

## DRECP Baseline Biology Report

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### 7 CONSERVATION AND MANAGEMENT FACTORS AND ISSUES

This section provides a summary of information gathered to date regarding landscape, natural communities, and species relationships for the 37 proposed Covered Species and 2 Planning Species. These relationships are presented in the context of key landscape issues, key ecological process issues, and potential environmental stressors and threats, and how they are related to the 37 proposed Covered Species and 2 Planning Species. Assembly and presentation of this information in the context of process, landscape and natural community issues, known or potential stressors/threats, and species relationships are a necessary foundation for development of biological goals and objectives and identification of avoidance and minimization measures, best management practices (BMPs), conservation actions, and mitigation measures for the preferred conservation strategy. Data and information will continue to be assembled for these factors for the 37 proposed Covered Species and 2 Planning Species.

This section summarizes key conservation factors for the proposed DRECP Covered and Planning Species by (1) natural communities; (2) landscape factors; (3) ecological processes; and (4) known or potential environmental stressors and threats. The main purpose of this discussion is to guide setting conservation goals and objectives at the appropriate landscape, natural community, and species levels, with acknowledgement that these levels are interrelated; i.e., landscape conservation goals would also provide for conservation of many natural communities and species. Where a landscape goal may not adequately meet a natural community or species goal, additional goals at these levels may be needed.

For **key landscape issues**, the main factors are the species' distribution (e.g., narrow range vs. broad) and the role of landscape connectivity in maintaining populations in the Plan Area. For each Covered and Planning Species, the key landscape issues are identified in terms of the distribution of the species in the Plan Area and the likely habitat connectivity issues. For example, Parish's daisy (*Erigeron parishii*) is endemic to carbonate substrates in the Big Bear/Holcomb Valley. From a landscape perspective, the main conservation issue is maintaining this endemic species within its restricted range. Connectivity for this species, if relevant, likely would operate at the sub-regional scale (i.e., a limited set of definable local habitat connections such as across pebble plain archipelagos for the Parish's daisy). For some species that may have very limited movement, such as California black rail (*Laterallus jamaicensis coturniculus*), habitat connectivity may operate at a local scale between contiguous suitable habitat patches. In contrast, golden eagle (*Aquila chrysaetos*) is widely distributed and highly mobile and able to access widely disjunct habitat areas. The main "connectivity" issue for this species is maintaining safe migration routes across a broad landscape. This

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connectivity issue applies to several of the highly mobile migratory bird species and bats. For bighorn sheep, the habitat connectivity issues are regional (i.e., intermountain) and relate both to suitable habitat and physical obstacles such as roads, canals, and fencing.

For **key ecological process issues**, the ecological processes important for maintaining suitable habitat for Covered and Planning Species are identified (e.g., aeolian processes for dune species, hydrology for wetland species, precipitation for plants, or special microhabitat factors such as soil structure and nest cavities). For plants, the pollinators and/or dispersers are identified where possible because stressors or threats at the ecological-process scale may affect pollinators and dispersers in a way that could adversely affect the Covered and Planning Species. For example, climate change may alter the availability of prey for western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) by decoupling the predator-prey relationship. Based on common sets of ecological processes for the Covered and Planning Species, goals and objectives can be identified at the ecological-process scale that address several of the species (e.g., sand transport and maintaining hydrology).

**Potential environmental stressors and threats** are identified based on a review of the literature, as summarized in the Covered and Planning Species profiles (Appendix B). Stressors or threats that are known or potentially related to ecological processes or landscape issues are identified. For example, key ecological processes for desert tortoise include soil and forage conditions and burrow temperatures that affect incubation temperature and sex determination. Grazing, recreation, other anthropogenic activities (including military land use), invasive plants, wildfire, and climate change are all related to maintaining ecological processes. “Non-permanent” activities that disturb soils and burrow habitats (e.g., through direct crushing or compaction) include grazing, recreation, and military operations. Factors that affect forage quality include grazing, invasive plants, wildfires, and climate change (note that these factors are not mutually exclusive but rather may be interactive). In addition to impacts on forage quality, climate change may also affect burrow temperatures and alter sex ratios. Desert tortoise is also sensitive to regional-scale habitat fragmentation. It should be noted that the potential adverse effect of habitat fragmentation is only specifically listed where it appears in the literature as a potential threat to a species. As a general principle of conservation biology, it can be assumed that habitat fragmentation has an adverse effect on most species, except perhaps highly vagile habitat generalists.

## 7.1 Natural Communities

### 7.1.1 California Forest and Woodland Communities

Table 7-1 lists key landscape and ecological processes, as well as ecological stressors and forest and woodland-associated species. The landscape issues include maintaining habitats

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for seasonal migrations (e.g., western red bat). As discussed in Section 4.2.1, California forest and woodland communities comprise only approximately 0.4% of the Plan Area. These landscape and ecological processes are mainly affected by stressors such as logging, wildfires, and climate change (i.e., drought and drought-related diseases such as bark beetle infestations). Covered and Planning Species associated with California forests and woodlands are listed in Table 7-1.

### **7.1.2 Chaparral and Coastal Scrub Communities**

Table 7-1 lists the key landscape and ecological processes, as well as ecological stressors and chaparral and coastal scrub-associated species. Landscape issues primarily relate to sub-regional habitat connectivity that allow for movement and dispersal of species that are relatively sedentary (i.e., species that do not make long-distance dispersal or migration movements between disjunct regions) and/or have small home ranges. As discussed in Section 4.2.2, the Plan Area includes several chaparral and coastal scrub vegetation types. These chaparral and coastal scrub communities depend on landscape-level habitat integrity to ensure that key ecological processes are maintained (e.g., soils, forage quality, precipitation). These landscape and ecological processes are potentially affected by the stressors identified in Table 7-1, including stressors that affect chaparral and coastal scrub vegetation structure, composition, successions, and conversions to other types (e.g., invasive plants, wildfire, fire suppression, flooding, grazing). Covered and Planning Species associated with chaparral and coastal scrub communities are listed in Table 7-1.

### **7.1.3 Desert Conifer Woodland Communities**

Table 7-1 lists key landscape and ecological processes, as well as ecological stressors and woodland-associated species. The landscape issues include sub-regional habitat connectivity. As discussed in Section 4.2.3, the desert conifer woodland communities comprise 1.3% of the Plan Area. These woodlands depend on landscape-level habitat integrity to ensure that key ecological processes such as hydrology are maintained. These landscape and ecological processes are potentially affected by the stressors identified in Table 7-1 (e.g., logging, habitat loss and degradation, wildfire, recreation, grazing, invasive plants, climate change, competition with other plants). Covered and Planning Species associated with desert conifer woodlands are listed in Table 7-1.

### **7.1.4 Desert Outcrop and Badlands**

Table 7-1 lists key landscape and ecological processes, as well as ecological stressors and species associated with desert outcrop and badlands. The landscape issues include regional and local habitat connectivity. As discussed in Section 4.2.4, approximately 8.3% of the Plan

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Area is covered by North American warm desert bedrock cliff and outcrop. These rocky, barren, and unvegetated areas depend on sub-regional habitat integrity to ensure that soil integrity is maintained (e.g., texture and openness), particularly for plant species. These landscape and ecological processes are potentially affected by the stressors identified in Table 7-1, including stressors that affect soil integrity and structure (e.g., habitat loss and fragmentation, climate change, invasive species, wildfire, recreation, mining, grazing, and other human activities). Covered and Planning Species associated with desert outcrop and badlands are listed in Table 7-1.

### **7.1.5 Desert Scrub Communities**

Table 7-1 lists the key landscape and ecological processes, as well as ecological stressors and desert scrub-associated species. Landscape issues primarily relate to sub-regional habitat connectivity that allow for movement and dispersal of species that are relatively sedentary (i.e., species that do not make long-distance dispersal or migration movements between disjunct regions) and/or have small home ranges. As discussed in Section 4.2.5, desert scrub communities are diverse and comprise the majority of the Plan Area. These desert scrub communities depend on landscape-level habitat integrity to ensure that key ecological processes are maintained (e.g., soils, forage quality, precipitation, cactus stands). These landscape and ecological processes are potentially affected by the stressors identified in Table 7-1, including stressors that affect desert scrub vegetation structure, composition, successions, and conversions to other types (e.g., invasive plants, wildfire, fire suppression, flooding, grazing). Covered and Planning Species associated with desert scrub communities are listed in Table 7-1.

