ranging from 480–6,200 feet amsl; species is found using a variety of habitats both natural and human made.	Occurs in central and southeastern Arizona.	Known to occur
Northern goshawk (*Accipiter gentilis*)	TNF: S		Oak Flat/Boyce Thompson IBA (WestLand 2012, 2015)		Species is found in wide variety of forest associations, including deciduous, coniferous and mixed forests; prefers mature forests for breeding in elevations ranging from 4,750–9,120 feet amsl.	Occurs throughout Arizona.	Known to occur
Clark's grebe (*Aechmophorus clarkia*)	TNF: SCC				Requires large, deep bodies of water for fishing.	Occurs in Mohave and La Paz Counties.	Unlikely to occur
Western grebe (*Aechmophorus occidentalis*)	TNF: SCC				Requires large, deep bodies of water for fishing.	Occurs in Coconino, Yavapai, Maricopa, Pinal, and Pima Counties.	Unlikely to occur
Golden eagle (*Aquila chrysaetos*)	BGEPA: Yes	Superstition Mountains: Hewitt Ridge (2014)	Devil's Canyon; Queen Creek; Boyce Thompson IBA (WestLand 2012, 2015)		Species prefers mountainous areas; nesting occurs at elevations between 4,000 and 10,000 feet amsl.	Occurs throughout Arizona.	Known to occur
Red-faced warbler (*Cardellina rubrifrons*)	TNF: SCC				Summer resident only; occurs in montane fir, pine and pine-oak woodlands.	Occurs in southeastern Arizona and along the Mogollon Rim.	Unlikely to occur
American dipper (*Cinclus mexicanus*)	TNF: SCC				Requires fast flowing streams in high-elevation forests.	Occurs in northern and eastern Arizona.	Unlikely to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Silver King Analysis Area**
Western yellow-billed cuckoo (distinct population segment) (*Coccyzus americanus*)	ESA: T (all Arizona counties) TNF: S	Dripping Springs Mountains: vicinity of Government Mountain (2011), Dripping Springs Mountains: Devil's Canyon (2011), Queen Creek: Whitlow Dam (2000)	Devil's Canyon; Queen Creek; Whitlow Dam; Apache Leap; Oak Flat; Rancho Rio Creek; Mineral Creek (WestLand 2012, 2015, 2017, 2019)		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. This species is found in all counties in Arizona.	Occurs throughout Arizona.	Known to occur
Gilded flicker (*Colaptes chrysoides*)	TNF: SCC		Devil's Canyon (2012) Apache Leap (2015), Arnett Creek (2017)		Habitat includes stands of large saguaros, Joshua trees, and low-elevation riparian groves.	Occurs in southern, central, and western Arizona.	Known to occur
Olive-sided flycatcher (*Contopus cooperi*)	TNF: SCC		Boyce Thompson (1989)		Species is only present in summer; breeding habitat includes mixed-conifer forests near open areas with lots of snags; in migration can be found in almost any habitat.	Occurs throughout Arizona.	Possible to occur
Broad-billed hummingbird (*Cynanthus latirostris*)	TNF: SCC		Apache Leap; Queen Creek; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2012); Queen Creek (2017)		Preferred habitat is rocky canyons in desert-like mountain habitats, can be found in foothills, canyons, arroyos, along streams and in deserts.	Occurs in southeast and central Arizona.	Known to occur
Southwestern willow flycatcher (*Empidonax traillii extimus*)	ESA: E (all counties except Navajo County)	Robles Butte: Queen Creek (2005)	Queen Creek near Boyce Thompson (WestLand 2017)		Found in dense riparian habitats along streams, rivers, and other wetlands where cottonwood, willow, boxelder (*Acer negundo*), tamarisk (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), buttonbush (*Cephalanthus* spp.), and arrowweed (*Pluchea sericea*) are present. Nests are found in thickets of trees and shrubs, primarily those that are 13–23 feet high, among dense, homogeneous foliage. Habitat occurs at elevations below 8,500 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, and Yuma Counties.	Occurs in riparian areas in Arizona, only during breeding season.	Known to occur
American peregrine falcon (*Falco peregrinus anatum*)	TNF: S	Oak Flat (2015)	East Plant; West Plant; Devil's Canyon; Queen Creek; Rancho Rio Creek; Apache Leap; Boyce Thompson IBA (WestLand 2004, 2009, 2012, 2015, 2017)		Species is found near cliffs overlooking habitats that support large numbers of birds; range in elevations from 400–9,000 feet amsl.	Occurs throughout Arizona.	Known to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Silver King Analysis Area**
MacGillivray's warbler (*Geothlypis tolmiei*)	TNF: SCC		Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2010, 2012, 2015)		The species is primarily a migratory species in Arizona; however, during breeding season, the species Is known to take residence over the higher, forested elevations of northern Arizona, especially along the Mogollon Rim. Preferred habitat during breeding season includes mixed-coniferous forests with riparian areas that have low shrubs; in migration species can be found in a variety of habitats.	Occurs throughout Arizona during migration, present during breeding season in high elevation streams.	Known to occur
Bald eagle (*Haliaeetus leucocephalus*)	BGEPA: Yes				Habitat components include large bodies of water with lots of coastline and tall perches above water to allow for hunting.	Occurs in central and northern Arizona.	Unlikely to occur
Yellow-eyed junco (*Junco phaeonotus*)	TNF: S, SCC				Habitat consists of open coniferous forest and pine-oak associations.	Occurs in central and southeastern Arizona.	Possible to occur
Lewis's woodpecker (*Melanerpes lewis*)	TNF: SCC		Oak Flat (WestLand 2012)		Distribution of the species is across the Four Corner states, the northern Rocky Mountains, and over the interior mountainous regions of Oregon and California. In Arizona, the species is common year-round across the higher, forested elevations of northern Arizona with some expansion of range into the southern Arizona deserts during the winter. Breeding habitats include open forests and woodlands that include oaks, ponderosa, pine, riparian woodlands, and orchards.	Occurs throughout Arizona.	Unlikely to occur
Elf owl (*Micrathene whitneyi*)	TNF: SCC		Magma Arizona Railroad Company Corridor, Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2012, 2015)		Species is present during breeding season only, found in desert-woodland washes, riparian forests, upland deserts, evergreen woodlands and canyon riparian forests.	Occurs in the southern half of Arizona.	Known to occur
Sulphur-bellied flycatcher (*Myiodynastes luteiventris*)	TNF: S, SCC				Preferred habitat includes sycamore-walnut canyons; species only present in Arizona during its breeding season. They are cavity nesters in broad-leaved riparian trees or occasionally use provided nest boxes (Corman and Wise-Gervais 2005).	Occurs in southeast and central Arizona.	Unlikely to occur
Desert purple martin (*Progne subis hesperia*)	TNF: SCC		Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2009, 2012, 2013, 2015)		Habitat consists of Sonoran Desert with many large saguaros proximal to water.	Occurs in southern and central Arizona.	Known to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Silver King Analysis Area**
Yuma Ridgeway's rail (*Rallus longirostris yumanensis*)	ESA: E (Gila, La Paz, Maricopa, Mohave, Pinal, and Yuma Counties)				Found in freshwater and brackish marshes below 4,500 feet amsl. This species is found in Gila, La Paz, Maricopa, Mohave, Pinal, and Yuma Counties.	Occurs in western and central Arizona.	Unlikely to occur
Mexican spotted owl (*Strix occidentalis lucida*)	ESA: T (All counties except La Paz and Yuma Counties)				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 (*Pinus ponderosa*)–Gambel oak (*Quercus gambelii*). Nests in live trees on natural platforms (e.g., dwarf mistletoe [*Arceuthobium* spp.] brooms), snags, and canyon walls at elevations between 4,100 and 9,000 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs throughout Arizona, except La Paz and Yuma counties.	Unlikely to occur
Pacific wren (*Troglodytes pacificus*)	TNF: SCC				Commonly found from the coastal islands of Alaska southward to the northern Rockies and northern California, the species has been known to winter near the Mogollon Rim. Wintering habitat in Arizona consists of woodlands and brushy vegetation.	Occurs along the Mogollon Rim.	Unlikely to occur
Gila longfin dace (*Agosia chrysogaster chrysogaster*)	TNF: SCC	Mineral Creek (2010)	Mineral Creek (WestLand 2009, 2018)		Habitat varies from intermittent hot low-desert stream to clear, cool streams at higher elevations; prefers medium-sized to small streams with sandy/gravely bottoms and pools with some cover. Species is normally found below 4,900 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Known to occur
Desert sucker (*Catostomus clarki*)	TNF: S				Species is found in flowing pools of streams and rivers with a gravel substrate; elevational range of 480–8,840 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Unlikely to occur
Sonora sucker (*Catostomus insignis*)	TNF: S				Found in a variety of habitats from warm rivers to cool streams, prefers gravelly or rocky pools in elevations ranging from 1,210–8,730 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Unlikely to occur
Desert pupfish (*Cyprinodon macularius*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Santa Cruz, and Yavapai Counties)	Queen Creek (2003)			Restricted to three natural populations in California and the non-natural irrigation drains around the Salton Sea. Also found in restricted locations in Sonora and Baja California, Mexico. One natural population still occurs in Quitobaquito Spring and pond in Pima County and reintroductions have been made in Pima, Pinal, Maricopa, Graham, Cochise, La Paz, and Yavapai Counties, Arizona. Found in shallow water of desert springs, small streams, and marshes below 5,000 feet amsl elevation. The species tolerates high salinities and high water temperatures.	Occurs in Cochise, Gila, Graham, Maricopa, Pima, Santa Cruz, and Yavapai Counties.	Known to occur

