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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 77 proposed Covered 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 77 proposed Covered 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 77 proposed Covered Species.

This section summarizes key conservation factors for the proposed DRECP Covered 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 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, the Algodones Dunes sunflower (*Helianthus niveus* ssp. *tephrodes*) is endemic to dune systems in the Imperial Valley, with the main known population within the Algodones Dunes. 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 I-8 for the Algodones Dunes). 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, American peregrine falcon (*Falco peregrinus anatum*) 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 connectivity issue applies to several of the highly mobile migratory bird

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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 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, 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 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 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 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 Dune Community

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

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connectivity. As discussed in Sections 2.1.3 and 4.2.1, 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 OHVs, non-native plants that may stabilize soils, and climate change that may bring about hydrological alterations). Covered Species associated with dunes are listed in Table 7-1.

7.1.2 Forest Community

Table 7-1 lists key landscape and ecological processes, as well as ecological stressors and forest-associated species. The landscape issues include maintaining habitats for seasonal migrations (e.g., bald eagles [*Haliaeetus leucocephalus*], hoary bat [*Lasiurus cinereus*], and western red bat). As discussed in Section 4.2.2, forests comprise only approximately 0.4% of the Plan Area, all within the California montane conifer forest group. 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 Species associated with forests are listed in Table 7-1.

7.1.3 Grasslands Community

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 4.2.3, the Plan Area includes a small amount of grassland communities (less than 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 Species associated with grasslands are listed in Table 7-1.

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7.1.4 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 Section 2.1.4, 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 are 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 Species associated with riparian communities are listed in Table 7-1.

7.1.5 Rocky, Barren, and Unvegetated Community

Table 7-1 lists key landscape and ecological processes, as well as ecological stressors and species associated with rocky, barren, and unvegetated areas. The landscape issues include regional and local habitat connectivity. As discussed in Section 4.2.5, approximately 30% of the Plan Area is covered by cliff, scree, and other rock vegetation, including desert playa, desert bedrock cliff and outcrop, and cliff and canyon. 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 Species associated with rocky, barren, and unvegetated areas are listed in Table 7-1.

7.1.6 Scrub and Chaparral Community

Table 7-1 lists the key landscape and ecological processes, as well as ecological stressors and scrub and chaparral-associated species. Landscape issues primarily relate to sub-regional habitat connectivity that allow for movement and dispersal of species that are

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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 4.2.6, the Plan Area includes several scrub and chaparral vegetation types. These scrub and chaparral 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 scrub and chaparral vegetation structure, composition, successions, and conversions to other types (e.g., invasive plants, wildfire, fire suppression, flooding, grazing). Covered Species associated with scrub and chaparral communities are listed in Table 7-1.

7.1.7 Wetlands Community

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 4.2.7, the wetland community covers approximately 1.4% of the Plan Area on the land cover map (Figure 4-1) and includes cool semi-desert and warm semi-desert/Mediterranean alkali-saline wetlands, western North America wet meadow and low shrub carr, western North American freshwater marsh, and open water. 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 Species associated with wetlands are listed in Table 7-1.

7.1.8 Woodland Community

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 4.2.8, the woodland community comprises 0.8% 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,

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habitat loss and degradation, wildfire, recreation, grazing, invasive plants, climate change, competition with other plants). Covered Species associated with woodlands are listed in Table 7-1.

7.1.9 Other Land Covers

7.1.9.1 Agriculture

Table 7-1 lists key landscape and ecological processes, as well as ecological stressors and species associated with agriculture. As discussed in Section 4.2.9.1, approximately 3.4% 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 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 Species.

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

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
Dunes	<ul style="list-style-type: none"> • North American warm desert dunes and sand flats 	<ul style="list-style-type: none"> • Sub-regional habitat connectivity • Local habitat connectivity 	<ul style="list-style-type: none"> • Aeolian processes • Accumulated sand microhabitat • Stabilized or partially stabilized sand dunes • Precipitation • Pollination 	<ul style="list-style-type: none"> • Sand transport alteration • Grazing • Recreation (OHVs and associated development, trampling) • Invasive plants • Climate change, hydrological alterations 	<ul style="list-style-type: none"> • Algodones Dunes sunflower • Peirson's milk-vetch • Wiggin's croton • Pallid bat • Mojave fringe-toed lizard • White-margined beardtongue • Sand food • Flat-tailed horned lizard
Forest	<ul style="list-style-type: none"> • California montane conifer forest 	<ul style="list-style-type: none"> • Seasonal migration 	—	<ul style="list-style-type: none"> • Logging 	<ul style="list-style-type: none"> • Bald eagle • Golden eagle • Pallid bat • Townsend's big-eared bat • Western mastiff bat • Hoary bat • Western red bat • San Bernardino Mountains dudleya • Piute Mountains jewel-flower • Coast horned lizard • White-tailed kite • Bighorn sheep
Grasslands	<ul style="list-style-type: none"> • California Annual and Perennial Grassland • Mediterranean California naturalized annual 	<ul style="list-style-type: none"> • Sub-regional habitat connectivity 	<ul style="list-style-type: none"> • Soil integrity (texture, openness, burrows) 	<ul style="list-style-type: none"> • Habitat loss and fragmentation • Climate change • Invasive plants • Wildfire • Grazing 	<ul style="list-style-type: none"> • Ash meadows gumplant • Barstow woolly sunflower • California condor • Desert tortoise • Golden eagle

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Table 7-1

Summary of Conservation and Management Factors for DRECP Covered 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"> and perennial grassland • Southern Great Basin semi-desert grassland 			<ul style="list-style-type: none"> • Trampling (wild horses) • Recreation (OHVs) • Other human activities (dumping) • Pesticides and contaminants 	<ul style="list-style-type: none"> • Mountain plover • Swainson's hawk • Western burrowing owl • Pallid bat • Western mastiff bat • Bakersfield cactus • Coast horned lizard • Tehachapi pocket mouse • White-tailed kite • Tricolored blackbird • Bighorn sheep
Riparian	<ul style="list-style-type: none"> • Southwestern North American introduced riparian scrub • Southwestern North American riparian evergreen and deciduous woodland • Southwestern North American Riparian, Flooded and Swamp Forest/Scrubland • Southwestern North American riparian/wash 	<ul style="list-style-type: none"> • Local habitat connectivity (within stream) • Sub-regional habitat connectivity (stopover habitats for migrants and sub-regional dispersers) 	<ul style="list-style-type: none"> • Surface and ground water hydrology • Geomorphology and sediment transport (including banks habitats) • Saturated soils (along creeks, swales, and intermittent creeks) • Soil structure • Natural flooding regimes • Water quality • Prey base and availability • Nest cavities • Old growth xeric woodlands 	<ul style="list-style-type: none"> • Habitat loss and degradation • Hydrological and geomorphological alterations (dams (including beaver dams on Mojave River), channelization, diversions) • Invasive plant species (tamarisk, giant reed, ice plant, pampas grass) • Pesticides and contaminants (water quality and prey impacts) • Climate change • Grazing 	<ul style="list-style-type: none"> • Arroyo toad • Bald eagle Bank swallow • Bell's vireo • California black rail • Elf owl • Gila woodpecker • Gilded flicker • Inyo California towhee • Mojave tarplant • Owens Valley checkerbloom • Swainson's hawk • Tehachapi slender salamander • Western yellow-billed cuckoo • Willow flycatcher • Yuma clapper rail • California leaf-nosed bat

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Table 7-1

Summary of Conservation and Management Factors for DRECP Covered Species Based on Natural Communities