### **7.1.6 Dune Communities**

Table 7-1 lists key landscape and ecological processes, as well as ecological stressors and dune-associated species. The landscape issues include regional and local habitat connectivity. As discussed in Sections 2.1.3 and 4.2.6, the Plan Area includes a large number of distinct dune systems. These dunes depend on landscape-level habitat integrity to ensure that aeolian processes are maintained (e.g., upwind sand sources and sand transport corridors). Local connectivity within the dune systems are also important to maintain their integrity and function as a dynamic system, and to ensure dispersal of plant and wildlife species and accommodate population expansions and contractions related to aeolian processes, stabilization, pollinators, etc. These landscape and ecological processes are potentially affected by the stressors identified in Table 7-1, including stressors that affect sand transport and deposition (e.g., physical obstacles, conversion of sand sources, other soil disturbances such as grazing and off-highway vehicles (OHVs), non-native plants

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that may stabilize soils, and climate change that may bring about hydrological alterations). Covered and Planning Species associated with dunes are listed in Table 7-1.

### **7.1.7 Grassland Communities**

Table 7-1 lists key landscape and ecological processes, as well as ecological stressors and species associated with grasslands. Landscape issues primarily relate to sub-regional habitat connectivity that allow for movement and dispersal of sedentary, low-mobility species. Some species associated with grasslands (e.g., burrowing owl, golden eagle) are highly mobile and do not depend on regional-scale habitat connectivity. As discussed in Section 4.2.7, the Plan Area includes a small amount of grassland communities (approximately 1.1%), primarily consisting of California annual and perennial grassland. Grasslands depend on landscape-level habitat integrity to ensure that soil integrity is maintained (e.g., texture, openness, burrows), which is important for both grassland-associated plant and wildlife species. These landscape and ecological processes are potentially affected by the stressors identified in Table 7-1, including stressors that affect soil characteristics or grassland species composition or structure (e.g., habitat loss and fragmentation, climate change, invasive plants, wildfire, grazing, trampling, recreation, other human activities, pesticides, and contaminants). Covered and Planning Species associated with grasslands are listed in Table 7-1.

### **7.1.8 Riparian Community**

Table 7-1 lists key landscape and ecological processes, as well as ecological stressors and riparian-associated species. The landscape issues include regional and local habitat connectivity. As discussed in Sections 2.1.4 and 4.2.8, the Plan Area is generally characterized by insubstantial surface waters and flows are extremely scarce and unpredictable. However, major hydrologic features in the Plan Area, including the lower Colorado River, Salton Sea, Owens River, Owens Lake, Mojave River, and Amargosa River, as well as other minor features described in Section 2.1.4, contribute to the development and maintenance of riparian communities in the Plan Area. Riparian communities depend on landscape-level habitat integrity to ensure that hydrologic processes are maintained (e.g., surface and groundwater hydrology, geomorphology and sediment transport, soils saturation and structure, flooding regimes, and precipitation). Local connectivity within riparian areas is also important to maintain habitat connectivity and adequate patch sizes for species (e.g., minimum territories for nesting birds). These landscape and ecological processes are potentially affected by the stressors identified in Table 7-1, including stressors that affect natural hydrological regimes and water quality (e.g., hydrological and geomorphological alterations, invasive plant species, pesticides and contaminants, wildfire). Covered and Planning Species associated with riparian communities are listed in Table 7-1.

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### 7.1.9 Wetland Communities

Table 7-1 lists key landscape and ecological processes, as well as ecological stressors and wetlands-associated species. The landscape issues include regional and local habitat connectivity. As discussed in Section 2.1.4.9, the Plan Area includes approximately 606,071 acres of wetlands identified by the NWI in the Plan Area, including freshwater emergent wetland, freshwater forested/shrub wetland, freshwater pond, as well as lake, riverine, and other wetland types. As discussed in Section 4.2.9, wetland communities cover approximately 4.5% of the Plan Area on the land cover map (Figure 4-1) and include several vegetation types as well as open water, playas, and lacustrine areas. Wetlands depend on landscape-level habitat integrity to ensure that hydrologic processes are maintained (e.g., surface and groundwater hydrology). Local connectivity within wetlands is also important to support habitat for resident wetland species. Sub-regional habitat connectivity is important to provide stopover habitats for migrants and winter residents, but wetland areas do not have to be connected for many migrating avian species. Landscape and ecological processes are potentially affected by the stressors identified in Table 7-1, including those affecting natural hydrologic regimes and water quality (e.g., habitat loss and degradation, pesticides and organochlorines, climate change, invasive plants). Covered and Planning Species associated with wetlands are listed in Table 7-1.

### 7.1.10 Other Land Covers

#### 7.1.10.1 Agriculture

Table 7-1 lists key landscape and ecological processes, as well as ecological stressors and species associated with agriculture. As discussed in Section 4.2.10.1, approximately 3.2% of the Plan Area consists of agriculture, which is concentrated in three main regions: the Imperial Valley south of the Salton Sea; the Palo Verde Valley in the Blythe region; and the Antelope Valley in the western Mojave Desert. The quality of habitat provided by agriculture depends on appropriate hydrology/irrigation (including seasonal variation) and prey availability. These factors are potentially affected by the stressors identified in Table 7-1, including stressors that affect water quality and prey availability (e.g., pesticides and contaminants, reduced prey availability). Covered and Planning Species associated with agriculture are listed in Table 7-1.

Table 7-2 summarizes the same key conservation factors and issues shown in Table 7-1 but is organized by Covered and Planning Species.

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**Table 7-1**  
**Summary of Conservation and Management Factors for**  
**DRECP Covered and Planning Species Based on Natural Communities**

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
<b>California Forest and Woodlands</b>	<ul style="list-style-type: none"> <li>California broadleaf forest and woodland</li> <li>Californian evergreen coniferous forest and woodland</li> <li>California montane conifer forest</li> </ul>	<ul style="list-style-type: none"> <li>Seasonal migration</li> </ul>	<ul style="list-style-type: none"> <li>Precipitation</li> <li>Hydrology</li> </ul>	<ul style="list-style-type: none"> <li>Logging</li> <li>Habitat loss and degradation</li> <li>Wildfire</li> <li>Recreation (OHVs)</li> <li>Grazing</li> <li>Invasive plants</li> <li>Climate change</li> <li>Competition with other plants</li> </ul>	<ul style="list-style-type: none"> <li>Bakersfield cactus</li> <li>Bighorn sheep</li> <li>California condor</li> <li>Golden eagle</li> <li>Mojave tarplant</li> <li>Pallid bat</li> <li>Parish's daisy</li> <li>Tehachapi slender salamander</li> <li>Townsend's big-eared bat</li> </ul>
<b>Chaparral and Coastal Scrub</b>	<ul style="list-style-type: none"> <li>California mesic chaparral</li> <li>California pre-montane chaparral</li> <li>California xeric chaparral</li> <li>Central and south coastal California seral scrub</li> <li>Central and southern Californian coastal sage scrub</li> <li>Western Mojave</li> </ul>	<ul style="list-style-type: none"> <li>Sub-regional habitat connectivity</li> </ul>	<ul style="list-style-type: none"> <li>Bare areas with little soil</li> <li>Soil conditions related to burrows and diggability</li> <li>Forage quality</li> <li>Precipitation</li> </ul>	<ul style="list-style-type: none"> <li>Habitat loss and fragmentation</li> <li>Invasive plants</li> <li>Climate change</li> <li>Wildfire</li> <li>Fire suppression</li> <li>Flooding</li> <li>Grazing</li> <li>Trampling (wild horses, burros)</li> <li>Recreation (OHVs, vehicle parking)</li> <li>Other human activities (dumping, military)</li> </ul>	<ul style="list-style-type: none"> <li>Alkali mariposa-lily</li> <li>Bighorn sheep</li> <li>Burrowing owl</li> <li>California condor</li> <li>California leaf-nosed bat</li> <li>Golden eagle</li> <li>Mojave tarplant</li> <li>Pallid bat</li> <li>Townsend's big-eared bat</li> </ul>