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Gila chub (*Gila intermedia*)	ESA: E (Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties)				Normally found in smaller headwater streams, cienegas, and springs or marshes of the Gila River Basin at elevations below 2,720 and 5,420 feet amsl.	Occurs in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Unlikely to occur
Headwater chub (*Gila nigra*)	TNF: S				Species is found in the middle to headwater reaches of medium-sized streams with large pools and cover; elevational range of 3,030–6,560 feet amsl.	Occurs in Gila, Graham, and Yavapai Counties.	Unlikely to occur
Roundtail chub (*Gila robusta*)	TNF: S				Species prefers cool to warm water in mid-elevation streams and rivers with pools up to 6.6 feet deep near flowing water. Cover consists of boulders, tree roots, deep water and submerged vegetation. Elevational range of 1,210–7,220 feet amsl.	Occurs in Apache, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pinal, and Yavapai Counties.	Unlikely to occur
Spikedace (*Meda fulgida*)	ESA: E (Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties)				Mid-water habitats, including runs, pools, and swirling eddies below 4,500 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties.	Occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties.	Unlikely to occur
Gila topminnow (including Yaqui) (*Poeciliopsis occidentalis*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties)	Boyce Thompson Arboretum (2003)			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. This species is found in Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs in Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Known to occur
Colorado pikeminnow (nonessential experimental) (*Ptychocheilus lucius*)	ESA: E, ENE (Gila, Maricopa, and Yavapai Counties)				Juveniles prefer slack water, backwater, and side channels with little or no flow and silty substrates; adults utilize turbid, deep and fast flowing waters. Species was reintroduced at an elevation of 1,960 feet amsl. Nonessential experimental populations of this fish in Arizona are located in the Salt and Verde River drainages. This species is found in Coconino, Gila, Maricopa, and Yavapai Counties.	Occurs in Gila, Maricopa, and Yavapai Counties.	Unlikely to occur
Loach minnow (*Tiaroga cobitis*)	ESA: E (Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties)				At elevations below 8,000 feet amsl in small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrography are important. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties.	Occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties.	Unlikely to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Silver King Analysis Area**
Razorback sucker (*Xyrauchen texanus*)	ESA: E (Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties)				Found in riverine and lacustrine areas, generally not in fast-moving water, and may use backwaters at elevations below 6,000 feet amsl. This species is found in Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties.	Occurs in Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties.	Unlikely to occur
Netwing midge (*Agathon arizonicus*)	TNF: S				Confined to areas in the immediate vicinity of rapidly flowing streams.	Disjunct populations present in Gila and Graham Counties. Recorded in Workman Creek in the Sierra Ancha Mountains, and from 6,000–9,300 feet in the Pinaleño Mountains.	Unlikely to occur
Parker's cylloepus riffle beetle (*Cylloepus parkeri)*	TNF: S, SCC				Habitat consists of small, rocky streams between 2,800 and 4,000 feet amsl.	Known only from creeks in the Bloody Basin, Yavapai County, Arizona.	Unlikely to occur
Monarch butterfly (*Danaus plexippus* pop. 1)	TNF: SCC				This species is designated as the California Overwintering Population. Overall, the monarch butterfly spends the spring and summer months across much of North America breeding, returning to Mexico during the fall and winter. The California Overwintering Population resides near the coastal regions of California. Species prefers riparian habitats with milkweed present.	Occurs throughout Arizona.	Possible to occur
A mayfly (*Fallceon eatoni*)	TNF: S				Aquatic areas. Rediscovered in 2005 from a single specimen taken in the Salt River Canyon, Gila County, Arizona (McCafferty 2006).	Occurs in Gila County, Arizona.	Unlikely to occur
Fossil springsnail (*Pyrgulopsis simplex*)	TNF: S, SCC				Habitat is only present at headsprings and upper section of the outflow, generally found on rocks or aquatic macrophytes in moderate current.	The known distribution of this species is limited to an unnamed spring near Strawberry, Arizona, and at Fossil Springs in Yavapai County.	Unlikely to occur
Phoenix talussnail (*Sonorella allynsmithi*)	TNF: SCC				Species prefers talus slopes in mid-elevation areas of the Sonoran Desert.	Occurs in Maricopa County, Arizona.	Unlikely to occur
A caddisfly (*Wormaldia planae*)	TNF: S				This species is primarily a neotropical species, with a limited distribution in Arizona (Muñoz-Quesada and Holzenthal 2008). Occurs in central Arizona, near Camp Verde, Beaver Creek, Sycamore Creek, and Fossil Creek. Typically occur in mountainous regions, in cooler, spring-fed streams. Has been found in upper portion of slow-speed streams with rocky substrate.	Occurs in Gila and Yavapai Counties.	Unlikely to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Silver King Analysis Area**
Sonoran pronghorn (*Antilocapra americana sonoriensis*)	ESA: ENE (La Paz, Maricopa, Pima, Pinal, Santa Cruz and Yuma Counties)				Found in Sonoran desertscrub within broad, intermountain, alluvial valleys with creosote (*Larrea tridentata*)-bursage (*Ambrosia* spp.) and palo verde-mixed cacti associations at elevations between 2,000–4,000 feet amsl. The only extant U.S. population is in southwestern Arizona; however, reintroductions have occurred in La Paz County. This species is found in La Paz, Maricopa, Pima, Pinal, Santa Cruz, and Yuma Counties.	Occurs in southwestern Arizona.	Unlikely to occur
Mexican gray wolf (*Canis lupis baileyi*)	ESA: E (Apache and Greenlee Counties) TNF: ENE				Found in variety of vegetation types, except low deserts. Cover, water, and sufficient prey, such as deer and elk, are important. Reintroduction areas are typically rugged lands in coniferous forest. Elevational range of 3,000–12,000 feet amsl. This species is found in Apache, Coconino, Gila, Greenlee, and Navajo Counties.	Occurs in Apache and Greenlee counties, reintroductions are occurring in Apache County. All packs are currently located on the Apache-Sitgreaves National Forest (AGFD 2018).	Unlikely to occur
Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)	TNF: S AGFD: SGCN 1B				This bat occurs in most of Arizona except the low-elevation deserts of the southwestern portion of the state. In summer, the species is found in caves and mines in elevations ranging from 550–7,520 feet amsl; in winter, the species is found in cold caves, lava tubes and mines in higher elevations than summer.	Occurs throughout Arizona.	Known to occur
Spotted bat (*Euderma maculatum*)	TNF: S AGFD: SGCN 1B				Habitat can vary widely from dry deserts to conifer forest; species prefers to roost in crevices and cracks in cliff faces; elevational range of 110–8,670 feet amsl.	Occurs throughout Arizona.	Possible to occur
Allen's lappet-browed or big-eared Bat (*Idionycteris phyllotis*)	TNF: S, SCC				Found in ponderosa pine, pinyon-juniper, Mexican woodland and riparian areas with cottonwoods, sycamores and willows; also have records from desertscrub and white fir habitats; elevational range of 1,320–9,800 feet amsl.	Occurs south central to southern and southeastern Arizona.	Unlikely to occur
Western red bat (*Lasiurus blossevillii*)	TNF: S, SCC	Queen Creek: Whitlow Dam (1965)	East Plant; Devil's Canyon; Queen Creek; near west vicinity (WestLand 2012)		Distribution in Arizona is from the southeast corner of the state northwest along the Mogollon Rim to near Flagstaff, with outlier records in Grand Canyon and at the Bill Williams River near its confluence with the Colorado River. Habitat consists of riparian and wooded areas, typically roosts in cottonwood trees; elevational range of 1,900–7,200 feet amsl.	Distribution in Arizona is from the southeast corner of the state northwest along the Mogollon Rim to near Flagstaff, with outlier records in Grand Canyon and at the Bill Williams River near its confluence with the Colorado River.	Known to occur
Western yellow bat (*Lasiurus xanthinus*)	(Added per request from AGFD) AGFD: SGCN 1B				Species may be associated with palm trees, sycamores, hackberries, and cottonwoods. Habitat consists of riparian and wooded areas, typically roosts in cottonwood trees; elevational range of 1,900–7,200 feet amsl.	Occurs throughout Arizona, historically found near Phoenix and Casa Grande.	Possible to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Silver King Analysis Area**
Ocelot (*Leopardus* [*Felis*] *pardalis*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Pinal, and Santa Cruz Counties)	Devil's Canyon (2011)			Habitats preferred by ocelots are variable, from tropical semiarid deserts to brushy forests and semiarid deserts in the northern part of its range. Densely vegetated movement corridors and small, semi-isolated habitat patches are important for facilitating dispersal movements in fragmented habitats. The current distribution extends into southern Arizona; dispersing individuals range more widely, as evidenced by the 2010 roadkill (on U.S. Route 60) near Top-of-the-World, Gila County. Little is known about ocelot habitat use in Arizona and Sonora, Mexico. Current information is lacking to draw conclusions about ocelot populations in Arizona, although more sightings have been substantiated recently in southern Arizona, in the vicinity of the U.S.-Mexico border. No information exists as to any established or breeding populations in Arizona. The individual killed near Top-of-the-World, between Superior and Globe along U.S. Route 60, is considered by some to be an extreme occurrence and well beyond its reasonable range.	Occurs in Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yavapai, and Yuma Counties.	Unlikely to occur
California leaf-nosed bat (*Macrotus californicus*)	TNF: SCC		Oak Flat (immediate vicinity), Near West (WestLand 2012, 2018)		Species prefers Sonoran desertscrub, roosts in mines, caves and rockshelters that have large areas of ceiling and flying space; elevational range of 160–3,980 feet amsl.	Occurs south of the Mogollon Plateau and in Mohave County.	Known to occur
Brazilian free-tailed bat (*Tadarida brasiliensis*)	(Added per request from AGFD) AGFD: SGCN 1B	Picketpost Mountain: Pott's Canyon (2017)	Oak Flat (immediate vicinity), Near West (WestLand 2012, 2018)		A species that is distributed across much of the southern United States with the largest concentrations residing in the western United States. Preferred habitat is the Upper and Lower Sonoran life zones and commonly roosts in caves, abandoned mines, under bridges, buildings, and hollow trees. Elevational ranges between 450–8,475 feet amsl.	Occurs throughout the state during summer; only southern half of state during winter.	Known to occur
Sonoran Desert tortoise (*Gopherus morafkai*)	TNF: S	Cottonwood Canyon (2007), Arnett Creek (2017), Telegraph Canyon (1990), Belmont Canyon (1990), Picketpost Mountain (1990), Raymert Wash (1990), Queen Creek (2016), Whitlow Ranch (2014), Whitlow Canyon (2014), Hewitt Canyon (2016)	Tailings Area, Far West Parcel, Near West (WestLand 2013, 2014, 2018)		The range of the species in Arizona is most of the southwestern half of the state, below the Mogollon Rim and north to Lake Mead. Habitat includes desertscrub to semidesert grassland and interior chaparral; elevational range of 510–5,300 feet amsl.	Occurs in the southern and southwestern part of Arizona.	Known to occur

Common Name (*Scientific Name*)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Silver King Analysis Area
Northern Mexican gartersnake (*Thamnophis eques megalops*)	ESA: T (All Arizona counties except Maricopa and Yuma) TNF: S				Inhabits streams, rivers, cienegas, and ponds with dense shoreline vegetation from Sonoran desertscrub up into Petran montane conifer forest. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Mohave, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs throughout Arizona except Maricopa and Yuma Counties.	Unlikely to occur
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)	ESA: T (Apache, Coconino, Gila, Graham, Greenlee, Navajo and Yavapai Counties) TNF: S				Species prefers pinyon-juniper and pine-oak woodlands, ranging into ponderosa pine at elevations between 2,440–8,080 feet amsl; species needs permanent water source.	Occurs in Apache, Coconino, Gila, Graham, Greenlee, Navajo, and Yavapai Counties.	Unlikely to occur
Bezy's night lizard (*Xantusia bezyi*)	TNF: S, SCC	Queen Creek Canyon (2008)			Species prefers rocky slopes in upland Sonoran desertscrub and chaparral vegetation types; elevational range of 2,400–5,800 feet amsl.	Occurs in Gila, Pinal and Maricopa Counties.	Known to occur

Sources: Unless otherwise noted, range or habitat information is from the following sources: AGFD abstracts (2020); Heritage Data Management System (2018); Kaufman (2001); NatureServe (2017); Tonto National Forest Final Assessment (Forest Service 2017); Tonto National Forest Threatened, Endangered, and Sensitive Species Abstracts (Forest Service 2000); U.S. Fish and Wildlife Service Arizona Ecological Services Field Office (U.S. Fish and Wildlife Service 2020).

Note: Occurrence evaluation is based on the proposed action mining component and its associated 5-mile analysis area.

* Status definitions are as follows:

Arizona Game and Fish Department (AGFD):

SGCN 1A = Species of Greatest Conservation Need Tier 1A. Species for which the AGFD has entered into an agreement or has legal or other contractual obligations or species that warrant the protection of a closed season.

SGCN 1B = Species of Greatest Conservation Need Tier 1B. Vulnerable species.

SGCN 1C = Species of Greatest Conservation Need Tier 1C. Species for which insufficient information is available to fully assess the vulnerabilities and, therefore, need to be watched for signs of stress.

Not all species with an SGCN status are addressed as part of these analyses; however, Brazilian free-tailed bat and western yellow bat were added to the analysis at the request of the AGFD, a cooperating agency.

Bald and Golden Eagle Protection Act (BGEPA):

A U.S. Federal statute that protects two species of eagle.

Endangered Species Act (ESA):

E = Endangered. Endangered species are those in imminent jeopardy of extinction. The 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.

T = Threatened. Threatened species are those that are likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

ENE = Reintroduced populations designated as Experimental – Nonessential, under the ESA.

Tonto National Forest (TNF):

S = Sensitive. Species identified by a regional forester for which population viability is a concern, as evidenced by 1) significant current or predicted downward trends in population number or density, or 2) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

SCC = Species of conservation concern.[4] A plant or animal for which we have concerns about its ability to remain on a landscape for a long time.

[4] Note that species of conservation concern is not considered a valid designation at this time and will not be until the revision of the Tonto Forest Plan is complete. This designation does not appear in the EIS and was included at the request of the cooperating agencies and categorized as other species of interest in the DEIS. A new draft list of species of conservation concern came out in 2019. Some species on the 2019 list overlap with other special-status designations and are analyzed in this document; however, the following species are included in that list, but are not analyzed here: Ancha Mountainsnail (*Oreohelix anchana*), Galiuro talussnail (*Sonorella galiurensis*), Milk Ranch talussnail (*Sonorella micromphala*), Richinbar talussnail (*Sonorella ashmuni*), Roosevelt talussnail (*Sonorella rooseveltiana*), Sierra Ancha talussnail (*Sonorella anchana*), and Verde Rim springsnail (*Pyrgulopsis glandulosa*).