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
	scrub		<ul style="list-style-type: none"> Precipitation Pollination 	<ul style="list-style-type: none"> Recreation (OHVs, fishing, camping, waterplay) Mining (sand, gravel and recreational gold mining) Competition for nest cavities Wildfire Meadow succession to uplands Competition with upland plants 	<ul style="list-style-type: none"> Pallid bat Townsend's big-eared bat Hoary bat Western red bat Bakersfield cactus Tricolored blackbird Bighorn sheep
Scrub and Chaparral	<ul style="list-style-type: none"> Arizonan upland Sonoran desert scrub California mesic chaparral California pre-montane chaparral California xeric chaparral Central and Southern Californian coastal sage scrub Intermontane seral shrubland Inter-Mountain 	<ul style="list-style-type: none"> Sub-regional habitat connectivity 	<ul style="list-style-type: none"> Bare areas with little soil Soil conditions related to burrows and diggability Sandy soils on alluvial fans and basins Forage quality Precipitation Cactus stands (primarily large columnar cacti) 	<ul style="list-style-type: none"> Habitat loss and fragmentation Invasive plants Climate change Wildfire Fire suppression Flooding Grazing Trampling (wild horses, burros) Recreation (OHVs, vehicle parking) Other human activities (dumping, military activities) Competition for nest cavities 	<ul style="list-style-type: none"> Ash Meadows gumplant Barstow woolly sunflower California condor Desert tortoise Desert cymopterus Elf owl Gila woodpecker Gilded flicker Golden eagle Inyo California towhee Mohave ground squirrel Mojave monkeyflower Mojave tarplant Owens Valley checkerbloom Red Rock tarplant Tracy's eriastrum

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

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
	<p>Dry Shrubland and Grassland</p> <ul style="list-style-type: none"> • Inter-Mountain West mesic tall sagebrush shrubland and steppe • Lower bajada and fan Mojavean-Sonoran desert scrub • Madrean Warm Semi-Desert Wash Woodland/Scrub • Shadscale-saltbush cool semi-desert scrub • Sonoran-Coloradan semi-desert wash woodland scrub • Western Mojave and western Sonoran Desert borderland chaparral 			<ul style="list-style-type: none"> • Competition with other plants 	<ul style="list-style-type: none"> • Triple-ribbed milk-vetch • Western burrowing owl • California leaf-nosed bat • Pallid bat • Townsend's big-eared bat • Western mastiff bat • Hoary bat • Western red bat • Alkali mariposa-lily • Little San Bernardino Mtns. Linanthus • Mojave fringe-toed lizard • Orocopia sage • Parish's phacelia • White-margined beardtongue Sand food • Kelso Creek monkeyflower • Kern buckwheat • Bakersfield cactus • Charlotte's phacelia • Coast horned lizard • White-tailed kite • Red Rock poppy • Amargosa beardtongue • Cushenbury buckwheat • Cushenbury milk-vetch • Cushenbury oxytheca

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Table 7-1

Summary of Conservation and Management Factors for DRECP Covered 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"> • Parish's daisy • Flat-tailed horned lizard • Bighorn sheep • Lane Mountain milk-vetch
Rocky, Barren, and Unvegetated	<ul style="list-style-type: none"> • California Cliff, Scree, and Other Rock Vegetation • Desert Playa • North American warm desert bedrock cliff and outcrop • Sierra Nevada cliff and canyon 	<ul style="list-style-type: none"> • Sub-regional habitat connectivity 	<ul style="list-style-type: none"> • Soil integrity (texture, openness) 	<ul style="list-style-type: none"> • Habitat loss and fragmentation • Climate change • Invasive species • Wildfire • Recreation (OHVs) • Mining • Grazing • Other human activities (dumping) 	<ul style="list-style-type: none"> • Ash meadows gumplant • Barstow woolly sunflower • California condor • Desert cymopterus Golden eagle • Mohave ground squirrel • Mojave monkeyflower • Owens Valley checkerbloom • Western burrowing owl • Pallid bat • Western mastiff bat • Barefoot gecko
Wetlands	<ul style="list-style-type: none"> • Great Basin cool semi-desert alkali basin • Open Water • Southwestern North American salt basin and high marsh • Arid west freshwater emergent marsh • Western North 	<ul style="list-style-type: none"> • Local habitat connectivity for residents • Sub-regional habitat connectivity (stopover habitats for migrants and winter residents) 	<ul style="list-style-type: none"> • Surface and ground water hydrology • Daily and season water fluctuations • Water quality 	<ul style="list-style-type: none"> • Habitat loss and degradation • Pesticides and organochlorines • Climate change • Invasive plants 	<ul style="list-style-type: none"> • American peregrine falcon • Bald eagle California black rail • Yuma clapper rail • Pallid bat Hoary bat • Alkali mariposa-lily Greater sandhill crane Tricolored blackbird • Desert pupfish • Mohave tui chub • Owens pupfish • Owens tui chub

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Table 7-1

Summary of Conservation and Management Factors for DRECP Covered Species Based on Natural Communities

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
	American Freshwater Marsh				<ul style="list-style-type: none"> • Amargosa niterwort • Amargosa vole • Parish's alkali grass • Sodaville milk-vetch
Woodland	<ul style="list-style-type: none"> • California broadleaf forest and woodland • California Forest and Woodland • California montane conifer forest • Rocky Mountain mesic subalpine forest and woodland • Western Great Basin montane conifer woodland 	<ul style="list-style-type: none"> • Sub-regional habitat connectivity 	<ul style="list-style-type: none"> • Precipitation • Hydrology 	<ul style="list-style-type: none"> • Logging • Habitat loss and degradation • Wildfire • Recreation (OHVs) • Grazing • Invasive plants • Climate change • Competition with other plants 	<ul style="list-style-type: none"> • Bald eagle • Gilded flicker • Golden eagle • Owens Valley checkerbloom • Tehachapi slender salamander • Thorne's buckwheat • Tracy's eriastrum • Pallid bat • Townsend's big-eared bat • Western mastiff bat • Hoary bat • Western red bat • San Bernardino Mountains dudleya • Kelso Creek monkeyflower • Kern buckwheat • Piute Mountains jewel-flower • Bakersfield cactus • Charlotte's phacelia • Coast horned lizard • Spanish Needle onion • Tehachapi pocket mouse • White-tailed kite

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Table 7-1
Summary of Conservation and Management Factors for DRECP Covered 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"> • Amargosa beardtongue • Cushenbury buckwheat • Cushenbury milk-vetch • Cushenbury oxytheca • Parish's daisy • Bighorn sheep
Agriculture	<ul style="list-style-type: none"> • Agriculture 	—	<ul style="list-style-type: none"> • Hydrology/irrigation • Prey availability 	<ul style="list-style-type: none"> • Pesticides and other contaminants • Reduced prey availability 	<ul style="list-style-type: none"> • Mountain plover • Swainson's hawk • Western burrowing owl • Pallid bat • Western mastiff bat • Greater sandhill crane • White-tailed kite • Tricolored blackbird

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Table 7-2
Summary of Key Conservation Factors for DRECP Covered Species
based on Natural Communities, Landscape, Ecological Processes, and Environmental Stressors/Threats

Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Algodones Dunes sunflower	<ul style="list-style-type: none"> Dune community 	<ul style="list-style-type: none"> Mainly endemic to Algodones Dunes system and other isolated areas Sub-regional habitat connectivity 	<ul style="list-style-type: none"> Aeolian processes/dune systems Accumulated sand microhabitat 	<ul style="list-style-type: none"> Recreation (OHVs) Other anthropogenic disturbances Sand transport alteration²
Alkali mariposa-lily	<ul style="list-style-type: none"> Scrub and chaparral community Wetland community 		<ul style="list-style-type: none"> Hydrology (periodic natural inundation) 	<ul style="list-style-type: none"> Urbanization and road construction Grazing and trampling Hydrological alternations and water diversions that lower the water table Military operations Dumping Grading
Amargosa beardtongue	<ul style="list-style-type: none"> Scrub and chaparral community Woodland community 	<ul style="list-style-type: none"> Known from the southern Great Basin floristic province east of the Sierra Nevada, the desert province in the northern desert mountains, and in western Nevada 	<ul style="list-style-type: none"> Host to the silvery blue butterfly (<i>Glaucopsyche lygdamus</i>) Pollination 	<ul style="list-style-type: none"> Habitat degradation and fragmentation Road expansion Cattle and over-grazing Mine tailings and trash OHV use Human activity/trampling
Amargosa niterwort	<ul style="list-style-type: none"> Wetlands community 	<ul style="list-style-type: none"> Endemic to Carson Slough, Ash Meadows, and Tecopa Hot Springs Sub-regional habitat connectivity within Plan Area 	<ul style="list-style-type: none"> Moist alkaline soils Subsurface irrigation 	<ul style="list-style-type: none"> Hydrological alteration² Climate change² Soil disturbance (soil crust)² Development (road construction) Mining (mineral) Trampling (wild horses)² Recreation (OHVs)² Invasive plants²

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Table 7-2
Summary of Key Conservation Factors for DRECP Covered Species
based on Natural Communities, Landscape, Ecological Processes, and Environmental Stressors/Threats

Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Amargosa vole	<ul style="list-style-type: none"> Wetlands community 	<ul style="list-style-type: none"> Endemic to Amargosa River and spring-fed wetland systems in the vicinity of Tecopa Hot Springs Sub-regional habitat connectivity within Plan Area 	<ul style="list-style-type: none"> Marsh habitat and hydrology 	<ul style="list-style-type: none"> Habitat loss and/or degradation (burning, grazing, development of marsh habitat)² Hydrological alteration (diversions, channelization, barriers to natural springs, and groundwater pumping)² Invasive plants (tamarisk)² Climate change² Predation (cats) Competition (potentially house mouse)
American peregrine falcon	<ul style="list-style-type: none"> Wetland community 	<ul style="list-style-type: none"> Highly mobile/able to access disjunct resource areas Migration routes 	<ul style="list-style-type: none"> None identified in literature 	<ul style="list-style-type: none"> Collisions and electrocutions Pesticides and contaminants (e.g., organochlorines) Predation (young by ravens and raccoons) Human disturbance and/or pet disturbance (nest sites)
Arroyo toad	<ul style="list-style-type: none"> Riparian community 	<ul style="list-style-type: none"> Contiguous and connected stream courses with contiguous adjacent uplands 	<ul style="list-style-type: none"> Hydrology (surface and ground water) Geomorphology (e.g., sediment transport and deposition) Natural flood disturbance regimes Water quality 	<ul style="list-style-type: none"> Hydrological and geomorphological alterations (dams (including beaver dams on Mojave River), channelization, diversions)² Groundwater pumping Invasive plant species (tamarisk, giant reed, ice plant, pampas grass)² Pesticides and contaminants (water quality impacts)² Climate change² Predation (bullfrogs, African clawed frogs, crayfish, non-native fish, Argentine ant, raccoons, striped skunk)

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Table 7-2
Summary of Key Conservation Factors for DRECP Covered Species
based on Natural Communities, Landscape, Ecological Processes, and Environmental Stressors/Threats

Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
				<ul style="list-style-type: none"> • Grazing² • Recreation (OHVs, fishing, camping, water-play)² • Mining (sand, gravel and recreational gold mining)²
Ash meadows gumplant	<ul style="list-style-type: none"> • Scrub and chaparral community • Grassland community • Rocky, barren, and unvegetated community 	<ul style="list-style-type: none"> • Endemic to mesic meadows within Carson Slough • Sub-regional habitat connectivity within Plan Area (?) 	<ul style="list-style-type: none"> • Standing water or high groundwater levels and areas with sun exposure • Fine-textured alkali and alkali clay soils (?) 	<ul style="list-style-type: none"> • Habitat fragmentation³ • Invasive plants (tamarisk)² • Hydrological alterations (surface and ground water reductions)² • Climate change² • Mining (clay) • Trampling (wild horses)² • Recreation (OHVs)²
Bakersfield cactus	<ul style="list-style-type: none"> • Grassland community • Riparian community • Scrub and chaparral community • Woodland community 	<ul style="list-style-type: none"> • Restricted to a limited area of central Kern County near Bakersfield in the southern San Joaquin Valley 	<ul style="list-style-type: none"> • Competition with non-native grasses for water • Pollination 	<ul style="list-style-type: none"> • Residential and urban as well as oil development, • OHVs • Sand mining • Competition from non-native grasses. • Climate change • Air pollution (including elevated nitrogen deposition) • Loss of pollinators • Flooding • Loss of genetic diversity
Bald eagle	<ul style="list-style-type: none"> • Riparian community • Forest community • Woodland community 	<ul style="list-style-type: none"> • Highly mobile/able to access disjunct resource areas • Migration routes 	<ul style="list-style-type: none"> • Large, open water resources with nearby roosting and perching sites 	<ul style="list-style-type: none"> • Habitat loss (suitable roosting/perching sites near foraging areas) • Pesticides and contaminants (organochlorines)² • Recreation • Mining

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Table 7-2
Summary of Key Conservation Factors for DRECP Covered Species
based on Natural Communities, Landscape, Ecological Processes, and Environmental Stressors/Threats

Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
	<ul style="list-style-type: none"> Wetland community 			<ul style="list-style-type: none"> Logging²
Bank swallow	<ul style="list-style-type: none"> Riparian community 	<ul style="list-style-type: none"> Highly mobile/able to access disjunct resource areas Migration routes 	<ul style="list-style-type: none"> Suitable nesting habitat (vertical banks or bluffs susceptible to erosion of sufficient intensity to maintain a near-vertical aspect with exposure of bare soils; usually riverbanks but also roadcuts and gravel mines) Nearby food sources (flying insects) 	<ul style="list-style-type: none"> Habitat loss and/or degradation (nesting habitat due to bank stabilization such as rip-rap; bank undercutting due to boat wakes and rising water levels in lakes and reservoirs)²
Barefoot gecko	<ul style="list-style-type: none"> Rocky, barren, and unvegetated community 	<ul style="list-style-type: none"> Endemic to rocky/boulder habitat in eastern San Diego and western Imperial counties Sub-regional habitat connectivity 	<ul style="list-style-type: none"> None identified in literature 	<ul style="list-style-type: none"> Recreation (camping, hiking, rock hounding, collection and habitat destruction by hobbyists and commercial collectors) Development (highway construction) Mining
Barstow woolly sunflower	<ul style="list-style-type: none"> Scrub and chaparral community Grassland community Rocky, barren, and unvegetated community 	<ul style="list-style-type: none"> Endemic to the west-central Mojave Desert Sub-regional habitat connectivity 	<ul style="list-style-type: none"> Bare areas with little soil that frequently contain a shallow subsurface caliche layer 	<ul style="list-style-type: none"> Development activities (energy and housing, highway and road improvements, pipelines) Grazing (sheep)² Recreation (OHVs)² Mining Other human activities (dumping)²