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**Table 7-1**  
**Summary of Conservation and Management Factors for**  
**DRECP Covered and Planning Species Based on Natural Communities**

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
	and western Sonoran Desert borderland chaparral			activities) • Competition for nest cavities • Competition with other plants	
<b>Desert Conifer Woodlands</b>	• Great Basin pinyon - juniper woodland	• Sub-regional habitat connectivity	• Precipitation • Hydrology	• Logging • Habitat loss and degradation • Wildfire • Recreation (OHVs) • Grazing • Invasive plants • Climate change • Competition with other plants	• Bendire's thrasher • Golden eagle • Parish's daisy • Bighorn sheep • Mojave tarplant • Pallid bat
<b>Desert Outcrop and Badlands</b>	• North American warm desert bedrock cliff and outcrop	• Sub-regional habitat connectivity	• Soil integrity (texture, openness)	• Habitat loss and fragmentation • Climate change • Invasive species • Wildfire • Recreation (OHVs) • Mining • Other human activities (dumping)	• Burrowing owl • California condor • Golden eagle • Pallid bat

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**Table 7-1**  
**Summary of Conservation and Management Factors for**  
**DRECP Covered and Planning Species Based on Natural Communities**

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
<b>Desert Scrub</b>	<ul style="list-style-type: none"> <li>• Arizonan upland Sonoran desert scrub</li> <li>• Intermontane deep or well-drained soil scrub</li> <li>• Intermontane seral shrubland</li> <li>• Inter-mountain dry shrubland and grassland</li> <li>• Inter-mountain big sagebrush shrubland and steppe</li> <li>• Lower bajada and fan Mojavean-Sonoran desert scrub</li> <li>• Mojave and Great Basin upper bajada and toeslope</li> <li>• Shadscale-saltbush cool</li> </ul>	<ul style="list-style-type: none"> <li>• Sub-regional habitat connectivity</li> </ul>	<ul style="list-style-type: none"> <li>• Bare areas with little soil</li> <li>• Soil conditions related to burrows and diggability</li> <li>• Sandy soils on alluvial fans and basins</li> <li>• Forage quality</li> <li>• Precipitation</li> <li>• Cactus stands (primarily large columnar cacti)</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and fragmentation</li> <li>• Invasive plants</li> <li>• Climate change</li> <li>• Wildfire</li> <li>• Fire suppression</li> <li>• Flooding</li> <li>• Grazing</li> <li>• Trampling (wild horses, burros)</li> <li>• Recreation (OHVs, vehicle parking)</li> <li>• Other human activities (dumping, military activities)</li> <li>• Competition for nest cavities</li> <li>• Competition with other plants</li> </ul>	<ul style="list-style-type: none"> <li>• Agassiz's desert tortoise</li> <li>• Alkali mariposa-lily</li> <li>• Bakersfield cactus</li> <li>• Barstow woolly sunflower</li> <li>• Bendire's thrasher</li> <li>• Bighorn sheep</li> <li>• Burro deer<sup>1</sup></li> <li>• Burrowing owl</li> <li>• California condor</li> <li>• California leaf-nosed bat</li> <li>• Desert cymopterus</li> <li>• Desert kit fox<sup>1</sup></li> <li>• Flat-tailed horned lizard</li> <li>• Gila woodpecker</li> <li>• Golden eagle</li> <li>• Little San Bernardino Mountains linanthus</li> <li>• Mohave ground squirrel</li> <li>• Mojave fringe-toed lizard</li> <li>• Mojave monkeyflower</li> <li>• Mojave tarplant</li> <li>• Pallid bat</li> <li>• Parish's daisy</li> <li>• Swainson's hawk</li> </ul>

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**Table 7-1**  
**Summary of Conservation and Management Factors for**  
**DRECP Covered and Planning Species Based on Natural Communities**

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
	<ul style="list-style-type: none"> <li>semi-desert scrub</li> <li>Southern Great Basin semi-desert grassland</li> </ul>				<ul style="list-style-type: none"> <li>Triple-ribbed milk-vetch</li> </ul>
<b>Dunes</b>	<ul style="list-style-type: none"> <li>North American warm desert dunes and sand flats</li> </ul>	<ul style="list-style-type: none"> <li>Sub-regional habitat connectivity</li> <li>Local habitat connectivity</li> </ul>	<ul style="list-style-type: none"> <li>Aeolian processes</li> <li>Accumulated sand microhabitat</li> <li>Stabilized or partially stabilized sand dunes</li> <li>Precipitation</li> <li>Pollination</li> </ul>	<ul style="list-style-type: none"> <li>Sand transport alteration</li> <li>Grazing</li> <li>Recreation (OHVs and associated development, trampling)</li> <li>Invasive plants</li> <li>Climate change, hydrological alterations</li> </ul>	<ul style="list-style-type: none"> <li>Burro deer<sup>1</sup></li> <li>Desert kit fox<sup>1</sup></li> <li>Flat-tailed horned lizard</li> <li>Little San Bernardino Mountains linanthus</li> <li>Mojave fringe-toed lizard</li> <li>Pallid bat</li> <li></li> </ul>
<b>Grasslands</b>	<ul style="list-style-type: none"> <li>California Annual and Perennial Grassland</li> <li>California annual forb/grass vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Sub-regional habitat connectivity</li> </ul>	<ul style="list-style-type: none"> <li>Soil integrity (texture, openness, burrows)</li> </ul>	<ul style="list-style-type: none"> <li>Habitat loss and fragmentation</li> <li>Climate change</li> <li>Invasive plants</li> <li>Wildfire</li> <li>Grazing</li> <li>Trampling (wild horses)</li> <li>Recreation (OHVs)</li> <li>Other human activities</li> </ul>	<ul style="list-style-type: none"> <li>Agassiz's desert tortoise</li> <li>Bakersfield cactus</li> <li>Bendire's thrasher</li> <li>Bighorn sheep</li> <li>Burrowing owl</li> <li>California condor</li> <li>Golden eagle</li> <li>Mountain plover</li> <li>Pallid bat</li> </ul>

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**Table 7-1**  
**Summary of Conservation and Management Factors for**  
**DRECP Covered and Planning Species Based on Natural Communities**

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
				(dumping) • Pesticides and contaminants	• Swainson's hawk • Tricolored blackbird
<b>Riparian</b>	<ul style="list-style-type: none"> <li>• Madrean warm semi-desert wash woodland/ scrub</li> <li>• Mojavean semi-desert wash scrub</li> <li>• Riverine</li> <li>• Sonoran-Coloradan semi-desert wash woodland/scrub</li> <li>• Southwestern North American riparian evergreen and deciduous woodland</li> <li>• Southwestern North American riparian/wash scrub</li> </ul>	<ul style="list-style-type: none"> <li>• Local habitat connectivity (within stream)</li> <li>• Sub-regional habitat connectivity (stopover habitats for migrants and sub-regional dispersers)</li> </ul>	<ul style="list-style-type: none"> <li>• Surface and ground water hydrology</li> <li>• Geomorphology and sediment transport (including banks habitats)</li> <li>• Saturated soils (along creeks, swales, and intermittent creeks)</li> <li>• Soil structure</li> <li>• Natural flooding regimes</li> <li>• Water quality</li> <li>• Prey base and availability</li> <li>• Nest cavities</li> <li>• Old growth xeric woodlands</li> <li>• Precipitation</li> <li>• Pollination</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and degradation</li> <li>• Hydrological and geomorphological alterations (dams (including beaver dams on Mojave River), channelization, diversions)</li> <li>• Invasive plant species (tamarisk, giant reed, ice plant, pampas grass)</li> <li>• Pesticides and contaminants (water quality and prey impacts)</li> <li>• Climate change</li> <li>• Grazing</li> <li>• Recreation (OHVs, fishing, camping, waterplay)</li> </ul>	<ul style="list-style-type: none"> <li>• Bakersfield cactus</li> <li>• Bighorn sheep</li> <li>• Burro deer<sup>1</sup></li> <li>• California black rail</li> <li>• California leaf-nosed bat</li> <li>• Desert kit fox<sup>1</sup></li> <li>• Desert pupfish</li> <li>• Gila woodpecker</li> <li>• Least Bell's vireo</li> <li>• Little San Bernardino Mountains linanthus</li> <li>• Mohave tui chub</li> <li>• Mojave tarplant</li> <li>• Owens pupfish</li> <li>• Owens tui chub</li> <li>• Swainson's hawk</li> <li>• Tehachapi slender salamander</li> <li>• Townsend's big-eared bat</li> <li>• Tricolored blackbird</li> <li>• Western yellow-billed</li> </ul>

