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Memorandum

To: David Harlow, Director, Desert Renewable Energy Conservation Plan (DRECP)

From: Laura Crane, The Nature Conservancy

Date: April 5, 2012

Subject: Comments on Draft Revised DRECP Biological Goals and Objectives

Docket No. 09-RENEW EO-01

We would like to thank you for the opportunity to review and comment on the draft Plan-wide Biological Goals and Objectives (BGOs) for the Desert Renewable Energy Conservation Plan (DRECP). We have incorporated our specific comments on the BGOs within the attached and referenced word document, and this cover memorandum is intended to provide an overview of the focus of our comments. Our organization fully supports this critical plan and our comments are intended to strengthen the DRECP.

We recognize that the draft Plan-wide Biological Goals and Objectives, released on March 21, 2012, does not include all BGOs and that as additional BGOs are developed, they will be added to future drafts. We look forward to the opportunity to review those as they are released.

Fundamental to the success of the DRECP will be the creation of Biological Goals and Objectives that inform conservation strategy development and reserve design delineation, to create and maintain the needed conditions for recovery and persistence of covered resources given accelerating and unpredictable changes in ecosystem dynamics from climate change, and other impacts. The following comments are our recommendations for creating the Biological Goals and Objectives in a manner to meet the above goal.

Overarching Comments

I. The Biological Goals and Objectives should include an overarching goal under which all BGOs, both landscape and species-specific, reside. We suggest instituting the DRECP Independent Science Advisors' recommended goal for DRECP, as the overarching goal. The advisors recommended that the plan's overarching goal should be to;

   "*contribute to the persistence, distribution, and diversity of the desert biota and all its natural components and processes today and into the future, while*

accommodating renewable energy development and adapting to climate change."

The existing landscape-level goals one and two align well under this new overarching goal.

II. The framework of how landscape, natural community and species goals and objectives nest into each other should be better documented and referenced, allowing the reader to track how stressors are being addressed, by which actions, and how these actions are intended to benefit the landscape or natural community versus those that are required to benefit species. In addition, the links between landscape issues, key ecological processes, ecological stressors and threats, and proposed actions should be clear. For example, each landscape issue or key ecological process should be evaluated to determine if there ecological stressors and threats impact the landscape or processes. Similarly, an action should be described to abate identified ecological stressors and threats. Where abating a threat is technically infeasible, this should be noted.

III. Prioritization of biological goals and objectives should be clear to facilitate implementation of the plan. Where there is a clear prioritization of biological goals, objectives under those goals, or actions to address stressors and threats, these prioritizes need to be clearly stated. Where there is no prioritization, it should be clear that all of the goals or objectives have equal importance, or that all of the actions identified are expected to be equally effective in addressing stressors and threats.

IV. A biological goal and objective should be established for protecting all seeps and springs, including areas critical to recharge, within the plan area, consistent with the recommendations of The Nature Conservancy's Mojave Desert Ecoregional Assessment (2010). Within the Assessment, seeps and springs were identified as conservation targets because of their great importance for plants and animals in this desert, including the fact that single springs and seeps or small clusters of them support narrowly distributed endemic species such as pupfish, springsnails, amphibians, and plants.

V. At the landscape-level, the plan should consider connections between mountain ranges and linkages that extend beyond the plan boundary. Creating and maintaining linkages between out-of-plan-area resources will be important to maintaining the needed conditions for recovery and persistence of covered resources within the plan area. For example, connections between the Spring and Kingston/Clark Mountains

and linkages to habitats in Nevada, Arizona, Mexico, and portions of California that are not included in the Plan Area should be considered.

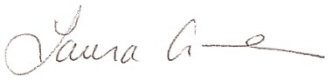
VI. A biological goal and objective should be established for bat species that may occur within the Plan Area. As a suite of species that are likely to be impacted by covered activities at wind energy facilities, these species warrant standalone species-specific conservation goals and objectives.

VII. The draft biological goals and objectives do not sufficiently address invertebrate species. Given the high level of endemism found within desert invertebrates, at a minimum these species should be incorporated into natural community-level goals and objectives under ecological processes, or by community type.

As referenced, specific comments can be found within the attached word document.

Thank you for your consideration of our comments. We look forward to continuing to work collaboratively on the Desert Renewable Energy Conservation Plan.

Sincerely,



Laura Crane
The Nature Conservancy

Attachment

DRAFT

March 21, 2012

Draft Memorandum

Date:	March 21, 2012
To:	Dave Harlow, Director of the DRECP Scott Flint, DRECP Program Manager, California Energy Commission DRECP Stakeholder Committee
Cc:	Renewable Energy Action Team (REAT)
From:	ICF International, Dudek
Subject:	**DRAFT Revised DRECP Biological Goals and Objectives**

This is a draft consultant work product prepared with the guidance of the REAT Agencies for the development of the DRECP Biological Goals and Objectives (BGOs). This draft does not include all BGOs; as additional BGOs are developed, they will be added to future drafts. Full review of this draft is underway by the REAT Agencies, and input from the REAT Agencies, as well as DRECP stakeholders, will also be reflected in future drafts.