Table A3. Special-Status Wildlife Species Analyzed for Alternative 5 – Peg Leg

Common Name (*Scientific Name*)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Occurrence Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Peg Leg Analysis Area
Arizona toad (*Anaxyrus microscaphus*)	BLM: S				Species prefers rocky stream and canyons in pine-oak associations and in lower deserts. Elevation ranges from sea level to 8,000 feet above mean sea level (amsl).	Occurs in Apache, Coconino, Gila, Graham, La Paz, Maricopa, Mohave, Navajo, and Yavapai Counties.	Unlikely to occur
Sonoran green toad (*Anaxyrus retiformis*)	BLM: S				Species is found in rain pools, wash bottoms and areas near water in semiarid mesquite-grassland, creosote desert, and upland saguaro-paloverde desert; elevational range of 500– 3,225 feet amsl.	Found in south-central Arizona, from Organ Pipe Cactus National Monument to 9 miles north of the Pima-Pinal county line in Santa Rosa Valley.	Unlikely to occur
Western barking frog (*Craugastor augusti cactorum*)	TNF: S BLM: S				Species prefers outcrops or caves on rocky slopes in oak/pine-oak associations; elevational range of 4,200– 6,200 feet amsl.	Occurs in rocky outcrops in Cochise and southern Pima and Santa Cruz Counties, in the Quinlan, Santa Rita, Patagonia, Huachuca, and Pajarito mountain ranges.	Unlikely to occur
Great Plains narrow-mouthed toad (*Gastrophryne olivacea*)	BLM: S				Found in mesquite semidesert grassland to oak woodland near streams, springs and rain pools; elevational range of sea level to 4,100 feet amsl.	Found from Santa Cruz County north to Maricopa County and west to near Ajo in Pima County.	Unlikely to occur
Plains leopard frog (*Lithobates blairi*)	BLM: S				Found near stream, ponds, reservoirs, marshes, or irrigation ditches in prairies and desert grasslands; elevational range of 4,060–5,880 feet amsl.	Isolated population located on the western side of the Chiricahua Mountains, Cochise County, Arizona.	Unlikely to occur
Chiricahua leopard frog (*Rana chiricahuensis*)	ESA: T (All Arizona counties except La Paz, Mohave, Pinal, and Yuma Counties) BLM: S				Headwater streams, springs, and livestock tanks. An important characteristic of habitat is that it be free or have low levels of nonnative species, including nonnative fish, crayfish, bull frogs (*Lithobates catesbeianus*), and barred tiger salamanders (*Ambystoma mavortium*). This species occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs along the Mogollon Rim and in mountainous areas of southeastern Arizona.	Unlikely to occur
Northern leopard frog (*Lithobates pipiens*)	TNF: S BLM: S				Range of habitats that includes grasslands, brush land, and forests, usually in permanent water; elevational range of 2,640–9,155 feet amsl.	Found in northern and central Arizona.	Unlikely to occur

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Lowland leopard frog (*Lithobates yavapaiensis*)	TNF: S, SCC BLM: S	Walnut Canyon (1993), White Canyon (2010), Wood Canyon (2016), Telegraph Canyon (2016), Tributary to Arnett Creek (2017), Rawhide Canyon west of Government Mountain (2009), Arnett Creek (1981, 1992, 2017), Dripping Springs Mountains: Picketpost Mountain (2017), Rio Rancho Creek (2017), Queen Creek (1992), Pinal Mountains: west of Iron Canyon (2010), Happy Camp Tank (2017)	Tailings corridor; East Plant; Devil's Canyon; Queen Creek; Oak Flat; Mineral Creek (WestLand 2009, 2018)		Aquatic systems in elevations ranging from 480–6,200 feet amsl; species is found using a variety of habitats both natural and human made.	Occurs in central and southeastern Arizona.	Known to occur
Northern goshawk (*Accipiter gentilis*)	TNF: S BLM: S		Oak Flat/Boyce Thompson IBA (WestLand 2012, 2015)		Species is found in wide variety of forest associations, including deciduous, coniferous and mixed forests; prefers mature forests for breeding in elevations ranging from 4,750–9120 feet amsl.	Occurs throughout Arizona.	Known to occur
Clark's grebe (*Aechmophorus clarkia*)	TNF: SCC BLM: S				Requires large, deep bodies of water for fishing.	Occurs in Mohave and La Paz Counties during summer, found on large lakes throughout Arizona in winter.	Unlikely to occur
Western grebe (*Aechmophorus occidentalis*)	TNF: SCC				Requires large, deep bodies of water for fishing.	Occurs in Coconino, Yavapai, Maricopa, Pinal, and Pima Counties.	Unlikely to occur
Arizona grasshopper sparrow (*Ammodramus savannarum ammolegus*)	BLM: S				Species' preferred habitat is open grasslands with some shrubs between 3,800–5,300 feet amsl.	Occurs in southeastern and southern Arizona.	Unlikely to occur
Golden eagle (*Aquila chrysaetos*)	BLM: S BGEPA: Yes	Dripping Springs Mountains: Walnut Canyon (2016), Superstition Mountains: Hewitt Ridge (2014)	Devil's Canyon; Queen Creek; Boyce Thompson IBA (WestLand 2012, 2015)		Species prefers mountainous areas; nesting occurs at elevations between 4,000–10,000 feet amsl.	Occurs throughout Arizona.	Known to occur
Western burrowing owl (*Athene cunicularia hypugaea*)	BLM: S				Distribution is common across the western United States, south-central Canada, and Mexico. Species is found in open, dry grasslands, deserts, and agricultural lands; elevation ranges from 650–6,140 feet amsl.	Occurs in southern and southeastern Arizona.	Possible to occur

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Ferruginous hawk (*Buteo regalis*)	BLM: S				Species is found in open grasslands, scrublands, and woodlands in winter; ranges in elevation from 3,500 to 6,000 feet amsl.	Occurs throughout Arizona.	Possible to occur
Red-faced warbler (*Cardellina rubrifrons*)	TNF: SCC BLM: S				Summer resident only; occurs in montane fir, pine and pine-oak woodlands.	Occurs in southeastern Arizona.	Unlikely to occur
American dipper (*Cinclus mexicanus*)	TNF: SCC				Requires fast-flowing streams in high-elevation forests.	Occurs in northern and eastern Arizona.	Unlikely to occur
Western yellow-billed cuckoo (distinct population segment) (*Coccyzus americanus*)	ESA: T (all Arizona counties) TNF: S BLM: S	Gila River: Indian Camp Wash (1999), Gila River: Kearny (2003), Gila River: southwest of North Butte (1993), Dripping Springs Mountains: vicinity of Government Mountain (2011), Dripping Springs Mountains: Devil's Canyon (2011), Queen Creek: Whitlow Ranch Dam (2000)	Devil's Canyon; Queen Creek; Whitlow Dam; Apache Leap; Oak Flat; Rancho Rio Creek; Mineral Creek (WestLand 2012, 2015, 2017, 2019)		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. This species is found in all counties in Arizona.	Occurs throughout Arizona.	Known to occur
Gilded flicker (*Colaptes chrysoides*)	TNF: SCC BLM: S		Devil's Canyon (2012) Apache Leap (2015), Arnett Creek (2017)		Habitat includes stands of large saguaros, Joshua trees, and low-elevation riparian groves.	Occurs in southern, central, and western Arizona.	Known to occur
Olive-sided flycatcher (*Contopus cooperi*)	TNF: SCC		Boyce Thompson (1989)		Species is only present in summer; breeding habitat includes mixed-conifer forests near open areas with lots of snags; in migration can be found in almost any habitat.	Occurs throughout Arizona.	Possible to occur
Broad-billed hummingbird (*Cynanthus latirostris*)	TNF: SCC BLM: S		Apache Leap; Queen Creek; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2012); Queen Creek (2017)		Preferred habitat is rocky canyons in desert-like mountain habitats; can be found in foothills, canyons, arroyos, along streams, and in deserts.	Occurs in southeast and central Arizona.	Known to occur

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Southwestern willow flycatcher (*Empidonax traillii extimus*)	ESA: E (all Arizona counties except Navajo County) BLM: S	Dripping Springs Mountains: Gila River (2015), Tortilla Mountains: Gila River near Kearny (2011, 2015), Gila River: near Box Canyon (2008), Gila River: Kelvin vicinity (2015), Gila River: east of North Butte (2010), Gila River: near Zellweger Wash (2015), Gila River: north of Grayback Mountain (1996), Gila River: The Spine (2011), Dripping Springs Mountains: Mineral Creek (2013), Robles Butte: Queen Creek (2005)	Queen Creek near Boyce Thompson (WestLand 2017)		Found in dense riparian habitats along streams, rivers, and other wetlands where cottonwood, willow, boxelder (*Acer negundo*), tamarisk (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), buttonbush (*Cephalanthus* spp.), and arrowweed (*Pluchea sericea*) are present. Nests are found in thickets of trees and shrubs, primarily those that are 13–23 feet high, among dense, homogeneous foliage. Habitat occurs at elevations below 8,500 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, and Yuma Counties.	Occurs throughout Arizona.	Known to occur
American peregrine falcon (*Falco peregrinus anatum*)	TNF: S BLM: S	Oak Flat (2015)	East Plant; West Plant; Devil's Canyon; Queen Creek; Rancho Rio Creek; Apache Leap; Boyce Thompson IBA (WestLand 2004, 2009, 2012, 2015, 2017)		Species is found near cliffs overlooking habitats that support large numbers of birds; range in elevations from 400–9,000 feet amsl.	Occurs throughout Arizona.	Known to occur
MacGillivray's warbler (*Geothlypis tolmiei*)	TNF: SCC		Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2010, 2012, 2015)		The species is primarily a migratory species in Arizona; however, during breeding season, the species Is known to take residence over the higher, forested elevations of northern Arizona, especially along the Mogollon Rim. Preferred habitat during breeding season includes mixed-coniferous forests with riparian areas that have low shrubs; in migration species can be found in a variety of habitats.	Occurs throughout Arizona.	Known to occur
Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*)	BLM: S				Species prefers streamside cottonwoods and willows near mesquite bosques; can also be found in dry washes with large mesquite, paloverde, ironwood, and saguaro.	Occurs in Organ Pipe Cactus National Monument and suburban Tucson.	Unlikely to occur
California condor (*Gymnogyps californianus*)	ESA: ENE (Apache, Coconino, Mohave, Navajo and Yavapai Counties) BLM: S				Roosts and nest in steep terrain with rock outcroppings, cliffs, and caves. High perches are necessary to create the strong updrafts the bird requires to lift into flight, and open grasslands or savannahs are essential for searching for food.	Occurs mostly along the Grand Canyon and Kaibab Plateau in northern Arizona.	Unlikely to occur

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Pinyon jay (*Gymnorhinus cyanocephalus*)	BLM: S		Boyce Thompson IBA (WestLand 2015)		Habitat consists of pinyon-juniper woodland, sometimes found in pine forests and in scrub oak or sagebrush areas.	Occurs in northern Arizona.	Known to occur
Bald eagle (*Haliaeetus leucocephalus*)	BLM: S BGEPA: Yes				Habitat components include large bodies of water with lots of coastline and tall perches above water to allow for hunting.	Occurs in central and northern Arizona.	Possible to occur
Yellow-eyed junco (*Junco phaeonotus*)	TNF: S, SCC				Habitat consists of open coniferous forest and pine-oak associations.	Occurs in central and southeastern Arizona.	Unlikely to occur
California black rail (*Laterallus jamaicensis coturniculus*)	BLM: S				Habitat in Arizona consists of shallow water habitat with emergent and shoreline vegetation. Prefers areas where water levels do not fluctuate.	Occurs only in southwestern part of state along the Colorado River in Yuma County.	Unlikely to occur
Lewis's woodpecker (*Melanerpes lewis*)	TNF: SCC		Oak Flat (WestLand 2012)		Distribution of the species is across the Four Corner states, the northern Rocky Mountains, and over the interior mountainous regions of Oregon and California. In Arizona, the species is common year-round across the higher, forested elevations of northern Arizona with some expansion of range into the southern Arizona deserts during the winter. Breeding habitats includes open forests and woodlands that include oaks, ponderosa, pine, riparian woodlands, and orchards.	Occurs throughout Arizona.	Unlikely to occur
Elf owl (*Micrathene whitneyi*)	TNF: SCC BLM: S		Magma Arizona Railroad Company Corridor, Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2012, 2015)		Species is present during breeding season only, found in desert-woodland washes, riparian forests, upland deserts, evergreen woodlands and canyon riparian forests.	Occurs in the southern half of Arizona.	Known to occur
Sulphur-bellied flycatcher (*Myiodynastes luteiventris*)	TNF: S, SCC				Preferred habitat includes sycamore-walnut canyons; species only present in Arizona during its breeding season. They are cavity nesters in broad-leaved riparian trees or occasionally use provided nest boxes (Corman and Wise-Gervais 2005).	Occurs in southeast and central Arizona.	Unlikely to occur
Arizona Botteri's sparrow (*Peucaea botterii arizonae*)	BLM: S				Species is found in grasslands with scattered mesquite trees.	Occurs in southeastern Arizona.	Unlikely to occur
Desert purple martin (*Progne subis hesperia*)	TNF: SCC BLM: S		Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2009, 2012, 2013, 2015)		Habitat consists of Sonoran Desert with many large saguaros proximal to water.	Occurs in southern and central Arizona, only present during breeding season.	Known to occur