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**Table 7-1**  
**Summary of Conservation and Management Factors for**  
**DRECP Covered and Planning Species Based on Natural Communities**

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
				<ul style="list-style-type: none"> <li>• Mining (sand, gravel and recreational gold mining)</li> <li>• Competition for nest cavities</li> <li>• Wildfire</li> <li>• Meadow succession to uplands</li> <li>• Competition with upland plants</li> </ul>	<ul style="list-style-type: none"> <li>• cuckoo</li> <li>• Willow flycatcher (including southwestern)</li> <li>• Yuma clapper rail</li> </ul>
<b>Wetlands</b>	<ul style="list-style-type: none"> <li>• Arid west freshwater emergent marsh</li> <li>• Californian warm temperate marsh/seep</li> <li>• Intermountain Basins alkaline-saline shrub wetland</li> <li>• North American warm desert alkaline scrub and herb playa and wet flat</li> </ul>	<ul style="list-style-type: none"> <li>• Local habitat connectivity for residents</li> <li>• Sub-regional habitat connectivity (stopover habitats for migrants and winter residents)</li> </ul>	<ul style="list-style-type: none"> <li>• Surface and ground water hydrology</li> <li>• Daily and season water fluctuations</li> <li>• Water quality</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and degradation</li> <li>• Pesticides and organochlorines</li> <li>• Climate change</li> <li>• Invasive plants</li> </ul>	<ul style="list-style-type: none"> <li>• Alkali mariposa-lily</li> <li>• Barstow woolly sunflower</li> <li>• California black rail</li> <li>• Desert cymopterus</li> <li>• Desert kit fox<sup>1</sup></li> <li>• Desert pupfish</li> <li>• Greater sandhill crane</li> <li>• Mohave tui chub</li> <li>• Owens pupfish</li> <li>• Owens tui chub</li> <li>• Owens Valley checkerbloom</li> <li>• Pallid bat</li> <li>• Tricolored blackbird</li> </ul>

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**Table 7-1**  
**Summary of Conservation and Management Factors for**  
**DRECP Covered and Planning Species Based on Natural Communities**

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
	<ul style="list-style-type: none"> <li>• Open water</li> <li>• Playa</li> <li>• Southwestern North American alkali marsh/seep vegetation</li> <li>• Southwestern North American salt basin and high marsh</li> <li>• Lacustrine</li> </ul>				<ul style="list-style-type: none"> <li>• Yuma clapper rail</li> </ul>
<b>Agriculture</b>	<ul style="list-style-type: none"> <li>• Agriculture</li> </ul>	—	<ul style="list-style-type: none"> <li>• Hydrology/irrigation</li> <li>• Prey availability</li> </ul>	<ul style="list-style-type: none"> <li>• Pesticides and other contaminants</li> <li>• Reduced prey availability</li> </ul>	<ul style="list-style-type: none"> <li>• Burrowing owl</li> <li>• Greater sandhill crane</li> <li>• Mountain plover</li> <li>• Pallid bat</li> <li>• Swainson's hawk</li> <li>• Tricolored blackbird</li> </ul>

**Notes:**

<sup>1</sup> Planning Species (no take authorization required); includes burro deer and desert kit fox.

## DRECP Baseline Biology Report

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
<i>Covered Species</i>				
<i>Amphibians/Reptiles</i>				
Agassiz's desert tortoise	<ul style="list-style-type: none"> <li>• Desert scrub</li> <li>• Grasslands</li> </ul>	<ul style="list-style-type: none"> <li>• Widespread throughout Plan Area</li> <li>• Sub-regional and regional habitat connectivity throughout range in Plan Area</li> <li>• Movement affected by incompatible land uses and available refuge (mainly suitable burrow sites)</li> </ul>	<ul style="list-style-type: none"> <li>• Soil conditions (soil diggability) suitable for burrows</li> <li>• Forage quality</li> <li>• Temperature and reproduction</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and fragmentation (development and agriculture)<sup>3</sup></li> <li>• Predation (ravens, dogs, coyotes)</li> <li>• Disease</li> <li>• Grazing<sup>2</sup></li> <li>• Recreation (OHVs)<sup>2</sup></li> <li>• Other human activities (military activities, collecting, trash and garbage)</li> <li>• Wildfires<sup>2</sup></li> <li>• Invasive plants<sup>2</sup></li> <li>• Climate change<sup>2</sup></li> </ul>
Flat-tailed horned lizard	<ul style="list-style-type: none"> <li>• Dunes</li> <li>• Desert scrub</li> </ul>	<ul style="list-style-type: none"> <li>• Endemic to southeastern California within three regional populations (Coachella Valley; the west side of the Salton Sea/Imperial Valley; and the east side of the Imperial Valley)</li> <li>• Sub-regional habitat connectivity (populations sub-divided by I-8 and I-10)</li> </ul>	<ul style="list-style-type: none"> <li>• Stabilized sand dunes (species tends to avoid active and unstable wind-blown dunes)</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and/or degradation (agriculture, urban, highways, canals, railroads, military activities, utilities, and geothermal, oil, gas, and wind energy)<sup>2</sup></li> <li>• Recreation (OHVs)<sup>2</sup></li> <li>• Predation</li> <li>• Mining (mineral extraction)</li> <li>• Invasive plants<sup>2</sup></li> <li>• Wildfire<sup>2</sup></li> <li>• Pesticides and contaminants</li> <li>• Grazing (cattle)<sup>2</sup></li> </ul>