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Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Bell's vireo	<ul style="list-style-type: none"> Riparian community 	<ul style="list-style-type: none"> Highly mobile/able to access disjunct resource areas Migration routes 	<ul style="list-style-type: none"> Hydrology (surface and ground water) Geomorphology (e.g., sediment transport and deposition) Natural flood disturbance regimes 	<ul style="list-style-type: none"> Habitat loss and/or degradation² Hydrological and geomorphological alterations² Invasive plants (tamarisk, giant reed, pampas grass)² Grazing² Recreation (OHVs)² Climate change² Cowbird parasitism Predation (Argentine ants, domestic and feral cats and other mesopredators)
Bighorn sheep	<ul style="list-style-type: none"> Grassland community Scrub and chaparral community Riparian community Woodland community Forest community 	<ul style="list-style-type: none"> Relatively high mobility between mountain ranges Inter-mountain connectivity for dispersal Contiguous habitat for seasonal movements Movement limited by manmade physical barriers (e.g., roads, canals, fencing, incompatible land uses) and water resources 	<ul style="list-style-type: none"> Water resources near escape terrain to support reproduction Available nutritious forage to support reproduction 	<ul style="list-style-type: none"> Habitat loss and/or degradation² Climate change (primarily drought which reduces available water resources and nutritious forage during reproduction)² Invasive plants (tamarisk)² Disease Development (fencing, aboveground canals, and highways and freeways that obstruct movement)³ Other human activities (OHVs, noise, aircraft, and pets) Predation (mountain lions, coyotes, and bobcats)
California black rail	<ul style="list-style-type: none"> Wetland community Riparian community 	<ul style="list-style-type: none"> Local habitat connectivity (including uplands and open water) between riparian marshes and wet meadows (movement by running or 	<ul style="list-style-type: none"> Marsh and wet meadow with surface water or high ground water levels and low daily water fluctuations 	<ul style="list-style-type: none"> Habitat loss and degradation (marsh habitat loss from control of seeps along irrigation canals)² Hydrological alteration (surface and subsurface hydrology, including daily fluctuations)²

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Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
		<ul style="list-style-type: none"> short distance swimming) Potential dispersal between disjunct habitat, but undocumented 		<ul style="list-style-type: none"> Climate change² Invasive plants (tamarisk)² Predation (non-native rats, cats, and red fox)
California condor	<ul style="list-style-type: none"> Scrub and chaparral community Grassland community Rocky, barren, and unvegetated community 	<ul style="list-style-type: none"> Highly mobile/able to access disjunct foraging, nesting, and roosting areas Traditional flight corridors (?) 	<ul style="list-style-type: none"> None identified in literature 	<ul style="list-style-type: none"> Contaminants (lead contamination of food resources, ingestion of microtrash and other contaminants such as antifreeze) Collisions and electrocutions (power lines, towers, and other tall structures) Other human activities (disturbances of nesting and historic roosting areas, attraction to human activities due to habituation)
California leaf-nosed bat	<ul style="list-style-type: none"> Mines and caves Riparian community Scrub and chaparral community 	<ul style="list-style-type: none"> 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 Desert riparian communities are very spatially limited resources that are used by a large number of bat species 	<ul style="list-style-type: none"> Inter-specific competition Management of desert riparian communities, including hydrology and species composition, is important for maintaining a diverse bat community 	<ul style="list-style-type: none"> Disturbances of roost sites due to human entrance, mine closures, and mine reactivation Loss and degradation of desert riparian habitats Development of golf courses and residential housing Pesticides Wind energy facilities
Charlotte's phacelia	<ul style="list-style-type: none"> Scrub and chaparral community 	<ul style="list-style-type: none"> This endemic species occurs in the desert-facing foothills of the Sierra Nevada and the adjacent El Paso Mountains, in 	<ul style="list-style-type: none"> Grazing cattle may play a role in seed dispersal, but are also a potential 	<ul style="list-style-type: none"> Grazing OHVs Trampling and collecting by hikers

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Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
	<ul style="list-style-type: none"> Woodland community 	Tulare, Inyo, and Kern counties.	threat	<ul style="list-style-type: none"> Mining Military expansion and activities
Coast horned lizard	<ul style="list-style-type: none"> Scrub and chaparral community Grassland community Woodland community Forest community 	<ul style="list-style-type: none"> Found primarily in coastal areas of the southwestern coast of the United States and the Baja Peninsula of northwestern Mexico Extremely high site fidelity Foraging distances and home range size are influenced by lower plant diversity and higher disturbance 	<ul style="list-style-type: none"> Requires sandy soils Availability and abundance of native ant prey (ant specialists) Invasion of non-native ants Predation 	<ul style="list-style-type: none"> Urbanization Disturbance and decline in vegetative density Vehicles Pets increase predation pressure Expansion of the Argentine ant Wildland fires Collecting for pets
Cushenbury buckwheat	<ul style="list-style-type: none"> Woodland community Scrub and chaparral community 	<ul style="list-style-type: none"> Probably endemic to the San Bernardino Mountains Sub-regional habitat connectivity 	<ul style="list-style-type: none"> Intact natural carbonate substrates (primarily limestone) Open areas with low accumulation of organic material 	<ul style="list-style-type: none"> Mining (including dust)² Recreation (OHVs, camping, firewood collection, and dust generation)² Fire suppression² Climate change² Lighting (pollinators and seed dispersers)
Cushenbury milk-vetch	<ul style="list-style-type: none"> Woodland community Scrub and chaparral community 	<ul style="list-style-type: none"> Endemic to the San Bernardino Mountains Sub-regional habitat connectivity 	<ul style="list-style-type: none"> Intact natural carbonate substrates (both limestone and dolomite) Open areas with low accumulation of organic material 	<ul style="list-style-type: none"> Mining (including dust)² Recreation (OHVs, camping, firewood collection, and dust generation)² Fire suppression² Climate change² Lighting (pollinators and seed dispersers)
Cushenbury oxytheca	<ul style="list-style-type: none"> Woodland community 	<ul style="list-style-type: none"> Endemic to the San Bernardino Mountains 	<ul style="list-style-type: none"> Intact natural carbonate substrates (both 	<ul style="list-style-type: none"> Mining (limestone) (including dust)² Lighting (pollinators and seed dispersers)

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	<ul style="list-style-type: none"> • Scrub and chaparral community 	<ul style="list-style-type: none"> • Sub-regional habitat connectivity 	<ul style="list-style-type: none"> • limestone and dolomite) • Open areas with low accumulation of organic material 	<ul style="list-style-type: none"> • Invasive plants² • Development (power line maintenance, hydroelectric development)
Desert cymopterus	<ul style="list-style-type: none"> • Scrub and chaparral community • Rocky, barren, and unvegetated community 	<ul style="list-style-type: none"> • Primarily Rogers Dry Lake, Harper Dry Lake, Cuddeback Dry Lake, and Superior Dry Lake basins • Sub-regional habitat connectivity (?) 	<ul style="list-style-type: none"> • Sandy soils on alluvial fans and basins and stabilized sand fields • Precipitation 	<ul style="list-style-type: none"> • Habitat loss and fragmentation³ • Development (oil, gas, utilities, renewable energy)² • Recreation (OHVs)² • Grazing (sheep)² • Climate change² • Invasive non-native plants
Desert pupfish	<ul style="list-style-type: none"> • Wetland community and riparian community (shallow water of desert springs, small streams, and marshes) 	<ul style="list-style-type: none"> • Occurs in desert springs, marshes, and tributary streams of the lower Gila and Colorado River drainages in Arizona, California, and Mexico 	<ul style="list-style-type: none"> • Hydrology • Predation, competition, and behavioral interference from non-native fish and invasive snails • Natural weather patterns influence cycles of expansion and contraction 	<ul style="list-style-type: none"> • Introduction of exotic fish species and invasive snails • Modifications to the water conveyance facilities used for irrigating and draining agricultural lands • Application of agricultural pesticides • Dewatering of some natural spring habitats by groundwater pumping
Desert tortoise	<ul style="list-style-type: none"> • Scrub and chaparral community • Grassland community 	<ul style="list-style-type: none"> • Widespread throughout Plan Area • Sub-regional and regional habitat connectivity throughout range in Plan Area • Movement affected by incompatible land uses and 	<ul style="list-style-type: none"> • Soil conditions (soil digability) suitable for burrows • Forage quality • Temperature and reproduction 	<ul style="list-style-type: none"> • Habitat loss and fragmentation (development and agriculture)³ • Predation (ravens, dogs, coyotes) • Disease • Grazing² • Recreation (OHVs)²