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Yuma Ridgeway's rail (*Rallus longirostris yumanensis*)	ESA: E (Gila, La Paz, Maricopa, Mohave, Pinal, and Yuma Counties) BLM: S				Found in freshwater and brackish marshes below 4,500 feet amsl. This species is found in Gila, La Paz, Maricopa, Mohave, Pinal, and Yuma Counties.	Occurs in western and central Arizona.	Unlikely to occur
California least tern (*Sternula antillarum browni*)	BLM: S				Habitat includes seacoasts, beaches, bays, estuaries, lagoons, lakes, and rivers.	Species is rarely found in the state; one breeding record occurred in 2009 in Maricopa County, but the species has not bred in the state since then.	Unlikely to occur
Mexican spotted owl (*Strix occidentalis lucida*)	ESA: T (All Arizona Counties except La Paz and Yuma Counties) BLM: S				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 (*Pinus ponderosa*)-Gambel oak (*Quercus gambelii*). Nests in live trees on natural platforms (e.g., dwarf mistletoe [*Arceuthobium* spp.] brooms), snags, and canyon walls at elevations between 4,100–9,000 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs throughout Arizona, except in La Paz and Yuma Counties.	Unlikely to occur
Le Conte's thrasher (*Toxostoma lecontei*)	BLM: S				A year-round resident in western Arizona, southern Nevada, southern California, and into northern Sonora, Mexico. Suitable habitats are desert flats with sparse, scattered low shrubs. Favors saltbush vegetation and mesquite and cholla cactus.	Occurs in southwestern Arizona.	Unlikely to occur
Pacific wren (*Troglodytes pacificus*)	TNF: SCC				Commonly found from the coastal islands of Alaska southward to the northern Rockies and northern California, the species has been known to winter near the Mogollon Rim. Wintering habitat in Arizona consists of woodlands and brushy vegetation.	Occurs along the Mogollon Rim.	Unlikely to occur
Gila longfin dace (*Agosia chrysogaster chrysogaster*)	TNF: SCC BLM: S	Gila River: Upstream of Box O Wash (1994), Gila River: Kelvin (1994), Tortilla Mountains: Gila River (1994), Gila River: Cochran (1993), Tortilla Mountains: Walnut Canyon (1994), Mineral Creek (1999, 2000, 2010)	Mineral Creek (WestLand 2009, 2018)		Habitat varies from intermittent hot low-desert streams to clear, cool streams at higher elevations; prefers medium-sized to small streams with sandy/gravely bottoms and pools with some cover. Species is normally found below 4,900 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Known to occur
Desert sucker (*Catostomus clarki*)	TNF: S BLM: S	Gila River: North Butte (1994), Gila River: Kelvin (1994), Gila River: Riverside (1994), Gila River: Cochran (1996)			Species is found in flowing pools of streams and rivers with a gravel substrate; elevational range of 480–8,840 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Known to occur

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Bluehead sucker (*Catostomus discobolus*)	BLM: S				Species occurs in a variety of habitats from small streams to large rivers ranging from cold, clear streams to warm, turbid rivers; elevational range of 2,001–6,759 feet amsl.	Occurs in the Colorado River mainstem and Grand Canyon tributaries.	Unlikely to occur
Sonora sucker (*Catostomus insignis*)	TNF: S BLM: S	Gila River: Kelvin (1994), Gila River: Riverside (1994), Gila River: Cochran (2001)			Found in a variety of habitats from warm rivers to cool streams; prefers gravelly or rocky pools in elevations ranging from 1,210–8,730 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Known to occur
Little Colorado sucker (*Catostomus sp.*)	BLM: S				Species prefers creeks, small to medium rivers, and impoundments most often with abundant cover; elevational range of 2,200–7,100 feet amsl.	Species is endemic to the upper portion of the Little Colorado River and some of its north-flowing tributaries.	Unlikely to occur
Desert pupfish (*Cyprinodon macularius*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Santa Cruz, and Yavapai Counties) BLM: S	Mineral Mountain vicinity: West of Box Canyon (1983), Queen Creek: West of Superior (2003)			Restricted to three natural populations in California and the non-natural irrigation drains around the Salton Sea. Also found in restricted locations in Sonora and Baja California, Mexico. One natural population still occurs in Quitobaquito Spring and pond in Pima County and reintroductions have been made in Pima, Pinal, Maricopa, Graham, Cochise, La Paz, and Yavapai Counties, Arizona. Found in shallow water of desert springs, small streams, and marshes below 5,000 feet amsl elevation. The species tolerates high salinities and high water temperatures.	Occurs in Cochise, Gila, Graham, Maricopa, Pima, Santa Cruz, and Yavapai Counties.	Known to occur
Gila chub (*Gila intermedia*)	ESA: E (Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties) BLM: S	Dripping Springs Mountains: Mineral Creek (1999), Dripping Springs Mountains: Devil's Canyon (2000)			Found in pools, springs, cienegas, and streams at elevations between 2,000 and 5,500 feet amsl. The species is dependent on undercut banks, terrestrial vegetation, boulders, root wads, fallen logs, and thick overhanging or aquatic vegetation for cover. This species occurs in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Known to occur
Headwater chub (*Gila nigra*)	TNF: S BLM: S				Species is found in the middle to headwater reaches of medium-sized streams with large pools and cover; elevational range of 3,030–6,560 feet amsl.	Occurs in Gila, Graham, and Yavapai Counties.	Unlikely to occur
Roundtail chub (*Gila robusta*)	TNF: S BLM: S				Species prefers cool to warm water in mid-elevation streams and rivers with pools up to 6.6 feet deep near flowing water. Cover consists of boulders, tree roots, deep water and submerged vegetation. Elevational range of 1,210–7,220 feet amsl.	Occurs in Apache, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pinal, and Yavapai Counties.	Unlikely to occur
Little Colorado spinedace (*Lepidomeda vittata*)	ESA: T (Apache, Coconino and Navajo Counties) BLM: S				Habitat consists of medium to small streams and is characteristically found in pools with water flowing over fine gravel and silt-mud substrates; elevational range of 4,000–8,000 feet amsl.	Found in East Clear Creek and its tributaries, Chevelon and Silver Creeks, and Nutrioso Creek and the Little Colorado River.	Unlikely to occur

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Spikedace (*Meda fulgida*)	ESA: E (Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties) BLM: S	Gila River: Cochran (1991), Gila River: Donnelly Wash vicinity (1991)			Mid-water habitats, including runs, pools, and swirling eddies below 4,500 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties.	Occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties.	Known to occur
Gila topminnow (including Yaqui) (*Poeciliopsis occidentalis*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties) BLM: S	Boyce Thompson Arboretum (2003)			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. This species is found in Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs in Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Known to occur
Colorado pikeminnow (*Ptychocheilus lucius*)	ESA: E, ENE (Gila, Maricopa, and Yavapai Counties)				Juveniles prefer slack water, backwater, and side channels with little or no flow and silty substrates; adults use turbid, deep, and fast flowing waters. Species was reintroduced at an elevation of 1,960 feet amsl. Nonessential experimental populations of this fish in Arizona are located in the Salt and Verde River drainages. This species is found in Coconino, Gila, Maricopa, and Yavapai Counties.	Occurs in Gila, Maricopa, and Yavapai Counties.	Unlikely to occur
Speckled dace (*Rhinichthys osculus*)	BLM: S				Species prefers rocky areas of riffles, runs, pools, creeks, and small to medium-sized rivers.	Occurs in the Colorado, Bill Williams, and Gila River drainages.	Unlikely to occur
Loach minnow (*Tiaroga cobitis*)	ESA: E (Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties) BLM: S				At elevations below 8,000 feet amsl in small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrography are important. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties.	Occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties.	Unlikely to occur
Razorback sucker (*Xyrauchen texanus*)	ESA: E (Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties) BLM: S				Found in riverine and lacustrine areas, generally not in fast-moving water, and may use backwaters at elevations below 6,000 feet amsl. This species is found in Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties.	Occurs in Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties.	Unlikely to occur
Netwing midge (*Agathon arizonicus*)	TNF: S				Confined to areas in the immediate vicinity of rapidly flowing streams.	Disjunct populations present in Gila and Graham counties. Recorded from Workman Creek in the Sierra Ancha Mountains, and from 6,000 to 9,300 feet in the Pinaleño Mountains.	Unlikely to occur
Parker's cylloepus riffle beetle (*Cylloepus parkeri*)	TNF: S, SCC				Habitat consists of small, rocky streams between 2,800–4,000 feet amsl.	Known only from creeks in the Bloody Basin, Yavapai County, Arizona.	Unlikely to occur