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Mojave fringe-toed lizard	<ul style="list-style-type: none"> <li>• Dunes</li> <li>• Desert scrub</li> </ul>	<ul style="list-style-type: none"> <li>• Restricted to deposits of loose sand; as a result its distribution is discontinuous throughout its range</li> <li>• Endemic to the Mojave and Sonoran deserts of Southern California and western Arizona</li> </ul>	<ul style="list-style-type: none"> <li>• Predation</li> <li>• Rodent burrows for protection from predators and thermal protection</li> <li>• Potentially competition for food with the zebra-tailed lizard</li> <li>• Sand movement</li> </ul>	<ul style="list-style-type: none"> <li>• OHVs</li> <li>• Disruption of the natural movement of sand caused by roads, windbreaks, and other man-made alterations</li> <li>• Habitat loss caused by urban development</li> </ul>
Tehachapi slender salamander	<ul style="list-style-type: none"> <li>• Riparian</li> <li>• California forest and woodlands</li> </ul>	<ul style="list-style-type: none"> <li>• Endemic to two distinct population segments: Caliente Creek drainage and Tehachapi Mountains</li> <li>• Local habitat connectivity within each distinct population (the two distinct population segments are geographically isolated)</li> </ul>	<ul style="list-style-type: none"> <li>• Talus and rocky slopes and moist habitats</li> <li>• Precipitation</li> </ul>	<ul style="list-style-type: none"> <li>• Climate change (especially prolonged drought)<sup>2</sup></li> <li>• Development and road construction</li> <li>• Mining</li> <li>• Grazing<sup>2</sup></li> <li>• Flood control projects<sup>2</sup></li> <li>• Feral pigs<sup>2</sup></li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
<i>Birds</i>				
Bendire's thrasher	<ul style="list-style-type: none"> <li>• Desert conifer woodlands</li> <li>• Desert scrub</li> <li>• Grasslands</li> </ul>	<ul style="list-style-type: none"> <li>• Highly mobile/able to access disjunct nesting and foraging habitats</li> <li>• Migration and dispersal routes</li> </ul>	<ul style="list-style-type: none"> <li>• None identified in literature</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and/or degradation<sup>2</sup></li> <li>• Habitat conversion (urban development, agriculture, military operations)</li> <li>• Grazing<sup>2</sup></li> <li>• Recreation (OHVs)<sup>2</sup></li> <li>• Cowbird parasitism</li> <li>• Competition with curve-billed thrashers (<i>Toxostoma curvirostre</i>) and northern mockingbirds (<i>Mimus polyglottos</i>)</li> </ul>
Burrowing owl	<ul style="list-style-type: none"> <li>• Grasslands</li> <li>• Chaparral and coastal scrub</li> <li>• Desert scrub</li> <li>• Desert outcrop and badlands</li> <li>• Agriculture</li> <li>• Developed and disturbed areas</li> </ul>	<ul style="list-style-type: none"> <li>• Highly mobile/able to access disjunct nesting and foraging habitats</li> <li>• Migration and dispersal routes</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable burrow sites (e.g., ground squirrel burrows) and prey</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat conversion (urban and non-compatible agriculture, flood control)</li> <li>• Collisions (vehicles, wind turbines)</li> <li>• Pesticides and other contaminants</li> <li>• Invasive plants<sup>2</sup></li> <li>• Climate change<sup>2</sup></li> <li>• Rodent controls (especially ground squirrels)</li> <li>• Predation by dogs and cats</li> </ul>
California black rail	<ul style="list-style-type: none"> <li>• Wetlands</li> <li>• Riparian</li> </ul>	<ul style="list-style-type: none"> <li>• Local habitat connectivity (including uplands and open water) between riparian marshes and wet</li> </ul>	<ul style="list-style-type: none"> <li>• Marsh and wet meadow with surface water or high ground water</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and degradation (marsh habitat loss from control of seeps along irrigation canals)<sup>2</sup></li> <li>• Hydrological alteration (surface and</li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
		<p>meadows (movement by running or short distance swimming)</p> <ul style="list-style-type: none"> <li>• Potential dispersal between disjunct habitat, but undocumented</li> </ul>	<p>levels and low daily water fluctuations</p>	<p>subsurface hydrology, including daily fluctuations)<sup>2</sup></p> <ul style="list-style-type: none"> <li>• Climate change<sup>2</sup></li> <li>• Invasive plants (tamarisk)<sup>2</sup></li> <li>• Predation (non-native rats, cats, and red fox)</li> </ul>
California condor	<ul style="list-style-type: none"> <li>• Chaparral and coastal scrub</li> <li>• Desert scrub</li> <li>• Grasslands</li> <li>• California forest and woodlands</li> <li>• Desert outcrop and badlands</li> </ul>	<ul style="list-style-type: none"> <li>• Highly mobile/able to access disjunct foraging, nesting, and roosting areas</li> <li>• Traditional flight corridors (?)</li> </ul>	<ul style="list-style-type: none"> <li>• None identified in literature</li> </ul>	<ul style="list-style-type: none"> <li>• Contaminants (lead contamination of food resources, ingestion of microtrash and other contaminants such as antifreeze)</li> <li>• Collisions and electrocutions (power lines, towers, and other tall structures)</li> <li>• Other human activities (disturbances of nesting and historic roosting areas, attraction to human activities due to habituation)</li> </ul>
Gila woodpecker	<ul style="list-style-type: none"> <li>• Desert scrub</li> <li>• Riparian</li> </ul>	<ul style="list-style-type: none"> <li>• Restricted to lower Colorado River and Brawley areas</li> <li>• Capable of short-distance seasonal movements (non-migratory)</li> <li>• Sub-regional habitat connectivity</li> </ul>	<ul style="list-style-type: none"> <li>• Riparian woodlands, old growth xeric woodlands, and uplands with large, columnar cacti</li> <li>• Hydrology</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and/or degradation (agriculture, urban, development, water diversions)<sup>2</sup></li> <li>• Competition (European starlings)<sup>2</sup></li> <li>• Invasive plants (tamarisk)<sup>2</sup></li> <li>• Wildfires<sup>2</sup></li> <li>• Climate change<sup>2</sup></li> </ul>
Golden eagle	<ul style="list-style-type: none"> <li>• California forest and</li> </ul>	<ul style="list-style-type: none"> <li>• Highly mobile/able to access disjunct foraging,</li> </ul>	<ul style="list-style-type: none"> <li>• None identified in literature</li> </ul>	<ul style="list-style-type: none"> <li>• Human activities (disturbance of nest sites)</li> <li>• Collisions and/or electrocutions (towers,</li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
	woodlands • Desert conifer woodlands • Chaparral and coastal scrub • Desert scrub • Grasslands • Desert outcrop and badlands	nesting, and roosting areas • Seasonal migration patterns		power lines, wind turbines, and other structures and vehicles) • Contaminants (lead contamination of prey) • Wildfires (impacts on prey densities)
Greater sandhill crane	• Wetlands • Agriculture	• Sandhill cranes are winter visitors to the Plan Area at the Central Valley and the lower Colorado River Valley.	• Hydrology • Suitable roost sites	• Disturbance from farm activities and hunting • Collision with power lines • Habitat degradation and destruction • Shortage of good roosting sites near foraging areas with grain fields • Lack of management and control over agricultural crops that provide winter foraging • Destruction of roost sites by past and proposed dredging and channelization projects along the lower Colorado River • Conversion of croplands from grain to crops that do not provide good foraging for cranes
Least bell's vireo	• Riparian	• Highly mobile/able to access disjunct resource areas	• Hydrology (surface and ground water) • Geomorphology	• Habitat loss and/or degradation <sup>2</sup> • Hydrological and geomorphological