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Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
		available refuge (mainly suitable burrow sites)		<ul style="list-style-type: none"> • Other human activities (military activities, collecting, trash and garbage) • Wildfires² • Invasive plants² • Climate change²
Elf owl	<ul style="list-style-type: none"> • Scrub and chaparral community • Riparian community 	<ul style="list-style-type: none"> • Highly mobile/able to access disjunct resource areas • Migration routes 	<ul style="list-style-type: none"> • Hydrology/dense riparian habitat and honey mesquite bosque habitat • Nest cavities excavated by woodpeckers (primarily acorn and Gila woodpeckers and flickers) 	<ul style="list-style-type: none"> • Habitat loss and degradation (flooding of riparian and bosque habitat, clearing for agriculture or development bank stabilization)² • Recreation (OHVs)² • Invasive plants (tamarisk)² • Competition (Loss of nesting cavities to European starlings)² • Climate change²
Flat-tailed horned lizard	<ul style="list-style-type: none"> • Dune community • Scrub and chaparral community 	<ul style="list-style-type: none"> • 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) • Sub-regional habitat connectivity (populations subdivided by I-8 and I-10) 	<ul style="list-style-type: none"> • Stabilized sand dunes (species tends to avoid active and unstable wind-blown dunes) 	<ul style="list-style-type: none"> • Habitat loss and/or degradation (agriculture, urban, highways, canals, railroads, military activities, utilities, and geothermal, oil, gas, and wind energy)² • Recreation (OHVs)² • Predation • Mining (mineral extraction) • Invasive plants² • Wildfire² • Pesticides and contaminants • Grazing (cattle)²
Gila woodpecker	<ul style="list-style-type: none"> • Scrub and chaparral community 	<ul style="list-style-type: none"> • Restricted to lower Colorado River and Brawley areas 	<ul style="list-style-type: none"> • Riparian woodlands, old growth xeric woodlands, and uplands with large, 	<ul style="list-style-type: none"> • Habitat loss and/or degradation (agriculture, urban, development, water diversions)²

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Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
	<ul style="list-style-type: none"> Riparian community 	<ul style="list-style-type: none"> Capable of short-distance seasonal movements (non-migratory) Sub-regional habitat connectivity 	<ul style="list-style-type: none"> columnar cacti Hydrology 	<ul style="list-style-type: none"> Competition (European starlings)² Invasive plants (tamarisk)² Wildfires² Climate change²
Gilded flicker	<ul style="list-style-type: none"> Scrub and chaparral community Riparian community Woodland community 	<ul style="list-style-type: none"> Restricted to lower Colorado River Sedentary and territorial (i.e., lack of even seasonal movement) Sub-regional habitat connectivity 	<ul style="list-style-type: none"> Large columnar cacti (giant saguaro) and riparian woodlands Hydrology 	<ul style="list-style-type: none"> Habitat loss and/or degradation (agriculture, urban, flood control, groundwater pumping, and severe flooding due to water releases from dams)² Wildfire (riparian habitat)² Recreation (OHVs)² Grazing (livestock impacts to tree saplings)² Invasive plants² Climate change¹
Golden eagle	<ul style="list-style-type: none"> Forest community Woodland community Scrub and chaparral community Grassland community Rocky, barren, and unvegetated community 	<ul style="list-style-type: none"> Highly mobile/able to access disjunct foraging, nesting, and roosting areas Seasonal migration patterns 	<ul style="list-style-type: none"> None identified in literature 	<ul style="list-style-type: none"> Human activities (disturbance of nest sites) Collisions and/or electrocutions (towers, power lines, wind turbines, and other structures and vehicles) Contaminants (lead contamination of prey) Wildfires (impacts on prey densities)
Greater sandhill crane	<ul style="list-style-type: none"> Wetland community Agriculture 	<ul style="list-style-type: none"> Sandhill cranes are winter visitors to the Plan Area at the Central Valley and the lower 	<ul style="list-style-type: none"> Hydrology Suitable roost sites 	<ul style="list-style-type: none"> Disturbance from farm activities and hunting Collision with power lines

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Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
		Colorado River Valley.		<ul style="list-style-type: none"> • 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
Hoary bat	<ul style="list-style-type: none"> • Woodland community • Forest community • Riparian community • Scrub and chaparral community • wetland community 	<ul style="list-style-type: none"> • Most widespread of all North American bat species 	<ul style="list-style-type: none"> • Inter-specific competition • Lighting may affect predator-prey relationships among bats • Maternity roost site selection 	<ul style="list-style-type: none"> • Loss of roosting habitat due to timber harvest • Pesticides • Barbed wire fences • Disturbances of day roosts in trees • Collisions with artificial structures, especially wind energy facilities
Inyo California towhee	<ul style="list-style-type: none"> • Riparian community • Scrub and chaparral community 	<ul style="list-style-type: none"> • Endemic to southern portion of Argus Range • Local habitat connectivity within Plan Area 	<ul style="list-style-type: none"> • Hydrology/dense riparian thickets 	<ul style="list-style-type: none"> • Habitat loss and/or degradation (water diversion, trampling by burros, horses, and cattle)² • Recreation (OHVs, noise, light, general activity)² • Climate change²
Kelso Creek monkeyflower	<ul style="list-style-type: none"> • Scrub and chaparral 	<ul style="list-style-type: none"> • Limited to the southern Sierra Nevada Foothills and western 	<ul style="list-style-type: none"> • Competition from non-native species 	<ul style="list-style-type: none"> • Urbanization • OHVs

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r	<ul style="list-style-type: none"> community Woodland community 	edge of the Mojave Desert within the Kern River drainage in the Lake Isabella area	<ul style="list-style-type: none"> Hydrology 	<ul style="list-style-type: none"> Agricultural land conversion Road maintenance Cattle grazing Habitat loss due to water inundation Fire suppression activities Competition from non-native species Water developments and impoundments Stochastic extinction events
Kern buckwheat	<ul style="list-style-type: none"> Scrub and chaparral community Woodland community 	<ul style="list-style-type: none"> Endemic to Kern County, California, there are only three known occurrences in the Sweet Ridge area of southeastern Kern County in the southeastern Sierra Nevada Foothills. 	<ul style="list-style-type: none"> Associated with limited pebble plain habitat Light (prefers full sunlight, appearing to be intolerant of extensive shading) Moisture (tolerant of low moisture conditions) In ability to recolonize disturbed areas 	<ul style="list-style-type: none"> Development of private land for wind turbine generators and other construction Vehicles Stochastic extinction events Grazing Logging and mining
Lane Mountain milk-vetch	<ul style="list-style-type: none"> Scrub and chaparral community 	<ul style="list-style-type: none"> Endemic to Brinkman Wash, Coolgardie Mesa, Paradise Valley, and NASA Goldstone north of Barstow Sub-regional habitat connectivity 	<ul style="list-style-type: none"> Host shrubs Thin soils (Jurassic or Cretaceous granitic bedrock) Hydrology and precipitation Pollination 	<ul style="list-style-type: none"> Habitat loss and degradation (surface mining, military training) Recreation (OHVs)² Climate change (drought and loss of host shrubs)² Wildfire² Invasive plants²