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Monarch butterfly (*Danaus plexippus* pop. 1)	TNF: SCC BLM: S				This species is designated as the California Overwintering Population. Overall, the monarch butterfly spends the spring and summer months across much of North America breeding, returning to Mexico during the fall and winter. The California Overwintering Population resides near the coastal regions of California. Species prefers riparian habitats with milkweed present.	Occurs throughout Arizona.	Possible to occur
A mayfly (*Fallceon eatoni*)	TNF: S				Aquatic areas. Rediscovered in 2005 from a single specimen taken in the Salt River Canyon, Gila County, Arizona (McCafferty 2006).	Occurs in Gila County, Arizona.	Unlikely to occur
Bylas springsnail (*Pyrgulopsis arizonae*)	BLM: S				Species is found in springs ranging from 26–32 degrees Celsius with submergent vegetation.	Found in three springs along the Gila River between Bylas and Pima in Graham County, Arizona.	Unlikely to occur
Fossil springsnail (*Pyrgulopsis simplex*)	TNF: S, SCC				Habitat is only present at headsprings and upper section of the outflow, generally found on rocks or aquatic macrophytes in moderate current.	The known distribution of this species is limited to an unnamed spring near Strawberry, Arizona, and at Fossil Springs in Yavapai County.	Unlikely to occur
Phoenix talussnail (*Sonorella allynsmithi*)	TNF: SCC BLM: S				Species prefers talus slopes in mid-elevation areas of the Sonoran Desert.	Occurs in Maricopa County, Arizona.	Unlikely to occur
Sonoran talussnail (*Sonorella magdalenensis*)	BLM: S				Species prefers talus slopes of coarse broken rock; elevational range of 2,750–6,000 feet amsl.	Occurs in Pima and Santa Cruz Counties, Arizona.	Unlikely to occur
Arizona cave amphipod (*Stygobromus arizonensis*)	BLM: S				Species prefers aquatic habitat in subterranean caves and mines; found at elevations of 5,245 feet amsl.	Found only at two locations in Cochise County, Arizona.	Unlikely to occur
Gila tryonia (*Tryonia gilae*)	BLM: S				Species is found in mildly thermal springs with submergent vegetation; elevational range of 2,600– 2,800 feet amsl.	Found in an unnamed spring north of Bylas, also in Cold Springs and Porter Wash in Graham County, Arizona.	Unlikely to occur
A caddisfly (*Wormaldia planae*)	TNF: S				This species is primarily a neotropical species, with a limited distribution in Arizona (Muñoz-Quesada and Holzenthal 2008). Occurs in central Arizona, near Camp Verde, Beaver Creek, Sycamore Creek, and Fossil Creek. Typically occurs in mountainous regions, in cooler, spring-fed streams. Has been found in upper portions of slow-speed streams with rocky substrate.	Occurs in Gila and Yavapai Counties, recently found in Line Fossil Creek, Fossil Creek, Beaver Creek, below the outlet of Montezuma Well, and an unnamed stream at Ward Ranch.	Unlikely to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Occurrence Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Peg Leg Analysis Area**
Sonoran pronghorn (*Antilocapra americana sonoriensis*)	ESA: ENE (La Paz, Maricopa, Pima, Pinal, Santa Cruz and Yuma Counties) BLM: S				Found in Sonoran desertscrub within broad, intermountain, alluvial valleys with creosote (*Larrea tridentata*)-bursage (*Ambrosia* spp.) and palo verde-mixed cacti associations at elevations between 2,000–4,000 feet amsl. The only extant U.S. population is in southwestern Arizona; however, reintroductions have occurred in La Paz County. This species is found in La Paz, Maricopa, Pima, Pinal, Santa Cruz, and Yuma Counties.	Occurs in southwestern Arizona.	Unlikely to occur
Mexican gray wolf (*Canis lupis baileyi*)	ESA: E (Apache and Greenlee Counties) TNF: ENE BLM: S				Found in variety of vegetation types, except low deserts. Cover, water, and sufficient prey, such as deer and elk, are important. Reintroduction areas are typically rugged lands in coniferous forest. Elevational range of 3,000–12,000 feet amsl. This species is found in Apache, Coconino, Gila, Greenlee, and Navajo Counties.	Occurs in Apache and Greenlee Counties; reintroductions are occurring in Apache County. All packs are currently located on the Apache-Sitgreaves National Forest (AGFD 2018).	Unlikely to occur
Mexican long-tongued bat (*Choeronycteris mexicana*)	BLM: S				Habitat includes mesic areas in canyons of mixed oak-conifer forests in mountains rising from the desert. Roosts in daytime in caves, abandoned mines, and rockshelters and occasionally in palo verde-saguaro areas. Typically at elevations of 2,540– 7,320 feet amsl.	Occurs in southeastern Arizona from the Chiricahua Mountains west to the Baboquivari Mountains and as far north as the Santa Catalina Mountains. Heritage Data Management System unpublished records from Pinal, Pima, Graham, Santa Cruz and Cochise Counties.	Unlikely to occur
Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)	TNF: S BLM: S AGFD: SGCN 1B				This bat occurs in most of Arizona except the low-elevation deserts of the southwestern portion of the state. In summer, the species is found in caves and mines in elevations ranging from 550–7,520 feet amsl; in winter, the species is found in cold caves, lava tubes and mines in higher elevations than summer.	Occurs throughout Arizona.	Known to occur
Gunnison's prairie dog (*Cynomys gunnisoni*)	BLM: S				Species prefers high mountain valleys and plateaus; elevational range of 6,000–12,000 feet amsl.	Occurs in central and eastern Arizona	Unlikely to occur
Black-tailed prairie dog (*Cynomys ludovicianus*)	BLM: S				Habitat is dry, flat, open plains and desert grasslands; elevational range of 2,300–7,200 feet amsl.	Occurs in southeast Arizona where they have been reintroduced to the Las Cienegas National Conservation Area.	Unlikely to occur
Banner-tailed kangaroo rat (*Dipodomys spectabilis*)	BLM: S				Habitat is Great Basin desertscrub, desert grasslands with mesquite, junipers or shrubs; elevational range of 3,500–4,000 feet amsl.	Occurs in Pima and Cochise Counties.	Unlikely to occur
Spotted bat (*Euderma maculatum*)	TNF: S AGFD: SGCN 1B BLM: S				Habitat can vary widely from dry deserts to conifer forest, prefers to roost in crevices and cracks in cliff faces; elevational range of 110–8,670 feet amsl.	Occurs in Yuma and Maricopa County, and eastern Arizona.	Unlikely to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Occurrence Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Peg Leg Analysis Area**
Greater western mastiff bat (*Eumops perotis californicus*)	BLM: S AGFD: SGCN 1B		East Plant; Devil's Canyon; Queen Creek; near west vicinity; Near West (WestLand 2012, 2018)		Species prefers lower and upper Sonoran desertscrub near cliffs with lots of crevices; elevational range of 240–8,475 feet amsl.	Occurs throughout Arizona.	Known to occur
Allen's lappet-browed or big-eared bat (*Idionycteris phyllotis*)	TNF: S, SCC BLM: S				Found in ponderosa pine, pinyon-juniper, Mexican woodland and riparian areas with cottonwoods, sycamores and willows; also have records from desertscrub and white fir habitats; elevational range of 1,320–9,800 feet amsl.	Occurs throughout Arizona except for deserts in southwestern Arizona.	Unlikely to occur
Western red bat (*Lasiurus blossevillii*)	TNF: S, SCC		East Plant; Devil's Canyon; Queen Creek; near west vicinity (WestLand 2012)		Distribution in Arizona is from the southeast corner of the state northwest along the Mogollon Rim to near Flagstaff, with outlier records in Grand Canyon and at the Bill Williams River near its confluence with the Colorado River. Habitat consists of riparian and wooded areas; typically roosts in cottonwood trees; elevational range of 1,900–7,200 feet amsl.	Distribution in Arizona is from the southeast corner of the state northwest along the Mogollon Rim to near Flagstaff, with outlier records in Grand Canyon and at the Bill Williams River near its confluence with the Colorado River.	Known to occur
Western yellow bat (*Lasiurus xanthinus*)	(Added per request from AGFD) AGFD: SGCN 1B				Species may be associated with palm trees, sycamores, hackberries, and cottonwoods. Habitat consists of riparian and wooded areas; typically roosts in cottonwood trees; elevational range of 1,900–7,200 feet amsl.	Occurs throughout Arizona; historically found near Phoenix and Casa Grande.	Possible to occur
Ocelot (*Leopardus* [*Felis*] *pardalis*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Pinal, and Santa Cruz Counties) BLM: S	Devil's Canyon (2011)			Habitats preferred by ocelots are variable, from tropical semiarid deserts to brushy forests and semiarid deserts in the northern part of its range. Densely vegetated movement corridors and small, semi-isolated habitat patches are important for facilitating dispersal movements in fragmented habitats. The current distribution extends into southern Arizona; dispersing individuals range more widely, as evidenced by the 2010 roadkill (on U.S. Route 60) near Top-of-the-World, Gila County. Little is known about ocelot habitat use in Arizona and Sonora, Mexico. Current information is lacking to draw conclusions about ocelot populations in Arizona although more sightings have been substantiated recently in southern Arizona, in the vicinity of the U.S.-Mexico border. No information exists as to any established or breeding populations in Arizona. The individual killed near Top-of-the-World, between Superior and Globe along U.S. Route 60, is considered by some to be an extreme occurrence and well beyond its reasonable range.	Occurs in Cochise, Gila, Graham, Maricopa, Pima, Pinal, and Santa Cruz Counties.	Unlikely to occur
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	BLM: S				Habitat consists of desert grasslands and shrublands in elevations ranging from 1,190–7,320 feet amsl; present only in summer.	Occurs in Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yavapai, and Yuma Counties.	Possible to occur

Common Name (*Scientific Name*)	**Status***	**Heritage Data Management System Records within 5 miles**	**Baseline Data Records**	**Other Occurrence Records (eBird, SWCA or Tonto National Forest Site Visits)**	**Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)**	**Geographical Range in Arizona**	**Likelihood of Occurrence in Peg Leg Analysis Area**
California leaf-nosed bat (*Macrotus californicus*)	TNF: SCC BLM: S	Tortilla Mountains: Gila River (2000), Dripping Springs Mountains: Mineral Creek (1999)	Oak Flat (immediate vicinity), Near West (WestLand 2012, 2018)		Species prefers Sonoran desertscrub; roosts in mines, caves and rockshelters that have large areas of ceiling and flying space; elevational range of 160–3,980 feet amsl.	Occurs south of the Mogollon Plateau and in Mohave County.	Known to occur
Arizona myotis (*Myotis occultus*)	BLM: S				Found in ponderosa pine and oak-pine woodlands near water, can also be found in riparian forests along the lower Colorado and Verde rivers; elevational ranges of 150–1,000 feet (lower Colorado River) and 3,200–8,620 feet amsl.	Occurs in central and eastern Arizona.	Unlikely to occur
Cave myotis (*Myotis velifer*)	BLM: S	Dripping Springs Mountains: Mineral Creek (2001)	Oak Flat (immediate vicinity), Near West (WestLand 2012, 2018)		Found in Arizona, the south-central United States, and throughout the interior mountainous regions of Mexico. Habitat consists of creosote, brittlebush, palo verde, and cacti; roosts in caves, tunnels, mineshafts, under bridges and sometimes in buildings. Elevational range of 300–5,000 feet amsl.	Occurs south of the Mogollon Plateau.	Known to occur
Jaguar (*Panthera onca*)	ESA: E (Cochise, Pima and Santa Cruz Counties) BLM: S				Variety of habitats, prefers lowland wet habitats but also occurs in drier habitats such as oak-pine woodlands; elevational range is rarely above 8,500 feet amsl.	Occurs in Cochise, Pima, and Santa Cruz Counties.	Unlikely to occur
Brazilian free-tailed bat (*Tadarida brasiliensis*)	(Added per request from AGFD) AGFD: SGCN 1B	Picketpost Mountain: Pott's Canyon (2017)	Oak Flat (immediate vicinity), Near West (WestLand 2012, 2018)		A species that is distributed across much of the southern United States with the largest concentrations residing in the western United States. Preferred habitat is the Upper and Lower Sonoran life zones and commonly roosts in caves, abandoned mines, under bridges, in buildings, and hollow trees. Elevational ranges between 450–8,475 feet amsl.	Occurs throughout the state during summer; only in the southern half of state during winter.	Known to occur
Arizona striped whiptail (*Aspidoscelis arizonae*)	BLM: S				Species prefers semidesert grasslands in low valleys and sandy flats.	Species only occurs near Willcox, Cochise County, Arizona and in Whitlock Valley, Graham County, Arizona.	Unlikely to occur
New Mexico ridge-nosed rattlesnake (*Crotalus willardi obscurus*)	ESA: T (Cochise County) BLM: S				Habitat includes rocks, bunchgrass, and leaf litter in steep rocky canyons in the pine-oak and pine-fir belts at elevations of 5,600–9,000 feet amsl.	Occurs only in the Peloncillo Mountains of Cochise County.	Unlikely to occur

Common Name (*Scientific Name*)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Occurrence Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Peg Leg Analysis Area
Sonoran Desert tortoise (*Gopherus morafkai*)	TNF: S BLM: S	Gila River: southeast of Kearny (1995), Tortilla Mountains (2011, 2014), South Butte: south of the Gila River (1990), North of Gila River: east of Dozer Hill (1997), Walnut Canyon (1994), northeast of Florence: south of Mineral Mountain (2015), Black Hill vicinity (1984), Cottonwood Canyon (2007), Arnett Creek (2017), Telegraph Canyon (1990), Belmont Canyon (1990), Picketpost Mountain (1990), Raymert Wash (1990), Queen Creek (2016), Whitlow Ranch (2014), Whitlow Canyon (2014), Hewitt Canyon (2016)	Tailings Area, Far West Parcel, Near West (WestLand 2013, 2014, 2018)		The range of the species in Arizona is most of the southwestern half of the state, below the Mogollon Rim, and north to Lake Mead. Habitat includes desertscrub to semidesert grassland and interior chaparral; elevational range of 510–5,300 feet amsl.	Occurs in the southern and southwestern part of Arizona.	Known to occur
Sonora mud turtle (*Kinosternon sonoriense sonoriense*)	BLM: S				Species prefers springs, creeks, and ponds of intermittent streams.	Found in the Gila River drainage of central and southeastern Arizona; Quitobaquito Spring; Laguna Dam area; and Big Sandy-Burro River drainages.	Unlikely to occur
Slevin's bunchgrass lizard (*Sceloporus slevini*)	BLM: S				Species prefers coniferous forests around bunchgrass in open sunny areas; elevational range of 4,300–9,480 feet amsl.	Found only in the mountains of extreme southeastern Arizona.	Unlikely to occur
Desert massasauga (*Sistrurus catenatus edwardsii*)	BLM: S				Species prefers tobosa grasslands in sloping bajadas with surface rocks; elevational range of 4,400–4,700 feet amsl.	Occurs in extreme southeastern Arizona in San Bernardino and Sulphur Springs Valley.	Unlikely to occur
Desert ornate box turtle (*Terrapene ornata*)	BLM: S	Gila River: town of Kearny (2003)			This species' range is from southern Texas to southern New Mexico and into parts of southern Arizona as well as in the states of Chihuahua and Sonora in Mexico. Species prefers grasslands but is also occasionally found in desertscrub; elevational range of 2,000–7,100 feet amsl.	Occurs in the southeast corner of the state from Winkelman to the Huachuca Mountains.	Known to occur
Northern Mexican gartersnake (*Thamnophis eques megalops*)	ESA: T (All counties except Maricopa and Yuma Counties) BLM: S				Inhabits streams, rivers, cienegas, and ponds with dense shoreline vegetation from Sonoran desertscrub up into Petran montane conifer forest. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Mohave, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs throughout Arizona except Maricopa and Yuma Counties.	Unlikely to occur

Common Name (*Scientific Name*)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Occurrence Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Soils, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Peg Leg Analysis Area
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)	ESA: T (Apache, Coconino, Gila, Graham, Greenlee, Navajo, and Yavapai Counties) TNF: S BLM: S				Species prefers pinyon-juniper and pine-oak woodlands, ranging into ponderosa pine at elevations between 2,440– 8,080 feet amsl; species needs permanent water source.	Occurs in Apache, Coconino, Gila, Graham, Greenlee, Navajo, and Yavapai Counties.	Unlikely to occur
Bezy's night lizard (*Xantusia bezyi*)	TNF: S, SCC				Species prefers rocky slopes in upland Sonoran desertscrub and chaparral vegetation types; elevational range of 2,400– 5,800 feet amsl.	Occurs in Gila, Pinal and Maricopa Counties.	Possible to occur

Sources: Unless otherwise noted, range or habitat information is from AGFD abstracts (2020); Heritage Data Management System (2018); Kaufman (2001); NatureServe (2017); Tonto National Forest Final Assessment (Forest Service 2017); Tonto National Forest Threatened, Endangered, and Sensitive Species Abstracts (Forest Service 2000); U.S. Fish and Wildlife Service Arizona Ecological Services Field Office (U.S. Fish and Wildlife Service 2020).

Note: Occurrence evaluation is based on the proposed action mining component and its associated 5-mile analysis area.