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
		<ul style="list-style-type: none"> <li>• Migration routes</li> </ul>	<ul style="list-style-type: none"> <li>(e.g., sediment transport and deposition)</li> <li>• Natural flood disturbance regimes</li> </ul>	<ul style="list-style-type: none"> <li>alterations<sup>2</sup></li> <li>• Invasive plants (tamarisk, giant reed, pampas grass)<sup>2</sup></li> <li>• Grazing<sup>2</sup></li> <li>• Recreation (OHVs)<sup>2</sup></li> <li>• Climate change<sup>2</sup></li> <li>• Cowbird parasitism</li> <li>• Predation (Argentine ants, domestic and feral cats, and other mesopredators)</li> </ul>
Mountain plover	<ul style="list-style-type: none"> <li>• Grasslands</li> <li>• Agriculture</li> </ul>	<ul style="list-style-type: none"> <li>• Sub-regional habitat connectivity</li> </ul>	<ul style="list-style-type: none"> <li>• Soil integrity (texture, openness, burrows)</li> <li>• Hydrology/irrigation</li> <li>• Prey availability</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and/or degradation<sup>2</sup></li> <li>• Insecticides/pesticides</li> <li>• Farm equipment mortalities</li> <li>• Predation (birds, mammals, reptiles)</li> <li>• Extreme weather conditions</li> <li>• Hunting (while in flocks; not a current conservation concern)</li> </ul>
Swainson's hawk	<ul style="list-style-type: none"> <li>• Grasslands</li> <li>• Riparian</li> <li>• Agriculture</li> <li>• Desert scrub</li> </ul>	<ul style="list-style-type: none"> <li>• Highly mobile/able to access disjunct foraging habitats and nesting habitat in Antelope Valley</li> <li>• Migration routes</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrology/riparian systems</li> </ul>	<ul style="list-style-type: none"> <li>• Nesting and foraging habitat conversion</li> <li>• Insecticides/pesticides</li> <li>• Wildfire<sup>2</sup></li> <li>• Climate change<sup>2</sup></li> <li>• Recreation (OHVs)<sup>2</sup></li> <li>• Human disturbances</li> <li>• Interactions/competition with ravens</li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Tricolored blackbird	<ul style="list-style-type: none"> <li>• Riparian</li> <li>• Wetlands</li> <li>• Agriculture</li> <li>• Grasslands</li> </ul>	<ul style="list-style-type: none"> <li>• Largely endemic to California, more than 90% of the population occurs in the state with more than 75% of the breeding population found in the Central Valley in any given year</li> </ul>	<ul style="list-style-type: none"> <li>• Predation</li> </ul>	<ul style="list-style-type: none"> <li>• Loss and degradation of habitat as a result of human activities</li> <li>• Agricultural expansion and operations (i.e., harvesting and plowing fields)</li> <li>• Predation</li> <li>• Poisons and contaminants</li> </ul>
Western yellow-billed cuckoo	<ul style="list-style-type: none"> <li>• Riparian</li> </ul>	<ul style="list-style-type: none"> <li>• Highly mobile/able to access disjunct nesting habitat</li> <li>• Migration routes</li> </ul>	<ul style="list-style-type: none"> <li>• Large, contiguous blocks of dense riparian habitat</li> <li>• Hydrology</li> </ul>	<ul style="list-style-type: none"> <li>• Nesting habitat loss and/or degradation (agriculture, urban)<sup>2</sup></li> <li>• Hydrological alteration (groundwater pumping)<sup>2</sup></li> <li>• Invasive plants (tamarisk)<sup>2</sup></li> <li>• Pesticides</li> <li>• Collisions with windows</li> <li>• Climate change (including decoupling of predator–prey relationships)<sup>2</sup></li> </ul>
Willow flycatcher (including southwestern)	<ul style="list-style-type: none"> <li>• Riparian</li> </ul>	<ul style="list-style-type: none"> <li>• Highly mobile/able to access disjunct nesting and foraging habitats</li> <li>• Migration routes</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrology (surface and ground water)</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and fragmentation<sup>2</sup></li> <li>• Altered hydrology and geomorphology (dams and reservoirs, water diversion and groundwater pumping, channelization, flood control)<sup>2</sup></li> <li>• Invasive plants (tamarisk, giant reed)<sup>2</sup></li> <li>• Wildfire<sup>2</sup></li> <li>• Grazing<sup>2</sup></li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
				<ul style="list-style-type: none"> <li>• Climate change<sup>2</sup></li> <li>• Cowbird parasitism</li> </ul>
Yuma clapper rail	<ul style="list-style-type: none"> <li>• Riparian</li> <li>• Wetlands</li> </ul>	<ul style="list-style-type: none"> <li>• Primarily limited to lower Colorado River and Salton Sea in Plan Area, with potential disjunct occurrences at Harper Dry Lake and Ash Meadows National Wildlife Refuge</li> <li>• Sub-regional habitat connectivity</li> <li>• Migration routes(?); migratory activity is unclear</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrology (surface and ground water)</li> <li>• Seasonal flooding/scouring</li> <li>• Timing of prey availability (crayfish)</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and modification (damming, channelization, and bank stabilization)<sup>2</sup></li> <li>• Hydrological alteration (e.g., fluctuating water levels)<sup>2</sup></li> <li>• Mesopredators (e.g., raccoon)</li> <li>• Contaminants (e.g., selenium)</li> </ul>
<i>Fish</i>				
Desert pupfish	<ul style="list-style-type: none"> <li>• Wetlands</li> <li>• Riparian (shallow water of desert springs, small streams, and marshes)</li> </ul>	<ul style="list-style-type: none"> <li>• Occurs in desert springs, marshes, and tributary streams of the lower Gila and Colorado River drainages in Arizona, California, and Mexico</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrology</li> <li>• Predation, competition, and behavioral interference from non-native fish and invasive snails</li> <li>• Natural weather patterns influence</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of exotic fish species and invasive snails</li> <li>• Modifications to the water conveyance facilities used for irrigating and draining agricultural lands</li> <li>• Application of agricultural pesticides</li> <li>• Dewatering of some natural spring habitats by groundwater pumping</li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
			cycles of expansion and contraction	
Mohave tui chub	<ul style="list-style-type: none"> <li>• Wetlands</li> <li>• Riparian (Lacustrine ponds/pools)</li> </ul>	<ul style="list-style-type: none"> <li>• Restricted to refugia at China Lake Naval Air Weapons Station, Camp Cady, the Lewis Center, Soda Springs, and Morning Star Mine</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrology</li> <li>• Water quality and quantity</li> <li>• Adaptation to lacustrine conditions rather than riverine</li> <li>• Tapeworms</li> <li>• Predation, competition, and habitat alteration from non-native plants and wildlife</li> </ul>	<ul style="list-style-type: none"> <li>• The present threatened destruction, modification, or curtailment of its habitat or range</li> <li>• Other natural or man-made factors affecting its continued existence (hybridization, introduction of non-native or transplanted species, predation, or competition)</li> <li>• Overdraft of Mojave River</li> <li>• A parasitic Asian tapeworm was found in Lake Tuendae</li> <li>• Non-native plant and wildlife species</li> <li>• Inadequacy of existing regulatory mechanisms</li> </ul>
Owens pupfish	<ul style="list-style-type: none"> <li>• Wetlands (warm, clear, shallow aquatic habitat)</li> <li>• Riparian</li> </ul>	<ul style="list-style-type: none"> <li>• Restricted to the Owens Valley portion of the Owens River in Mono and Inyo counties, California and spring outflows on the periphery of Owens Lake</li> <li>• Small, isolated populations</li> </ul>	<ul style="list-style-type: none"> <li>• Predation and competition from non-native species</li> <li>• Hydrology</li> <li>• Habitat alteration from emergent vegetation</li> </ul>	<ul style="list-style-type: none"> <li>• Non-native predators</li> <li>• Habitat modification for water diversions that altered Owens River flows</li> <li>• Cattail encroachment and other emergent vegetation</li> <li>• Extinction from stochastic (random) demographic, genetic, and catastrophic environmental events because populations are small and isolated</li> <li>• Groundwater pumping</li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Owens tui chub	<ul style="list-style-type: none"> <li>Wetlands (low-velocity waters)</li> <li>Riparian</li> </ul>	<ul style="list-style-type: none"> <li>Endemic to the Owens Basin (Owens Valley, Round Valley, and Long Valley) of Inyo and Mono counties, California</li> <li>Small, isolated populations</li> </ul>	<ul style="list-style-type: none"> <li>Predation and competition from, and hybridization with, non-native aquatic predators and other tui chub subspecies and hybrids</li> <li>Requires aquatic vegetation and gravel substrates for spawning</li> <li>Hydrology and water quality</li> <li>Alteration of aquatic habitat by invasive emergent plants</li> <li>Disease</li> </ul>	<ul style="list-style-type: none"> <li>Extensive habitat destruction and modification</li> <li>Invasive emergent plants that alter aquatic habitat</li> <li>Non-native invasive predators</li> <li>Poor water quality</li> <li>Inappropriate water quantity (including overdrafting of the aquifer in the Owens Valley Groundwater Basin area)</li> <li>Disease</li> <li>Inadequacy of existing regulatory mechanisms</li> <li>Vulnerability and loss of genetic diversity resulting from small isolated populations</li> </ul>
<i>Mammals</i>				
Bighorn sheep	<ul style="list-style-type: none"> <li>Grasslands</li> <li>Chaparral and coastal scrub</li> <li>Desert scrub</li> <li>Riparian</li> <li>Desert conifer</li> </ul>	<ul style="list-style-type: none"> <li>Relatively high mobility between mountain ranges</li> <li>Inter-mountain connectivity for dispersal</li> <li>Contiguous habitat for</li> </ul>	<ul style="list-style-type: none"> <li>Water resources near escape terrain to support reproduction</li> <li>Available nutritious forage to support</li> </ul>	<ul style="list-style-type: none"> <li>Habitat loss and/or degradation<sup>2</sup></li> <li>Climate change (primarily drought, which reduces available water resources and nutritious forage during reproduction)<sup>2</sup></li> <li>Invasive plants (tamarisk)<sup>2</sup></li> <li>Disease</li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
	woodlands • California forest and woodlands	seasonal movements • Movement limited by manmade physical barriers (e.g., roads, canals, fencing, incompatible land uses) and water resources	reproduction	<ul style="list-style-type: none"> <li>• Development (fencing, aboveground canals, and highways and freeways that obstruct movement)<sup>3</sup></li> <li>• Other human activities (OHVs, noise, aircraft, and pets)</li> <li>• Predation (mountain lions, coyotes, and bobcats)</li> </ul>
California leaf-nosed bat	<ul style="list-style-type: none"> <li>• Mines and caves</li> <li>• Riparian</li> <li>• Chaparral and coastal scrub</li> <li>• Desert scrub</li> </ul>	<ul style="list-style-type: none"> <li>• In California, the California leaf-nosed bat occurs in the desert regions of eastern San Bernardino (i.e., excluding the western Mojave region), Riverside, and San Diego counties and all of Imperial County</li> <li>• Desert riparian communities are very spatially limited resources that are used by a large number of bat species</li> </ul>	<ul style="list-style-type: none"> <li>• Inter-specific competition</li> <li>• Management of desert riparian communities, including hydrology and species composition, is important for maintaining a diverse bat community</li> </ul>	<ul style="list-style-type: none"> <li>• Disturbances of roost sites due to human entrance, mine closures, and mine reactivation</li> <li>• Loss and degradation of desert riparian habitats</li> <li>• Development of golf courses and residential housing</li> <li>• Pesticides</li> <li>• Wind energy facilities</li> </ul>
Mohave ground squirrel	<ul style="list-style-type: none"> <li>• Desert scrub</li> </ul>	<ul style="list-style-type: none"> <li>• Endemic to Western Mojave</li> <li>• Sub-regional connectivity, including dispersal</li> </ul>	<ul style="list-style-type: none"> <li>• None identified in literature</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and fragmentation (urban, agriculture, military, energy, and transportation)<sup>3</sup></li> <li>• Recreation (OHVs)<sup>2</sup></li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
		habitat		<ul style="list-style-type: none"> <li>• Grazing (cattle and sheep)<sup>2</sup></li> <li>• Invasive plants<sup>2</sup></li> <li>• Climate change (especially prolonged drought)<sup>2</sup></li> <li>• Predation (cats, dogs, and ravens)</li> <li>• Rodenticides/pesticides</li> </ul>
Pallid bat	<ul style="list-style-type: none"> <li>• All land covers (except developed and disturbed)</li> </ul>	<ul style="list-style-type: none"> <li>• Widespread throughout the western United States</li> <li>• Inhabits rocky outcrops, cliffs, and spacious crevices with access to open habitats for foraging</li> </ul>	<ul style="list-style-type: none"> <li>• Day roost selection, fidelity, and lability (flexibility) and social roosting</li> <li>• Ectoparasites</li> <li>• Foraging and food partitioning mechanisms</li> <li>• Lighting</li> <li>• Predation</li> </ul>	<ul style="list-style-type: none"> <li>• Disturbances of roost sites through vandalism, extermination, and destruction of buildings and recreational activities</li> <li>• Pesticides and heavy metals</li> <li>• Habitat modification or degradation (i.e., conversion to agriculture, prescribed fires, wildfires)</li> <li>• Predation by urban-related predators</li> <li>• Wind energy facilities</li> </ul>
Townsend's big-eared bat	<ul style="list-style-type: none"> <li>• Abandoned mines</li> <li>• California forest and woodlands</li> <li>• Riparian</li> <li>• Chaparral and coastal scrub</li> </ul>	<ul style="list-style-type: none"> <li>• In the U.S., it occurs in a continuous distribution in all of the western states and east into western South Dakota, northwestern Nebraska, southwestern Kansas, western Oklahoma, and western Texas</li> </ul>	<ul style="list-style-type: none"> <li>• Inter-specific competition</li> <li>• Lighting may affect predator-prey relationships among bats</li> </ul>	<ul style="list-style-type: none"> <li>• Human disturbances of roost sites</li> <li>• Reduced foraging habitat from agricultural conversion</li> <li>• Pesticides</li> <li>• Wind energy facilities</li> </ul>