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Little San Bernardino Mountains linanthus	<ul style="list-style-type: none"> • Scrub and chaparral community 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Hydrology • Competition for resources from invading non-native species 	<ul style="list-style-type: none"> • Urbanization • OHV use • Flood control activities • Illegal dumping • Invasive non-native species • Increased fire frequency • Groundwater loss • Soil erosion
Mohave ground squirrel	<ul style="list-style-type: none"> • Scrub and chaparral community • Rocky, barren, and unvegetated community 	<ul style="list-style-type: none"> • Endemic to Western Mojave • Sub-regional connectivity, including dispersal habitat 	<ul style="list-style-type: none"> • None identified in literature 	<ul style="list-style-type: none"> • Habitat loss and fragmentation (urban, agriculture, military, energy, and transportation)³ • Recreation (OHVs)² • Grazing (cattle and sheep)² • Invasive plants² • Climate change (especially prolonged drought)² • Predation (cats, dogs, and ravens) • Rodenticides/pesticides
Mohave tui chub	<ul style="list-style-type: none"> • Wetland community and riparian community (Lacustrine ponds/pools) 	<ul style="list-style-type: none"> • Restricted to refugia at China Lake Naval Air Weapons Station, Camp Cady, the Lewis Center, Soda Springs, and Morning Star Mine 	<ul style="list-style-type: none"> • Hydrology • Water quality and quantity • Adaptation to lacustrine conditions rather than riverine • Tapeworms • Predation, competition, and habitat alteration 	<ul style="list-style-type: none"> • The present threatened destruction, modification, or curtailment of its habitat or range • Other natural or man-made factors affecting its continued existence (hybridization, introduction of non-native or transplanted species, predation, or competition) • Overdraft of Mojave River • A parasitic Asian tapeworm was found in Lake Tuendae

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Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
			from non-native plants and wildlife	<ul style="list-style-type: none"> • Non-native plant and wildlife species • Inadequacy of existing regulatory mechanisms
Mojave fringe-toed lizard	<ul style="list-style-type: none"> • Dune community • Scrub and chaparral community 	<ul style="list-style-type: none"> • Restricted to deposits of loose sand; as a result its distribution is discontinuous throughout its range • Endemic to the Mojave and Sonoran deserts of Southern California and western Arizona 	<ul style="list-style-type: none"> • Predation • Rodent burrows for protection from predators and thermal protection • Potentially competition for food with the zebra-tailed lizard • Sand movement 	<ul style="list-style-type: none"> • OHVs • Disruption of the natural movement of sand caused by roads, windbreaks, and other man-made alterations • Habitat loss caused by urban development
Mojave monkeyflower	<ul style="list-style-type: none"> • Scrub and chaparral community • Rocky, barren, and unvegetated community 	<ul style="list-style-type: none"> • Endemic to west-central Mojave Desert, primarily Barstow southeast to Newberry Springs and northeast of Victorville • Sub-regional habitat connectivity 	<ul style="list-style-type: none"> • Precipitation • Pollination and dispersal 	<ul style="list-style-type: none"> • Development (solar, wind, and roads) • Mining • Grazing² • Invasive plants² • Habitat Fragmentation/potential inbreeding • Climate change² • BLM land exchanges
Mojave tarplant	<ul style="list-style-type: none"> • Riparian community • Scrub and chaparral community 	<ul style="list-style-type: none"> • Primarily occurs in southeastern Sierra Nevada range in Kern County and possible Red Rock Canyon • Sub-regional habitat connectivity (?); discontinuous populations may already be relictual 	<ul style="list-style-type: none"> • Hydrology/seasonally saturated clay and silty soils (seeps and along grassy swales and intermittent creeks) • Precipitation • Pollination (?) 	<ul style="list-style-type: none"> • Hydrological alterations² • Recreation (OHVs, (trampling/crushing and soils disturbance)² • Climate change² • Grazing (livestock trampling at water sources)² • Development • Road maintenance

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Mountain plover	<ul style="list-style-type: none"> Grassland community Agriculture 	<ul style="list-style-type: none"> Highly mobile/able to access disjunct wintering habitats Migration routes 	<ul style="list-style-type: none"> None identified in literature 	<ul style="list-style-type: none"> Wintering habitat loss and degradation (urban development) Collisions (farm equipment) Pesticides Human disturbance
Orocopia sage	<ul style="list-style-type: none"> Scrub and chaparral community 	<ul style="list-style-type: none"> Restricted to extreme southeastern California, in Imperial, Riverside, and San Bernardino counties 	<ul style="list-style-type: none"> Pollination Hydrology (associated with alluvial fans adjacent to desert washes) 	<ul style="list-style-type: none"> Increased dust levels resulting from vehicle movement or explosions of ordnance OHVs Invasive species Human trampling Changes to hydrological regimes Threats to pollinators
Owens pupfish	<ul style="list-style-type: none"> Wetland community and riparian community (warm, clear, shallow aquatic habitat) 	<ul style="list-style-type: none"> 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 Small, isolated populations 	<ul style="list-style-type: none"> Predation and competition from non-native species Hydrology Habitat alteration from emergent vegetation 	<ul style="list-style-type: none"> Non-native predators Habitat modification for water diversions that altered Owens River flows Cattail encroachment and other emergent vegetation Extinction from stochastic (random) demographic, genetic, and catastrophic environmental events because populations are small and isolated Groundwater pumping
Owens tui chub	<ul style="list-style-type: none"> Wetland community and riparian community (low-velocity waters) 	<ul style="list-style-type: none"> Endemic to the Owens Basin (Owens Valley, Round Valley, and Long Valley) of Inyo and Mono counties, California Small, isolated populations 	<ul style="list-style-type: none"> Predation and competition from, and hybridization with, non-native aquatic predators and other tui chub 	<ul style="list-style-type: none"> Extensive habitat destruction and modification Invasive emergent plants that alter aquatic habitat Non-native invasive predators Poor water quality Inappropriate water quantity (including

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Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
			<ul style="list-style-type: none"> subspecies and hybrids Requires aquatic vegetation and gravel substrates for spawning Hydrology and water quality Alteration of aquatic habitat by invasive emergent plants Disease 	<ul style="list-style-type: none"> overdrafting of the aquifer in the Owens Valley Groundwater Basin area) Disease Inadequacy of existing regulatory mechanisms Vulnerability and loss of genetic diversity resulting from small isolated populations
Owens Valley checkerbloom	<ul style="list-style-type: none"> Scrub and chaparral community Riparian community Rocky, barren, and unvegetated community Woodland community 	<ul style="list-style-type: none"> Endemic to southern Owens Valley Local habitat connectivity among alkali meadow and spring communities scattered along about 125 kilometers of the Owens River drainage 	<ul style="list-style-type: none"> Moist alkaline meadows and seeps and chenopod (saltbush) scrub Fine, sandy loam with alkaline crusts Pollination 	<ul style="list-style-type: none"> Hydrological alteration (diversion of Owens River and groundwater pumping)² Climate change² Grazing (cattle)² Competition (rhizomatous grass species and upland rubber rabbitbrush)² Meadow succession² Invasive plants (Russian olive, knapweed)²
Pallid bat	<ul style="list-style-type: none"> Rocky, barren, and unvegetated community All land covers (except developed and disturbed) 	<ul style="list-style-type: none"> Widespread throughout the western United States Inhabits rocky outcrops, cliffs, and spacious crevices with access to open habitats for foraging 	<ul style="list-style-type: none"> Day roost selection, fidelity, and lability (flexibility) and social roosting Ectoparasites Foraging and food partitioning mechanisms 	<ul style="list-style-type: none"> Disturbances of roost sites through vandalism, extermination, and destruction of buildings and recreational activities Pesticides and heavy metals Habitat modification or degradation (i.e., conversion to agriculture, prescribed fires, wildfires)