* Status definitions are as follows:

Arizona Game and Fish Department (AGFD):

SGCN 1A = Species of Greatest Conservation Need Tier 1A. Species for which the AGFD has entered into an agreement or has legal or other contractual obligations or species that warrant the protection of a closed season.

SGCN 1B = Species of Greatest Conservation Need Tier 1B. Vulnerable species.

SGCN 1C = Species of Greatest Conservation Need Tier 1C. Species for which insufficient information is available to fully assess the vulnerabilities and, therefore, need to be watched for signs of stress.

Not all species with an SGCN status are addressed as part of these analyses; however, Brazilian free-tailed bat and western yellow bat were added to the analysis at the request of the AGFD, a cooperating agency.

Bald and Golden Eagle Protection Act (BGEPA):

A U.S. Federal statute that protects two species of eagle.

Bureau of Land Management (BLM):

S = Sensitive. Species that could easily become endangered or extinct in the state.

Endangered Species Act (ESA):

E = Endangered. Endangered species are those in imminent jeopardy of extinction. The 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.

T = Threatened. Threatened species are those that are likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

ENE = Reintroduced populations designated as Experimental – Nonessential, under the ESA.

Tonto National Forest (TNF):

S = Sensitive. Species identified by a regional forester for which population viability is a concern, as evidenced by 1) significant current or predicted downward trend in population number or density; or 2) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

SCC = Species of Conservation Concern. [5] A plant or animal for which we have concerns about its ability to remain on a landscape for a long time.

[5] Note that species of conservation concern is not considered a valid designation at this time and will not be until the revision of the Tonto Forest Plan is complete. This designation does not appear in the EIS and was included at the request of the cooperating agencies and categorized as other species of interest in the DEIS. A new draft list of species of conservation concern came out in 2019. Some species on the 2019 list overlap with other special-status designations and are analyzed in this document; however, the following species are included in that list but are not analyzed here: Ancha Mountainsnail (*Oreohelix anchana*), Galiuro talussnail (*Sonorella galiurensis*), Milk Ranch talussnail (*Sonorella micromphala*), Richinbar talussnail (*Sonorella ashmuni*), Roosevelt talussnail (*Sonorella rooseveltiana*), Sierra Ancha talussnail (*Sonorella anchana*), and Verde Rim springsnail (*Pyrgulopsis glandulosa*).

Table A4. Special-Status Wildlife Species Analyzed for Alternative 6 – Skunk Camp

Common Name (Scientific Name)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Occurrence Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Skunk Camp Analysis Area
Western barking frog (*Craugastor augusti cactorum*)	TNF: S				Species prefers outcrops or caves on rocky slopes in oak/pine-oak associations; elevational range of 4,200– 6,200 feet above mean sea level (amsl).	Occurs in rocky outcrops in Cochise and southern Pima and Santa Cruz Counties, in the Quinlan, Santa Rita, Patagonia, Huachuca, and Pajarito mountain ranges.	Unlikely to occur
Northern leopard frog (*Lithobates* [*Rana*] *pipiens*)	TNF: S				Range of habitats that includes grasslands, brush land, and forests, usually in permanent water; elevational range of 2,640–9,155 feet amsl.	Found in northern and central Arizona.	Unlikely to occur
Lowland leopard frog (*Lithobates yavapaiensis*)	TNF: S, SCC	Arnett Creek (2010), Telegraph Canyon (2016), Rio Rancho Creek (2017), Queen Creek (1992), Pinal Mountains: west of Iron Canyon (2010), Pinal Mountains: west of El Capitan Canyon (1990), Wood Canyon (2016), Government Mountain (2017), Pinto Creek (2005)	Tailings corridor; East Plant; Devil's Canyon; Queen Creek; Oak Flat; Mineral Creek (WestLand 2009, 2018)		Aquatic systems in elevations ranging from 480–6,200 feet amsl; species is found using a variety of habitats, both natural and human made.	Occurs in central and southeastern Arizona.	Known to occur
Chiricahua leopard frog (*Rana chiricahuensis*)	ESA: T (All Arizona counties except La Paz, Mohave, Pinal, Yuma Counties)				Headwater streams, springs, and livestock tanks. An important characteristic of habitat is that it be free or have low levels of nonnative species, including nonnative fish, crayfish, bull frogs (*Lithobates catesbeianus*), and barred tiger salamanders (*Ambystoma mavortium*). This species occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs along the Mogollon Rim and in mountainous areas of southeastern Arizona.	Unlikely to occur
Northern goshawk (*Accipiter gentilis*)	TNF: S		Oak Flat/Boyce Thompson IBA (WestLand 2012, 2015)		Species is found in wide variety of forest associations, including deciduous, coniferous and mixed forests; prefers mature forests for breeding in elevations ranging from 4,750–9,120 feet amsl. The project action area is at the western edge of the documented breeding range of the species (Corman and Wise-Gervais 2005).	Occurs throughout Arizona.	Known to occur
Clark's grebe (*Aechmophorus clarkia*)	TNF: SCC				Requires large, deep bodies of water for fishing.	Occurs throughout the state in winter; breeding occurs in Mohave and La Paz Counties.	Unlikely to occur
Western grebe (*Aechmophorus occidentalis*)	TNF: SCC				Requires large, deep bodies of water for fishing.	Occurs throughout the state in winter; breeding occurs in Coconino, Yavapai, Maricopa, Pinal, and Pima Counties.	Unlikely to occur

Common Name (Scientific Name)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Occurrence Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Skunk Camp Analysis Area
Golden eagle (*Aquila chrysaetos*)	BGEPA: Yes	Walnut Canyon (2016), Hewitt Ridge (2014)	Devil's Canyon; Queen Creek; Boyce Thompson IBA (WestLand 2012, 2015)		Species prefers mountainous areas; nesting occurs at elevations between 4,000–10,000 feet amsl.	Occurs throughout Arizona.	Known to occur
Red-faced warbler (*Cardellina rubrifrons*)	TNF: SCC				Summer resident only; occurs in montane fir, pine, and pine-oak woodlands at elevations between 5,400 and 9,000.	Occurs along the Mogollon Rim and in southeastern Arizona.	Possible to occur
American dipper (*Cinclus mexicanus*)	TNF: SCC				Requires fast-flowing streams in high-elevation forests.	Occurs in central and northern Arizona.	Unlikely to occur
Western yellow-billed cuckoo (distinct population segment) (*Coccyzus americanus*)	ESA: T (all Arizona counties) TNF: S	Dripping Spring Mountains: vicinity of Government Mountain (2011), Devil's Canyon (2011), Whitlow Ranch Dam (2000)	Devil's Canyon; Queen Creek; Whitlow Dam; Apache Leap; Oak Flat; Rancho Rio Creek; Mineral Creek (WestLand 2012, 2015, 2017, 2019)		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. This species is found in all counties in Arizona.	Occurs throughout Arizona.	Known to occur
Gilded flicker (*Colaptes chrysoides*)	TNF: SCC		Devil's Canyon (2012) Apache Leap (2015), Arnett Creek (2017)		Habitat includes stands of large saguaros, Joshua trees, and low-elevation riparian groves.	Occurs in southern, central, and western Arizona.	Known to occur
Olive-sided flycatcher (*Contopus cooperi*)	TNF: SCC		Boyce Thompson (1989)		Species is only present in summer; breeding habitat includes mixed-conifer forests near open areas with lots of snags; in migration can be found in almost any habitat.	Occurs throughout Arizona.	Possible to occur
Broad-billed hummingbird (*Cynanthus latirostris*)	TNF: SCC		Apache Leap; Queen Creek; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2012); Queen Creek (2017)		Preferred habitat is rocky canyons in desert-like mountain habitats, can be found in foothills, canyons, arroyos, along streams, and in deserts.	Occurs in southeastern and central Arizona.	Known to occur
Southwestern willow flycatcher (*Empidonax traillii extimus*)	ESA: E (all counties except Navajo County)	Dripping Spring Mountain: vicinity of Government Mountain (2011), Devil's Canyon (2011), Queen Creek: Whitlow Ranch Dam (2000)	Queen Creek near Boyce Thompson (WestLand 2017)		Found in dense riparian habitats along streams, rivers, and other wetlands where cottonwood, willow, boxelder (*Acer negundo*), tamarisk (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), buttonbush (*Cephalanthus* spp.), and arrowweed (*Pluchea sericea*) are present. Nests are found in thickets of trees and shrubs, primarily those that are 13–23 feet high, among dense, homogeneous foliage. Habitat occurs at elevations below 8,500 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, and Yuma Counties.	Occurs throughout Arizona.	Known to occur

Common Name (Scientific Name)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Occurrence Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Skunk Camp Analysis Area
American peregrine falcon (*Falco peregrinus anatum*)	TNF: S	Oak Flat (2015)	East Plant; West Plant; Devil's Canyon; Queen Creek; Rancho Rio Creek; Apache Leap; Boyce Thompson IBA (WestLand 2004, 2009, 2012, 2015, 2017)		Species is found near cliffs overlooking habitats that support large numbers of birds; ranges in elevation from 400–9,000 feet amsl.	Occurs throughout Arizona.	Known to occur
MacGillivray's warbler (*Geothlypis tolmiei*)	TNF: SCC		Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2010, 2012, 2015)		The species is primarily a migratory species in Arizona; however, during breeding season, the species is known to take residence over the higher, forested elevations of northern Arizona, especially along the Mogollon Rim. Preferred habitat during breeding season includes mixed-coniferous forests with riparian areas that have low shrubs; in migration species can be found in a variety of habitats.	Occurs throughout Arizona.	Known to occur
Bald eagle (*Haliaeetus leucocephalus*)	BGEPA: Yes				Habitat components include large bodies of water with lots of coastline and tall perches above water to allow for hunting.	Occurs in central and northern Arizona.	Unlikely to occur
Yellow-eyed junco (*Junco phaeonotus*)	TNF: S, SCC				Habitat consists of open coniferous forest and pine-oak associations.	Occurs in central and southeastern Arizona.	Possible to occur
Lewis's woodpecker (*Melanerpes lewis*)	TNF: SCC		Oak Flat (WestLand 2012)		Distribution of the species is across the Four Corner states, the northern Rocky Mountains, and over the interior mountainous regions of Oregon and California. In Arizona, the species is common year-round across the higher, forested elevations of northern Arizona with some expansion of range into the southern Arizona deserts during the winter. Breeding habitats include open forests and woodlands that include oaks, ponderosa, pine, riparian woodlands, and orchards.	Occurs throughout Arizona.	Unlikely to occur
Elf owl (*Micrathene whitneyi*)	TNF: SCC		Magma Arizona Railroad Company Corridor, Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2012, 2015)		Species is present during breeding season only; found in desert-woodland washes, riparian forests, upland deserts, evergreen woodlands, and canyon riparian forests.	Occurs in the south half of Arizona.	Known to occur
Sulphur-bellied flycatcher (*Myiodynastes luteiventris*)	TNF: S, SCC				Preferred habitat includes sycamore-walnut canyons; species only present in Arizona during its breeding season. They are cavity nesters in broad-leaved riparian trees or occasionally use provided nest boxes (Corman and Wise-Gervais 2005).	Occurs in southeastern and central Arizona.	Unlikely to occur