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<i>Plants</i>				
Alkali mariposa-lily	<ul style="list-style-type: none"> <li>• Chaparral and coastal scrub</li> <li>• Desert Scrub</li> <li>• Wetlands</li> </ul>		<ul style="list-style-type: none"> <li>• Hydrology (periodic natural inundation)</li> </ul>	<ul style="list-style-type: none"> <li>• Urbanization and road construction</li> <li>• Grazing and trampling</li> <li>• Hydrological alternations and water diversions that lower the water table</li> <li>• Military operations</li> <li>• Dumping</li> <li>• Grading</li> </ul>
Bakersfield cactus	<ul style="list-style-type: none"> <li>• Grasslands</li> <li>• Riparian</li> <li>• Desert scrub</li> <li>• California forest and woodlands</li> </ul>	<ul style="list-style-type: none"> <li>• Restricted to a limited area of central Kern County near Bakersfield in the southern San Joaquin Valley</li> </ul>	<ul style="list-style-type: none"> <li>• Competition with non-native grasses for water</li> <li>• Pollination</li> </ul>	<ul style="list-style-type: none"> <li>• Residential and urban as well as oil development</li> <li>• OHVs</li> <li>• Sand mining</li> <li>• Competition from non-native grasses</li> <li>• Climate change</li> <li>• Air pollution (including elevated nitrogen deposition)</li> <li>• Loss of pollinators</li> <li>• Flooding</li> <li>• Loss of genetic diversity</li> </ul>
Barstow woolly sunflower	<ul style="list-style-type: none"> <li>• Desert scrub</li> <li>• Wetlands</li> </ul>	<ul style="list-style-type: none"> <li>• Endemic to the west-central Mojave Desert</li> <li>• Sub-regional habitat connectivity</li> </ul>	<ul style="list-style-type: none"> <li>• Bare areas with little soil that frequently contain a shallow subsurface caliche layer</li> </ul>	<ul style="list-style-type: none"> <li>• Development activities (energy and housing, highway and road improvements, pipelines)</li> <li>• Grazing (sheep)<sup>2</sup></li> <li>• Recreation (OHVs)<sup>2</sup></li> <li>• Mining</li> <li>• Other human activities (dumping)<sup>2</sup></li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Desert cymopterus	<ul style="list-style-type: none"> <li>• Desert scrub</li> <li>• Wetlands (playas)</li> </ul>	<ul style="list-style-type: none"> <li>• Primarily Rogers Dry Lake, Harper Dry Lake, Cuddeback Dry Lake, and Superior Dry Lake basins</li> <li>• Sub-regional habitat connectivity (?)</li> </ul>	<ul style="list-style-type: none"> <li>• Sandy soils on alluvial fans and basins and stabilized sand fields</li> <li>• Precipitation</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and fragmentation<sup>3</sup></li> <li>• Development (oil, gas, utilities, renewable energy)<sup>2</sup></li> <li>• Recreation (OHVs)<sup>2</sup></li> <li>• Grazing (sheep)<sup>2</sup></li> <li>• Climate change<sup>2</sup></li> <li>• Invasive non-native plants</li> </ul>
Little San Bernardino Mountains linanthus	<ul style="list-style-type: none"> <li>• Desert scrub</li> <li>• Riparian</li> <li>• Dunes</li> </ul>	<ul style="list-style-type: none"> <li>• Restricted to the mouth of Dry Morongo Canyon near the City of Desert Hot Springs and the north side of Joshua Tree National Park south of State Highway 62 in the Little San Bernardino Mountains and from Whitewater Canyon in the eastern San Bernardino Mountains to Palm Springs</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrology</li> <li>• Competition for resources from invading non-native species</li> </ul>	<ul style="list-style-type: none"> <li>• Urbanization</li> <li>• OHV use</li> <li>• Flood control activities</li> <li>• Illegal dumping</li> <li>• Invasive non-native species</li> <li>• Increased fire frequency</li> <li>• Groundwater loss</li> <li>• Soil erosion</li> </ul>
Mojave monkeyflower	<ul style="list-style-type: none"> <li>• Desert scrub</li> </ul>	<ul style="list-style-type: none"> <li>• Endemic to west-central Mojave Desert, primarily Barstow southeast to Newberry Springs and northeast of Victorville</li> </ul>	<ul style="list-style-type: none"> <li>• Precipitation</li> <li>• Pollination and dispersal</li> </ul>	<ul style="list-style-type: none"> <li>• Development (solar, wind, and roads)</li> <li>• Mining</li> <li>• Grazing<sup>2</sup></li> <li>• Invasive plants<sup>2</sup></li> <li>• Habitat fragmentation/potential inbreeding</li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
		<ul style="list-style-type: none"> <li>• Sub-regional habitat connectivity</li> </ul>		<ul style="list-style-type: none"> <li>• Climate change<sup>2</sup></li> <li>• BLM land exchanges</li> </ul>
Mojave tarplant	<ul style="list-style-type: none"> <li>• Riparian</li> <li>• Chaparral and coastal scrub</li> <li>• Desert scrub</li> <li>• California forest and woodlands</li> <li>• Desert conifer woodlands</li> </ul>	<ul style="list-style-type: none"> <li>• Primarily occurs in southeastern Sierra Nevada range in Kern County and possible Red Rock Canyon</li> <li>• Sub-regional habitat connectivity(?); discontinuous populations may already be relictual</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrology/seasonally saturated clay and silty soils (seeps and along grassy swales and intermittent creeks)</li> <li>• Precipitation</li> <li>• Pollination (?)</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrological alterations<sup>2</sup></li> <li>• Recreation (OHVs—trampling/crushing and soils disturbance)<sup>2</sup></li> <li>• Climate change<sup>2</sup></li> <li>• Grazing (livestock trampling at water sources)<sup>2</sup></li> <li>• Development</li> <li>• Road maintenance</li> </ul>
Owens Valley checkerbloom	<ul style="list-style-type: none"> <li>• Wetlands</li> </ul>	<ul style="list-style-type: none"> <li>• Endemic to southern Owens Valley</li> <li>• Local habitat connectivity among alkali meadow and spring communities scattered along about 125 kilometers of the Owens River drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Moist alkaline meadows and seeps and chenopod (saltbush) scrub</li> <li>• Fine, sandy loam with alkaline crusts</li> <li>• Pollination</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrological alteration (diversion of Owens River and groundwater pumping)<sup>2</sup></li> <li>• Climate change<sup>2</sup></li> <li>• Grazing (cattle)<sup>2</sup></li> <li>• Competition (rhizomatous grass species and upland rubber rabbitbrush)<sup>2</sup></li> <li>• Meadow succession<sup>2</sup></li> <li>• Invasive plants (Russian olive, knapweed)<sup>2</sup></li> </ul>
Parish's daisy	<ul style="list-style-type: none"> <li>• California forest and woodlands</li> <li>• Desert conifer woodlands</li> </ul>	<ul style="list-style-type: none"> <li>• Mostly endemic to calcareous slopes of San Bernardino Mountains, with a few collections from granitic areas of</li> </ul>	<ul style="list-style-type: none"> <li>• Carbonate alluvium</li> <li>• Pollination</li> </ul>	<ul style="list-style-type: none"> <li>• Mining (limestone) (including dust)<sup>2</sup></li> <li>• Lighting (pollinators and seed dispersers)</li> <li>• Recreation (camping, firewood collection, and dust generation)<sup>2</sup></li> </ul>