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			<ul style="list-style-type: none"> • Lighting • Predation 	<ul style="list-style-type: none"> • Predation by urban-related predators • Wind energy facilities
Parish's daisy	<ul style="list-style-type: none"> • Woodland community • Scrub and chaparral community 	<ul style="list-style-type: none"> • Mostly endemic to calcareous slopes of San Bernardino Mountains, with a few collections from granitic areas of eastern San Bernardino Mountains and quartz monzonite areas in the Little San Bernardino Mountains • Local habitat connectivity 	<ul style="list-style-type: none"> • Carbonate alluvium • Pollination 	<ul style="list-style-type: none"> • Mining (limestone) (including dust)² • Lighting (pollinators and seed dispersers) • Recreation (camping, firewood collection, and dust generation)² • Fire suppression² • Climate change² • Energy development • Road and residential development
Parish's alkali grass	<ul style="list-style-type: none"> • Wetland community (Alkali springs and seeps) 	<ul style="list-style-type: none"> • Only occurs at one location in Southern California, in San Bernardino County, and at scattered locations in northern and eastern Arizona, and western New Mexico 	<ul style="list-style-type: none"> • Hydrology/Soil Moisture • Invasion by non-native plant species 	<ul style="list-style-type: none"> • Ground water pumping • Water diversion • Flood control • Non-native plant species • Urban and rural residential development • Trampling, soil disturbance/erosion, and surface water runoff resulting from livestock grazing
Parish's phacelia	<ul style="list-style-type: none"> • Scrub and chaparral community 	<ul style="list-style-type: none"> • Known in California from four sites east and south of Barstow in San Bernardino County and one site in Stewart Valley near the Nevada border in Inyo County. However, it is more widely distributed in Nevada, and has also been identified from one location in Arizona 	<ul style="list-style-type: none"> • Associated with clay and alkaline soils on playas and alkali sinks • Pollination • Hydrology 	<ul style="list-style-type: none"> • Military expansion and activities • OHVs • Access road construction • Power lines • Overgrazing by cattle and horses

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Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Peirson's milk-vetch	<ul style="list-style-type: none"> Dune community 	<ul style="list-style-type: none"> Endemic to Algodones Dunes Local habitat connectivity 	<ul style="list-style-type: none"> Aeolian processes/active dune systems; slopes less than 20-30% Precipitation Pollination 	<ul style="list-style-type: none"> Recreation (OHVs and associated development, trampling)² Climate change/hydrological alterations² Grazing² Invasive plants² Other development
Piute Mountains jewel-flower	<ul style="list-style-type: none"> Woodland community Forest community 	<ul style="list-style-type: none"> Restricted to the Piute Mountains of southern High Sierra Nevada in Kern County 	<ul style="list-style-type: none"> Pollination 	<ul style="list-style-type: none"> Maintenance of wind energy facilities Roads and OHV use Construction Cattle grazing Logging or mining
Red Rock poppy	<ul style="list-style-type: none"> Scrub and chaparral community 	<ul style="list-style-type: none"> Known only from the Rand and El Paso mountains in Kern and San Bernardino counties in the western Mojave Desert 	<ul style="list-style-type: none"> Restricted to certain soil types (primarily associated with volcanic tuff) 	<ul style="list-style-type: none"> OHV use
Red Rock tarplant	<ul style="list-style-type: none"> Scrub and chaparral community 	<ul style="list-style-type: none"> Endemic Red Rock Canyon and Last Chance Canyon Local habitat connectivity 	<ul style="list-style-type: none"> Hydrology associated with seeps and seasonally moist substrates along ephemeral streams (sandy and gravelly washes), low ridges, and road shoulders Pollination (?) 	<ul style="list-style-type: none"> Recreation (OHVs, camping and vehicle parking) Non-native plants (tamarisk) Climate change/ hydrological alterations²

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San Bernardino Mountains dudleya	<ul style="list-style-type: none"> • Woodland community • Forest community 	<ul style="list-style-type: none"> • Known only from the San Bernardino Mountains. 	<ul style="list-style-type: none"> • Associated with limited pebble plain habitat 	<ul style="list-style-type: none"> • Development • Foot traffic • Limestone mining • Vehicles • Non-native plants • Illegal dumping
Sand food	<ul style="list-style-type: none"> • Dune community • Scrub and chaparral community 	<ul style="list-style-type: none"> • Occurs in the Sonoran Desert in southeastern Imperial County, as well as western Arizona and northwestern Mexico 	<ul style="list-style-type: none"> • Root parasite primarily dependent on perennial desert shrub hosts • Dune stability • Non-native plants 	<ul style="list-style-type: none"> • Vehicles • Military activities • Agriculture • Habitat loss from the conversion of dune habitat to agricultural lands, residential development, highways, and recreational sites • Non-native plants • Dune stabilization
Sodaville milk-vetch	<ul style="list-style-type: none"> • Wetland community (meadows and seeps) 	<ul style="list-style-type: none"> • Endemic to Death Valley/Big Sand Spring in Plan Area • Local habitat connectivity 	<ul style="list-style-type: none"> • Hydrology associated with meadows and seeps and moist, open hummocks, flats, and drainages near cool springs • Pollination/dispersal (?) 	<ul style="list-style-type: none"> • Climate change/ hydrological alterations² • Trampling (burros and livestock)² • Development • Water diversions² • Vehicles² • Extinction for stochastic impacts related to small distribution and abundance
Spanish Needle onion	<ul style="list-style-type: none"> • Woodland community 	<ul style="list-style-type: none"> • Known from two areas in Kern County: Spanish Needle Peak in northern Kern County, and in the Horse Canyon/Jawbone Canyon area in the Tehachapi 	<ul style="list-style-type: none"> • Soil associations (grows in rocky soil and the edge of rock outcrops and talus derived from volcanic and 	<ul style="list-style-type: none"> • Wind energy development • grazing • OHVs • Road/trail construction

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		Mountains area • Found in remote, rugged areas	metamorphic rock)	• Collection
Swainson's hawk	<ul style="list-style-type: none"> • Grassland community • Riparian community • Agriculture 	<ul style="list-style-type: none"> • Highly mobile/able to access disjunct foraging habitats and nesting habitat in Antelope Valley • Migration routes 	<ul style="list-style-type: none"> • Hydrology/riparian systems 	<ul style="list-style-type: none"> • Nesting and foraging habitat conversion • Insecticides/pesticides • Wildfire² • Climate change² • Recreation (OHVs)² • Human disturbances • Interactions/competition with ravens
Tehachapi pocket mouse	<ul style="list-style-type: none"> • Grassland community • Woodland community 	<ul style="list-style-type: none"> • Known from a few scattered, isolated localities in the Tehachapi Mountains 	<ul style="list-style-type: none"> • Environment modification via burrow digging • Predation 	<ul style="list-style-type: none"> • Habitat fragmentation and isolation due to increased urbanization and agricultural intensification • Isolation of populations makes it vulnerable to local extirpation • Surface disturbance • Livestock grazing
Tehachapi slender salamander	<ul style="list-style-type: none"> • Riparian community • Woodland community 	<ul style="list-style-type: none"> • Endemic to two distinct population segments: Caliente Creek drainage and Tehachapi Mountains • Local habitat connectivity within each distinct population (the two distinct population segments are geographically isolated) 	<ul style="list-style-type: none"> • Talus and rocky slopes and moist habitats • Precipitation 	<ul style="list-style-type: none"> • Climate change (especially prolonged drought)² • Development and road construction • Mining • Grazing² • Flood control projects² • Feral pigs²