Common Name (Scientific Name)	Status*	Heritage Data Management System Records within 5 miles	Baseline Data Records	Other Occurrence Records (eBird, SWCA or Tonto National Forest Site Visits)	Habitat Components (Elevation, Vegetation Association, Slope, Aspect, etc.)	Geographical Range in Arizona	Likelihood of Occurrence in Skunk Camp Analysis Area
Desert purple martin (*Progne subis hesperia*)	TNF: SCC		Apache Leap; Queen Creek Canyon; East Plant Site; Rancho Rio Creek; Devil's Canyon; Mineral Creek (WestLand 2009, 2012, 2013, 2015)		Habitat consists of Sonoran Desert with many large saguaros proximal to water.	Occurs in southern and central Arizona.	Known to occur
Yuma Ridgeway's rail (*Rallus longirostris yumanensis*)	ESA: E (Gila, La Paz, Maricopa, Mohave, Pinal, and Yuma Counties)				Found in freshwater and brackish marshes below 4,500 feet amsl. This species is found in Gila, La Paz, Maricopa, Mohave, Pinal, and Yuma Counties.	Occurs in western and central Arizona.	Unlikely to occur
Mexican spotted owl (*Strix occidentalis lucida*)	ESA: T (All Arizona counties except La Paz and Yuma Counties)	Pinal Mountains: Mill Creek (2003)			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 (*Pinus ponderosa*)-Gambel oak (*Quercus gambelii*). Nests in live trees on natural platforms (e.g., dwarf mistletoe [*Arceuthobium* spp.] brooms), snags, and canyon walls at elevations between 4,100 and 9,000 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs throughout Arizona, except La Paz and Yuma Counties.	Known to occur
Pacific wren (*Troglodytes pacificus*)	TNF: SCC				Commonly found from the coastal islands of Alaska southward to the northern Rockies and northern California, the species has been known to winter near the Mogollon Rim. Wintering habitat in Arizona consists of woodlands and brushy vegetation.	Occurs along the Mogollon Rim.	Unlikely to occur
Gila longfin dace (*Agosia chrysogaster chrysogaster*)	TNF: SCC	Tortilla Mountains: Gila River (1994), Mineral Creek (1999, 2000, 2010), Government Hill: Pinto Creek (2013)	Mineral Creek (WestLand 2009, 2018)		Habitat varies from intermittent hot low-desert stream to clear, cool streams at higher elevations; prefers medium-sized to small streams with sandy/gravely bottoms and pools with some cover. Species is normally found below 4,900 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Known to occur
Desert sucker (*Catostomus clarki*)	TNF: S	Gila River: Riverside (1994), northwest of Kearny: vicinity of Ray Junction (1998), Government Hill: Pinto Creek (2005)			Species is found in flowing pools of streams and rivers with a gravel substrate; elevational range of 480–8,840 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Known to occur
Sonora sucker (*Catostomus insignis*)	TNF: S	Gila River: Riverside (1994)			Found in a variety of habitats from warm rivers to cool streams, prefers gravelly or rocky pools in elevations ranging from 1,210–8,730 feet amsl.	Occurs in central, southern, and southeastern Arizona.	Known to occur

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Desert pupfish (*Cyprinodon macularius*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Santa Cruz, and Yavapai Counties)	Queen Creek: west of Superior (2003)			Restricted to three natural populations in California and the non-natural irrigation drains around the Salton Sea. Also found in restricted locations in Sonora and Baja California, Mexico. One natural population still occurs in Quitobaquito Spring and pond in Pima County and reintroductions have been made in Pima, Pinal, Maricopa, Graham, Cochise, La Paz, and Yavapai Counties, Arizona. Found in shallow water of desert springs, small streams, and marshes below 5,000 feet amsl elevation. The species tolerates high salinities and high water temperatures.	Occurs in Cochise, Gila, Graham, Maricopa, Pima, Santa Cruz, and Yavapai Counties.	Known to occur
Gila chub (*Gila intermedia*)	ESA: E (Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties)	Dripping Spring Mountains: Mineral Creek (1999), Devil's Canyon (2000)			Found in pools, springs, Cienegas, and streams at elevations between 2,000 and 5,500 feet amsl. The species is dependent on undercut banks, terrestrial vegetation, boulders, root wads, fallen logs, and thick overhanging or aquatic vegetation for cover. This species occurs in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Known to occur
Headwater chub (*Gila nigra*)	TNF: S				Species is found in the middle to headwater reaches of medium-sized streams with large pools and cover; elevational range of 3,030–6,560 feet amsl.	Occurs in Gila, Graham, and Yavapai Counties.	Unlikely to occur
Roundtail chub (*Gila robusta*)	TNF: S				Species prefers cool to warm water in mid-elevation streams and rivers with pools up to 6.6 feet deep near flowing water. Cover consists of boulders, tree roots, deep water and submerged vegetation. Elevational range of 1,210–7,220 feet amsl.	Occurs in Apache, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pinal, and Yavapai Counties.	Unlikely to occur
Spikedace (*Meda fulgida*)	ESA: E (Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties)				Mid-water habitats, including runs, pools, and swirling eddies below 4,500 feet amsl. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties.	Occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Pinal, and Yavapai Counties.	Unlikely to occur
Gila topminnow (including Yaqui) (*Poeciliopsis occidentalis*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties)	West of Mescal Mountains: south of Pasadera Mountain (1987), Boyce Thompson Arboretum (2003)			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. This species is found in Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs in Cochise, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Known to occur
Colorado pikeminnow (nonessential experimental) (*Ptychocheilus Lucius*)	ESA: E (Gila, Maricopa, and Yavapai Counties)				Juveniles prefer slack water, backwater, and side channels with little or no flow and silty substrates; adults use turbid, deep, and fast-flowing waters. Species was reintroduced at an elevation of 1,960 feet amsl. Nonessential experimental populations of this fish in Arizona are located in the Salt and Verde River drainages. This species is found in Coconino, Gila, Maricopa, and Yavapai Counties.	Occurs in Gila, Maricopa, and Yavapai Counties.	Unlikely to occur

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Loach minnow (*Tiaroga cobitis*)	ESA: E (Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties)				Found at elevations below 8,000 feet amsl in small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrography are important. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties.	Occurs in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Pinal, and Yavapai Counties.	Unlikely to occur
Razorback sucker (*Xyrauchen texanus*)	ESA: E (Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties)				Found in riverine and lacustrine areas, generally not in fast-moving water, and may use backwaters at elevations below 6,000 feet amsl. This species is found in Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties.	Occurs in Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, and Yuma Counties.	Unlikely to occur
Netwing midge (*Agathon arizonicus*)	TNF: S				Confined to areas in the immediate vicinity of rapidly flowing streams.	Disjunct populations present in Gila and Graham Counties. Recorded from Workman Creek in the Sierra Ancha Mountains, and from 6,000 to 9,300 feet in the Pinaleño Mountains.	Unlikely to occur
Parker's cylloepus riffle beetle (*Cylloepus parkeri*)	TNF: S, SCC				Habitat consists of small, rocky streams between 2,800 and 4,000 feet amsl.	Known only from creeks in the Bloody Basin, Yavapai County, Arizona.	Unlikely to occur
Monarch butterfly (*Danaus plexippus* pop. 1)	TNF: SCC				This species is designated as the California Overwintering Population. Overall, the monarch butterfly spends the spring and summer months across much of North America breeding, returning to Mexico during the fall and winter. The California Overwintering Population resides near the coastal regions of California. Species prefers riparian habitats with milkweed present.	Occurs throughout Arizona.	Possible to occur
A mayfly (*Fallceon eatoni*)	TNF: S				Aquatic areas. Rediscovered in 2005 from a single specimen taken in the Salt River Canyon, Gila County, Arizona (McCafferty 2006).	Occurs in Salt River Canyon, Gila County, Arizona.	Unlikely to occur
Fossil springsnail (*Pyrgulopsis simplex*)	TNF: S, SCC				Habitat is only present at headsprings and upper section of the outflow, generally found on rocks or aquatic macrophytes in moderate current.	The known distribution of this species is limited to an unnamed spring near Strawberry, Arizona, and at Fossil Springs in Yavapai County.	Unlikely to occur
Phoenix talussnail (*Sonorella allynsmithi*)	TNF: SCC				Species prefers talus slopes in mid-elevation areas of the Sonoran Desert.	Occurs in Maricopa County, Arizona.	Unlikely to occur

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A caddisfly (*Wormaldia planae*)	TNF: S				This species is primarily a neotropical species, with a limited distribution in Arizona (Muñoz-Quesada and Holzenthal 2008). Occurs in central Arizona, near Camp Verde, Beaver Creek, Sycamore Creek, and Fossil Creek. Typically occurs in mountainous regions, in cooler, spring-fed streams. Has been found in upper portions of slow-speed streams with rocky substrate.	Occurs in Gila and Yavapai Counties.	Unlikely to occur
Sonoran pronghorn (*Antilocapra americana sonoriensis*)	ESA: ENE (La Paz, Maricopa, Pima, Pinal, Santa Cruz and Yuma Counties)				Found in Sonoran desertscrub within broad, intermountain, alluvial valleys with creosote (*Larrea tridentata*)-bursage (*Ambrosia* spp.) and palo verde-mixed cacti associations at elevations between 2,000 and 4,000 feet amsl. The only extant U.S. population is in southwestern Arizona; however, reintroductions have occurred in La Paz County. This species is found in La Paz, Maricopa, Pima, Pinal, Santa Cruz, and Yuma Counties.	Occurs in southwestern Arizona.	Unlikely to occur
Mexican gray wolf (*Canis lupis baileyi*)	ESA: E (Apache and Greenlee Counties)				Found in variety of vegetation types, except low deserts. Cover, water, and sufficient prey, such as deer and elk, are important. Reintroduction areas are typically rugged lands in coniferous forest. Elevational range of 3,000–12,000 feet amsl. This species is found in Apache, Coconino, Gila, Greenlee, and Navajo Counties.	Occurs in Apache and Greenlee Counties, reintroductions are occurring in Apache County.	Unlikely to occur
Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)	TNF: S AGFD: SGCN 1B	Dripping Spring Wash (2004)			This bat occurs in most of Arizona except the low-elevation deserts of the southwestern portion of the state. In summer, the species is found in caves and mines in elevations ranging from 550–7,520 feet amsl; in winter, the species is found in cold caves, lava tubes, and mines in higher elevations than summer.	Occurs throughout Arizona.	Known to occur
Spotted bat (*Euderma maculatum*)	TNF: S AGFD: SGCN 1B				Habitat can vary widely from dry deserts to conifer forest; prefers to roost in crevices and cracks in cliff faces; elevational range of 110– 8,670 feet amsl.	Occurs in Yuma and Maricopa County, and eastern Arizona.	Possible to occur
Allen's lappet-browed or big-eared bat (*Idionycteris phyllotis*)	TNF: S, SCC				Found in ponderosa pine, pinyon-juniper, Mexican woodland and riparian areas with cottonwoods, sycamores and willows; also have records from desertscrub and white fir habitats; elevational range of 1,320–9,800 feet amsl.	Occurs throughout Arizona except for deserts in southwestern Arizona.	Possible to occur
Western red bat (*Lasiurus blossevillii*)	TNF: S, SCC	Queen Creek: Whitlow Dam (1965), J K Mountain: Pinto Creek (2002)	East Plant; Devil's Canyon; Queen Creek; near west vicinity (WestLand 2012)		Distribution in Arizona is from the southeast corner of the state northwest along the Mogollon Rim to near Flagstaff, with outlier records in Grand Canyon and at the Bill Williams River near its confluence with the Colorado River. Habitat consists of riparian and wooded areas, typically roosts in cottonwood trees; elevational range of 1,900–7,200 feet amsl.	Distribution in Arizona is from the southeast corner of the state northwest along the Mogollon Rim to near Flagstaff, with outlier records in Grand Canyon and at the Bill Williams River near its confluence with the Colorado River.	Known to occur

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Western yellow bat (*Lasiurus xanthinus*)	(Added per request from AGFD) AGFD: SGCN 1B				Species may be associated with palm trees, sycamores, hackberries, and cottonwoods. Habitat consists of riparian and wooded areas; typically roosts in cottonwood trees; elevational range of 1,900–7,200 feet amsl.	Occurs throughout Arizona, historically found near Phoenix and Casa Grande.	Possible to occur
Ocelot (*Leopardus* [*Felis*] *pardalis*)	ESA: E (Cochise, Gila, Graham, Maricopa, Pima, Pinal, and Santa Cruz Counties)	Devil's Canyon (2011)			Habitats preferred by ocelots are variable, from tropical semiarid deserts to brushy forests and semiarid deserts in the northern part of its range. Densely vegetated movement corridors and small, semi-isolated habitat patches are important for facilitating dispersal movements in fragmented habitats. The current distribution extends into southern Arizona; dispersing individuals range more widely, as evidenced by the 2010 roadkill (on U.S. Route 60) near Top-of-the-World, Gila County. Little is known about ocelot habitat use In Arizona and Sonora, Mexico. Current information is lacking to draw conclusions about ocelot populations in Arizona although more sightings have been substantiated recently in southern Arizona, in the vicinity of the U.S.-Mexico border. No information exists as to any established or breeding populations in Arizona. The individual killed near Top-of-the-World, between Superior and Globe along U.S. Route 60, is considered by some to be an extreme occurrence and well beyond its reasonable range.	Occurs in Cochise, Gila, Graham, Maricopa, Pima, Pinal, and Santa Cruz Counties.	Unlikely to occur
California leaf-nosed bat (*Macrotus californicus*)	TNF: SCC	Tortilla Mountains: Gila River (2000), Dripping Springs Mountains: Dripping Springs Wash (2000), Dripping Springs Mountains: Dripping Spring Wash vicinity (1993), Mineral Creek (1999)	Oak Flat (immediate vicinity), Near West (WestLand 2012, 2018)		Species prefers Sonoran desertscrub; roosts in mines, caves, and rockshelters that have large areas of ceiling and flying space; elevational range of 160–3,980 feet amsl.	Occurs south of the Mogollon Plateau and in Mohave County.	Known to occur
Jaguar (*Panthera onca*)	ESA: E (Cochise, Pima, and Santa Cruz Counties)				Variety of habitats; prefers lowland wet habitats but also occurs in drier habitats such as oak-pine woodlands; elevational range of sightings in Arizona was from 5,200–5,700 feet amsl.	Occurs in Cochise, Pima, and Santa Cruz Counties.	Unlikely to occur
Brazilian free-tailed bat (*Tadarida brasiliensis*)	(Added per request from AGFD) AGFD: SGCN 1B	Picketpost Mountain: Pott's Canyon (2017)	Oak Flat (immediate vicinity), Near West (WestLand 2012, 2018)		A species that is distributed across much of the southern United States with the largest concentrations residing in the western United States. Preferred habitat is the Upper and Lower Sonoran life zones and commonly roosts in caves, abandoned mines, under bridges, buildings, and hollow trees. Elevational ranges between 450–8,475 feet amsl.	Occurs throughout the state during summer; only in the south half of state during winter.	Known to occur