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	<ul style="list-style-type: none"> <li>Desert scrub</li> </ul>	eastern San Bernardino Mountains and quartz monzonite areas in the Little San Bernardino Mountains <ul style="list-style-type: none"> <li>Local habitat connectivity</li> </ul>		<ul style="list-style-type: none"> <li>Fire suppression<sup>2</sup></li> <li>Climate change<sup>2</sup></li> <li>Energy development</li> <li>Road and residential development</li> </ul>
Triple-ribbed milk-vetch	<ul style="list-style-type: none"> <li>Desert scrub</li> </ul>	<ul style="list-style-type: none"> <li>Limited to western portion of Plan Area in Wathier Landing, Catclaw Flat, upper Mission Creek, Dry Morongo Creek, Big Morongo Canyon (two occurrence locations), Long Canyon, and Key's Ranch (unvouchered)</li> <li>Sub-regional habitat connectivity</li> </ul>	<ul style="list-style-type: none"> <li>Barren rocky slopes and ridges</li> <li>Precipitation (?)</li> <li>Pollination/dispersal (deme populations, waifs) (?)</li> </ul>	<ul style="list-style-type: none"> <li>Development (construction/maintenance of gas and oil pipelines, residential)</li> <li>Recreation (OHVs)<sup>2</sup></li> <li>Fire suppression<sup>2</sup></li> <li>Flooding<sup>2</sup></li> <li>Climate change<sup>2</sup></li> </ul>
<i>Planning Species</i>				
<i>Mammals</i>				
Burro deer	<ul style="list-style-type: none"> <li>Riparian</li> <li>Dunes</li> <li>Desert scrub</li> </ul>	<ul style="list-style-type: none"> <li>Seasonal migration</li> <li>High mobility/relatively large home ranges</li> <li>Distribution of water sources</li> <li>Connectivity between</li> </ul>	<ul style="list-style-type: none"> <li>Competition from non-native grazing animals</li> </ul>	<ul style="list-style-type: none"> <li>Habitat loss and degradation (urban and energy development, agriculture)<sup>2</sup></li> <li>Invasive plants (tamarisk, non-native pasture plants)<sup>2</sup></li> <li>Recreation (OHVs)</li> <li>Hydrologic alterations (flood control)</li> </ul>

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Species	Natural Community <sup>1</sup>	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
		riparian and mountain habitats		<ul style="list-style-type: none"> <li>• Mining operations</li> <li>• Vehicle collisions</li> <li>• Poaching</li> <li>• Drowning in canals</li> <li>• Competition from non-native grazing animals</li> <li>• Overstocking and competition from cattle, domestic sheep, and goats</li> </ul>
Desert kit fox	<ul style="list-style-type: none"> <li>• Desert scrub</li> <li>• Wetlands (playas)</li> <li>• Riparian (washes)</li> <li>• Dunes (marginal habitat)</li> </ul>	<ul style="list-style-type: none"> <li>• Mobile with relatively large home ranges</li> <li>• Suitable den site availability</li> </ul>	<ul style="list-style-type: none"> <li>• Prey availability, which is likely variable spatially and temporally</li> <li>• Competition and predation from coyotes</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat loss and fragmentation (development, roads, recreation, and grazing)<sup>3</sup></li> <li>• Recreation (OHVs, shooting)<sup>2</sup></li> <li>• Predator and rodent controls/rodenticide poisoning</li> <li>• Expansion and increased abundance of coyotes (predation and competition)</li> <li>• Disease (canine distemper)</li> <li>• Vehicle collisions</li> <li>• Military training and noise</li> </ul>

**Notes:**

<sup>1</sup> Natural community information based on the DRECP Land Cover map vegetation types, which are aggregated communities based on the National Vegetation Classification Standard (Groups and Macrogroups). Where expert-based species habitat distribution models have been developed for a species, the natural communities listed are based on the selected vegetation types used for these models. Where expert-based models were not developed for a species, natural communities list are based on literature as summarized in the species profile.

<sup>2</sup> Potential ecological processes stressor

<sup>3</sup> Potential landscape issue

(?) = unknown issue