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Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Thorne's buckwheat	<ul style="list-style-type: none"> Woodland community 	<ul style="list-style-type: none"> Endemic to Fourth of July Canyon in the New York Mountains within Mojave National Park Local habitat connectivity 	<ul style="list-style-type: none"> Soil association with copper (?) Pollination/dispersal (?) 	<ul style="list-style-type: none"> None identified in literature
Townsend's big-eared bat	<ul style="list-style-type: none"> Abandoned mines Woodland community Forest community Riparian community Scrub and chaparral community 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Inter-specific competition Lighting may affect predator-prey relationships among bats 	<ul style="list-style-type: none"> Human disturbances of roost sites Reduced foraging habitat from agricultural conversion Pesticides Wind energy facilities
Tracy's eriastrum	<ul style="list-style-type: none"> Scrub and chaparral community Woodland community 	<ul style="list-style-type: none"> Limited to two locations in Kern County in the DRECP; more widespread west of DRECP Sub-regional habitat connectivity to populations west of Plan Area 	<ul style="list-style-type: none"> Associated with or tolerant of disturbances (?) (e.g., occurrences associated with grazing or road-blading) Pollination/dispersal (?) 	<ul style="list-style-type: none"> Competition with other plant species (may not tolerate shading)² Vehicles² Road maintenance (?) Development Grazing (?)²
Tricolored blackbird	<ul style="list-style-type: none"> Riparian community Wetland community Agriculture Grassland community 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Predation 	<ul style="list-style-type: none"> Loss and degradation of habitat as a result of human activities Agricultural expansion and operations (i.e., harvesting and plowing fields) Predation Poisons and contaminants

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Species	Natural Community ¹	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Triple-ribbed milk-vetch	<ul style="list-style-type: none"> • Scrub and chaparral community 	<ul style="list-style-type: none"> • 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) • Sub-regional habitat connectivity 	<ul style="list-style-type: none"> • Barren rocky slopes and ridges • Precipitation (?) • Pollination/dispersal (deme populations, waifs) (?) 	<ul style="list-style-type: none"> • Development (construction/maintenance of gas and oil pipelines, residential) • Recreation (OHVs)² • Fire suppression² • Flooding² • Climate change²
Western burrowing owl	<ul style="list-style-type: none"> • Grassland community • Scrub and chaparral community • Rocky, barren, and unvegetated community • Agriculture • Developed and disturbed areas 	<ul style="list-style-type: none"> • Highly mobile/able to access disjunct nesting and foraging habitats • Migration and dispersal routes 	<ul style="list-style-type: none"> • Suitable burrow sites (e.g., ground squirrel burrows) and prey 	<ul style="list-style-type: none"> • Habitat conversion (urban and non-compatible agriculture, flood control) • Collisions (vehicles, wind turbines) • Pesticides and other contaminants • Invasive plants² • Climate change² • Rodent controls (especially ground squirrels) • Predation by dogs and cats
Western mastiff bat	<ul style="list-style-type: none"> • Rocky, barren, and unvegetated community • Woodland community • Forest community 	<ul style="list-style-type: none"> • It is widespread in the southwestern United States, the northern portion of Baja California, Mexico, and south into central mainland Mexico 	<ul style="list-style-type: none"> • Inter-specific competition 	<ul style="list-style-type: none"> • Urbanization causing human disturbances of roost sites and habitat loss • Inundation of roosting sites by water development and storage reservoirs • Extermination of colonies from buildings • Highway projects

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	<ul style="list-style-type: none"> • Scrub and chaparral community • grassland community • Agriculture 			<ul style="list-style-type: none"> • Recreational rock climbing • Mining and quarry operations (although roost sites may also be created) • Grazing and meadow management activities on foraging habitat • Pesticides and other environmental contaminants • Wind energy facilities
Western red bat	<ul style="list-style-type: none"> • Woodland community • Forest community • Riparian community • Scrub and chaparral community 	<ul style="list-style-type: none"> • Although the species has a wide range, there are relatively few records for the western red bat outside of California. The Central Valley is the breeding center in California. 	<ul style="list-style-type: none"> • Inter-specific competition • Lighting may affect predator-prey relationships among bats 	<ul style="list-style-type: none"> • Loss and degradation of well-developed riparian zones that support larger, mature trees • Pesticides • Human activities • Wind energy facilities • Collisions with tall buildings and towers
Western yellow-billed cuckoo	<ul style="list-style-type: none"> • Riparian community 	<ul style="list-style-type: none"> • Highly mobile/able to access disjunct nesting habitat • Migration routes 	<ul style="list-style-type: none"> • Large, contiguous blocks of dense riparian habitat • Hydrology 	<ul style="list-style-type: none"> • Nesting habitat loss and/or degradation (agriculture, urban)² • Hydrological alteration (groundwater pumping)² • Invasive plants (tamarisk)² • Pesticides • Collisions with windows • Climate change (including decoupling of predator-prey relationships)²

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White-margined beardtongue	<ul style="list-style-type: none"> • Scrub and chaparral community • Dune community 	<ul style="list-style-type: none"> • Known from only four general locations: two in the Mojave Desert of Southern Nevada, one in the Mojave Desert of southeast California, and one in the Sonoran Desert of northwest Arizona 	<ul style="list-style-type: none"> • Pollination • Vegetation structure of habitat (more likely in canopy inter-spaces) • Fluvial processes and sediment transport 	<ul style="list-style-type: none"> • Wind and solar project development • Military expansion and activities • Highways, roads, and OHVs • Power lines and pipelines • Trampling
White-tailed kite	<ul style="list-style-type: none"> • Grassland community • Agriculture • Woodland community • Forest community • Scrub and chaparral community 	<ul style="list-style-type: none"> • The species' breeding range stronghold in North America is California, with nearly all areas up to the western Sierra Nevada foothills and southeast deserts occupied. 	<ul style="list-style-type: none"> • Prey availability and abundance • Competition for nest sites with other raptors and corvids 	<ul style="list-style-type: none"> • Human disturbance at night roosts and nest sites • Urbanization • Clean farming techniques and other changes in agricultural practices • Competition for nest sites with other raptors and corvids • Drought • Removal of suitable nesting habitat • Reductions in prey abundance with conversion of agriculture
Wiggins' croton	<ul style="list-style-type: none"> • Dune community 	<ul style="list-style-type: none"> • Primarily limited to southeastern Imperial County, including Algodones Dunes • Sub-regional habitat connectivity 	<ul style="list-style-type: none"> • Stabilized or partially stabilized sand dunes • Pollination (?) 	<ul style="list-style-type: none"> • Recreation (OHVs)²
Willow flycatcher	<ul style="list-style-type: none"> • Riparian community 	<ul style="list-style-type: none"> • Highly mobile/able to access disjunct nesting and foraging habitats • Migration routes 	<ul style="list-style-type: none"> • Hydrology (surface and ground water) 	<ul style="list-style-type: none"> • Habitat loss and fragmentation² • Altered hydrology and geomorphology (dams and reservoirs, water diversion and groundwater pumping, channelization, flood control)² • Invasive plants (tamarisk, giant reed)²

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				<ul style="list-style-type: none"> • Wildfire² • Grazing² • Climate change² • Cowbird parasitism
Yuma clapper rail	<ul style="list-style-type: none"> • Riparian community • Wetland community 	<ul style="list-style-type: none"> • 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 • Sub-regional habitat connectivity • Migration routes (?); migratory activity is unclear 	<ul style="list-style-type: none"> • Hydrology (surface and ground water) • Seasonal flooding/scouring • Timing of prey availability (crayfish) 	<ul style="list-style-type: none"> • Habitat loss and modification (damming, channelization, and bank stabilization)² • Hydrological alteration (e.g., fluctuating water levels)² • Mesopredators (e.g., raccoon) • Contaminants (e.g., selenium)

¹ 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.

² Potential ecological processes stressor

³ Potential landscape issue

Note: (?) = unknown issue.