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Sonoran Desert tortoise (*Gopherus morafkai*)	TNF: S	Cottonwood Canyon (2007), Arnett Creek (2017), Telegraph Canyon (1990), Belmont Canyon (1990), Picketpost Mountain (1990), Raymert Wash (1990), Queen Creek (2016), Whitlow Ranch (2014), Whitlow Canyon (2014), Hewitt Canyon (2016), Gila River: southeast of Kearny (1995), Kane Spring Canyon (1990)	Tailings Area, Far West Parcel, Near West (WestLand 2013, 2014, 2018)		The range of the species in Arizona is most of the southwest half of the state, below the Mogollon Rim, and north to Lake Mead. Habitat includes desertscrub to semidesert grassland and interior chaparral; elevational range of 510–5,300 feet amsl.	Occurs in the southern and southwestern part of Arizona.	Known to occur
Northern Mexican gartersnake (*Thamnophis eques megalops*)	ESA: T (All Arizona Counties except Maricopa and Yuma) TNF: S				Inhabits streams, rivers, cienegas, and ponds with dense shoreline vegetation from Sonoran desertscrub up into Petran montane conifer forest. This species is found in Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Mohave, Navajo, Pima, Pinal, Santa Cruz, and Yavapai Counties.	Occurs throughout Arizona except Maricopa and Yuma Counties.	Unlikely to occur
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)	ESA: T (Apache, Coconino, Gila, Graham, Greenlee, Navajo, and Yavapai Counties) TNF: S				Species prefers pinyon-juniper and pine-oak woodlands, ranging into ponderosa pine at elevations between 2,440–8,080 feet amsl; species needs permanent water source.	Occurs in Apache, Coconino, Gila, Graham, Greenlee, Navajo, and Yavapai Counties.	Unlikely to occur
Bezy's night lizard (*Xantusia bezyi*)	TNF: S, SCC	Queen Creek Canyon (2008)			Species prefers rocky slopes in upland Sonoran desertscrub and chaparral vegetation types; elevational range of 2,400–5,800 feet amsl.	Occurs in Gila, Pinal and Maricopa Counties.	Known to occur

Sources: Unless otherwise noted, range or habitat information is from AGFD abstracts (2020); Heritage Data Management System (2018); Kaufman (2001); NatureServe (2017); Tonto National Forest Final Assessment (Forest Service 2017); Tonto National Forest Threatened, Endangered, and Sensitive Species Abstracts (Forest Service 2000); U.S. Fish and Wildlife Service Arizona Ecological Services Field Office (U.S. Fish and Wildlife Service 2020).

Note: Occurrence evaluation is based on the proposed action mining component and its associated 5-mile analysis area.

* Status definitions are as follows:

Arizona Game and Fish Department (AGFD):

SGCN 1A = Species of Greatest Conservation Need Tier 1A. Species for which the AGFD has entered into an agreement or has legal or other contractual obligations or species that warrant the protection of a closed season.

SGCN 1B = Species of Greatest Conservation Need Tier 1B. Vulnerable species.

SGCN 1C = Species of Greatest Conservation Need Tier 1C. Species for which insufficient information is available to fully assess the vulnerabilities and, therefore, need to be watched for signs of stress.

Not all species with an SGCN status are addressed as part of these analyses; however, Brazilian free-tailed bat and western yellow bat were added to the analysis at the request of the AGFD, a cooperating agency.

Bald and Golden Eagle Protection Act (BGEPA):

A U.S. Federal statute that protects two species of eagles.

Endangered Species Act (ESA):

E = Endangered. Endangered species are those in imminent jeopardy of extinction. The 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.

T = Threatened. Threatened species are those that are likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

ENE = Reintroduced populations designated as Experimental – Nonessential, under the ESA.

Tonto National Forest (TNF):

S = Sensitive. Species identified by a regional forester for which population viability is a concern, as evidenced by 1) significant current or predicted downward trend in population number or density; or 2) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

SCC = Species of conservation concern.[6] A plant or animal for which we have concerns about its ability to remain on a landscape for a long time.

[6] Note that species of conservation concern is not considered a valid designation at this time and will not be until the revision of the Tonto Forest Plan is complete. This designation does not appear in the EIS and was included at the request of the cooperating agencies and categorized as other species of interest in the DEIS. A new draft list of species of conservation concern came out in 2019. Some species on the 2019 list overlap with other special-status designations and are analyzed in this document; however, the following species are included in that list but are not analyzed here: Ancha Mountainsnail (*Oreohelix anchana*), Galiuro talussnail (*Sonorella galiurensis*), Milk Ranch talussnail (*Sonorella micromphala*), Richinbar talussnail (*Sonorella ashmuni*), Roosevelt talussnail (*Sonorella rooseveltiana*), Sierra Ancha talussnail (*Sonorella anchana*), and Verde Rim springsnail (*Pyrgulopsis glandulosa*).

Appendix 2 – Literature Review of Artificial Light Effects on Wildlife Species

Stone et al. 2012. Impacts of LED Lights on Bats

Many studies have shown that artificial lights at night negatively affect bat roosting and foraging behavior; however, little is known about effects of LED lights on bats compared with traditional street lighting. A study was conducted to expand knowledge on the effects of LED streetlights on several bat species. Results concluded that LED light have a negative effect on slow-flying bat species but do not affect fast-flying bat species.

Stone et al. 2015. Mammalian Biology: Impacts of Artificial Lighting on Bats

Current trends of artificial lights and their effects on bat behavior are reviewed. Impacts of these effects are discussed and include spatial avoidance and habitat fragmentation, increased and reduced foraging opportunities, delayed emergence, spatial avoidance or roost abandonment, reduced reproductive success, and increased arousal from hibernation. Solutions to minimize effects are discussed and include avoidance, variable lighting regimes, reducing intensity of light, and changing the light type.

Troy. 2013. Dissertation. NESH – Light Studies, Seabird Fallout, and Habitat Suitability

A dissertation that included several large-scale geographic information system (GIS) studies on artificial light, seabird fallout, and habitat suitability of two endangered seabirds: Newell's shearwater (*Puffinus newelli*), and Hawaiian petrel (*Pterodroma sandwichensis*). Models are developed to hypothesize that few areas exist where no artificial light can be seen in first flights of the fledglings. Results are consistent with the hypothesis. Information provided by the studies may help with conservation methods.

Troy et al. 2013. Endangered Species Research. Using Observed Seabird Fallout Records to Infer Patterns of Attraction to Artificial Light.

Using previous Newell's shearwater fallout records, hypothetical models are created to make assumptions of flight paths with attraction to light, and a new study comparing recent findings with model assumptions. Results conclude that spatial patterns of fallout are consistent with amount of light the birds may view along flights, which follow model expectations.

Van Doren et al. 2017. Urban Light and Bird Migration

A study was conducted to quantify behavioral alterations of migratory birds affected by the nocturnal beams of New York's National September 11 Memorial "Tribute in Light." Results concluded that an estimated amount of over 1 million birds were influenced during a study period of 7 nights over 7 years. Additional studies involving the effects of powerful lights in urban areas on migratory birds and involving conservation efforts for such installations are recommended.

Watson et al. 2016. Anthropogenic Light is Associated with Increased Vocal Activity by Nocturnally Migrating Birds

A study was conducted in the Great Lakes region, comparing the number of nocturnal flight calls produced by migrating birds over artificially lit areas vs. nearby dark areas. Results concluded that more nocturnal flight calls were detected over sites with artificial light than over nearby dark sites.

Wise. 2007. Studying the Ecological Impacts of Light Pollution on Wildlife Amphibians as Models

Several methods of research on the impact of light pollution on amphibians are examined and summarized. These methods include laboratory experiments, field experiments, and natural, observational studies. Results of the studies show that artificial lighting at night can have potentially negative effects on biological processes and activities of amphibians, and that future studies using a multilevel approach that includes all three methods are important to assess the impacts of these effects.

Rich, C. and T. Longcore. 2006. Ecological Consequences of Artificial Night Lighting. Island Press, Washington, D.C.

PART I. MAMMALS

Chapter 2. Effects of Artificial Night Lighting on Terrestrial Mammals (Paul Beier)

Artificial night lighting can increase the risk of predation and decrease food consumption for small, herbivorous, nocturnal mammals. Circadian rhythm and melatonin production in mammals are likely affected by artificial night lighting; however, studies have also shown that natural moonlight also affects mammal species. Population-level effect studies is lacking. Increased artificial night lighting may also increase roadkill and disrupt mammalian dispersal movements and wildlife corridor use.

Chapter 3. Bats and Their Insect Prey at Streetlights (Jens Rydell)

Replacement of the light source of streetlights to a source (in this case, high-pressure sodium instead of mercury vapor) that does not attract insects as much is positive for insects and bats; however, this may result in a lower food intake for the bats and possibly lower reproductive success for some species of aerial-hawking bats. Evidence suggests that moth prey capture increases for some bat species at streetlights because the moth's evolved ultrasound hearing trait of sensing bats gets turned off under bright light. Therefore, the long process of coevolution of the predator-prey relationship between bats and moths seems to favor bats in this case.

PART II. BIRDS

Chapter 4. Effects of Artificial Night Lighting on Migrating Birds (Sidney A. Gauthreaux Jr. and Carroll G. Belser)

Migrating birds are attracted to lights, especially when visibility and the ceiling are low. Effects from this can range from death or injury from collisions with structures, reducing energy stores due to delays or altered routes, and delayed arrival at breeding grounds.

PART III. REPTILES AND AMPHIBIANS

Chapter 8. Night Lights and Reptiles: Observed and Potential Effects (Gad Perry and Robert N. Fisher)

The negative consequences of artificial lighting are well known for sea turtles; however, negative effects on other species are not as clearly identified and are more speculative. Potential negative impacts include an extended photoperiod, which can also be positive for some species like geckos. The chapter is clear, however, in stating, "We know little about effects of artificial lights on reptiles other than to sea turtles."

Chapter 9. Observed and Potential Effects of Artificial Night Lighting on Anuran Amphibians (Bryant W. Buchanan)

Artificial light can affect the biology of anuran amphibians; however, these changes may be subtle or complex and not easily predictable. Less is known about the effects on the early life stages of anuran species. Possible effects include changes to predator-prey relationships, changes in reproduction, and competition.

PART IV. FISHES

Chapter 11. Artificial Night Lighting and Fishes (Barbara Nightingale, Travis Longcore, and Charles A. Simenstad)

Not enough effort has been directed to study the effects of artificial light on fish species; however, potential impacts include breakdowns in niche portioning, changes in migratory patterns, temporary blindness, alternations of predator-prey relations, and changes to foraging.

PART V. INVERTEBRATES

Chapter 12. Artificial Night Lighting and Insects: Attraction of Insects to Streetlamps in a Rural Setting in Germany (Gerhard Eisenbeis)

One study in Germany found that effects from high-pressure sodium light sources reduce attraction of insects by 55 percent and of moths by 75 percent, compared with high-pressure mercury vapor light sources. Three main effects on insects from street lighting include a "fixation" or "captivity" effect, the "crash barrier" effect, and the "vacuum cleaner" effect. Although long-term monitoring is needed, all of these would likely have a population-level effect. K-Strategist species, which are species that have life history strategies of having a low number of offspring, are most affected by artificial lighting.

Chapter 13. Effects of Artificial Night Lighting on Moths (Kenneth D. Frank)

Only minimal research has been done to examine the effects of artificial lighting on moths, and none has been done on the effect on moth populations; however, many studies have used lights to study moths. From that research, the following effects on moths from artificial lighting can affect almost every aspect of their life history: flight to light; flight activity; vision through temporary blindness or improved vision at a distance; deactivation of moths' defense mechanism to hear bats and avoid predation; increased predation by birds of moths resting near light sources in the morning; increased predation by sit-and-wait predators; effects on oviposition of gravid females; changes to dispersal and migration; circadian rhythm changes; and desiccation or death by incineration at light sources.