DRAFT

March 21, 2012

Draft Memorandum

Subject: DRAFT Revised DRECP Biological Goals and Objectives

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Acronyms and Abbreviations

BGOs	Biological Goals and Objectives
BLM	Bureau of Land Management
DBH	diameter at breast height
DPS	Distinct Population Segment
DRECP	Desert Renewable Energy Conservation Plan
NHD	National Hydrography Dataset
NVCS	National Vegetation Classification System
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
PCS	Preliminary Conservation Strategy
REAT	Renewable Energy Action Team
SWA	State Wildlife Area
USGS	U.S. Geological Survey

DRAFT

March 21, 2012

Draft Memorandum

Subject: DRAFT Revised DRECP Biological Goals and Objectives

Draft Memorandum

Revised Biological Goals and Objectives

Introduction

This memorandum outlines draft Plan-wide Biological Goals and Objectives (BGOs) for the Desert Renewable Energy Conservation Plan (DRECP). Initial discussions regarding BGOs began with a stakeholder meeting in March 2011, followed by development of a Framework Conservation Strategy(FCS) Report (May 2011) and a Preliminary Conservation Strategy (PCS) (October 2011). Further conversations with stakeholders lead to development of a Conceptual Model (Figure 1). This model articulates how Plan-wide BGOs and other information contribute to the development of specific BGOs for the DRECP, which relate more directly to the proposed Covered Activities. A detailed description of the Conceptual Model is provided as Appendix A to this memorandum.

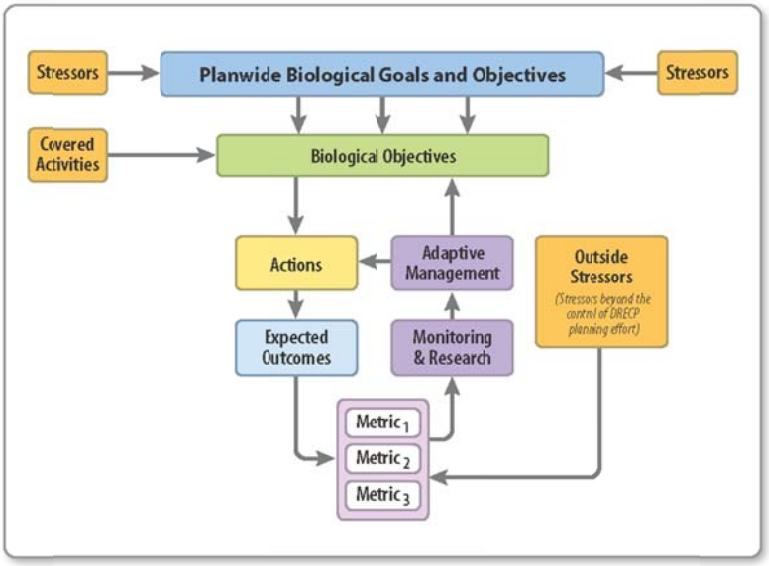

Figure 1. DRECP Conservation Strategy Conceptual Model

Comment [EB1]: TNC: As discussed at the workshop, this figure is a little confusing with the stressors only engaging at plan wide BGOs, while covered activities only intercept at Biological Objectives. Suggest clarifying by adding second arrows to stressors that intercept biological goals.

The Plan-wide BGOs outlined in this memorandum follow the three-tiered approach for presented in the PCS and based on the concepts of scale: landscape, natural community, and species. They have

since received initial input from stakeholders and Renewable Energy Action Team (REAT) agencies and have been refined to provide greater specificity based on key ecological processes, factors critical to species and community conservation (see Tables in Appendix B), and stressors to covered species (See Figures in Appendix C), including climate change.

Through a process of iterative review and revision, the goals and objectives will continue to be refined as they are applied during the creation of the conservation strategy, the delineation of a reserve design, and the evaluation of alternative development scenarios.

Goals and Objectives Development Process

The Plan-wide BGOs were developed hierarchically at the landscape, natural community, and species levels based on information from the following resources, work products and deliverables (Figure 1).

- Documented components of ecosystem processes and constituent habitat types from the FCS Report,
- DRECP National Vegetation Classification System (NVCS) land cover map,
- Natural Community descriptions in the PCS,
- Species Profiles,
- Factors Critical to Species and Community Conservation (Appendix B),
- Conservation Planning ("Stressor") Diagrams for individual species (or groups of similar species) (Appendix C), and
- Statistical- and Expert-based Habitat Models.

For each species an overarching goal is to conserve (protect and manage) viable self-sustaining populations in the Plan Area. For some species, the landscape- or natural community-level BGOs will achieve this overarching goal and additional species-specific goals and objectives were not developed. Species-specific goals and objectives are developed for those species that require additional protection and/or management not addressed at the landscape or natural community levels. To reduce redundancy, species goals and objectives that apply to multiple species are stated only once for those species.

In addition, the conservation benefits of all landscape, natural-community, and species level BGOs will be described in the Species Goals Summaries (See Examples in Appendix D). Complete Species Goals Summaries will be written once the biological goals and objectives are finalized.

The term "conserve" as used in the Plan-wide BGOs below includes land acquisition, other forms of land protection (e.g., conservation easements), the contribution of additional legal protections to

publicly owned land, and land management for native species and ecological processes. The specific mechanisms for conservation may be described in more detail within the geographic targets once the impact analysis is concluded and the conservation strategy is developed. The amount of land conserved will be scaled in proportion to impacts. Other terms such as "protect," "maintain," and manage will be made more specific once the reserve design is complete, and there is an understanding of the nature of the management action (e.g., acquisition, increased protection) relative to a given area or natural community.

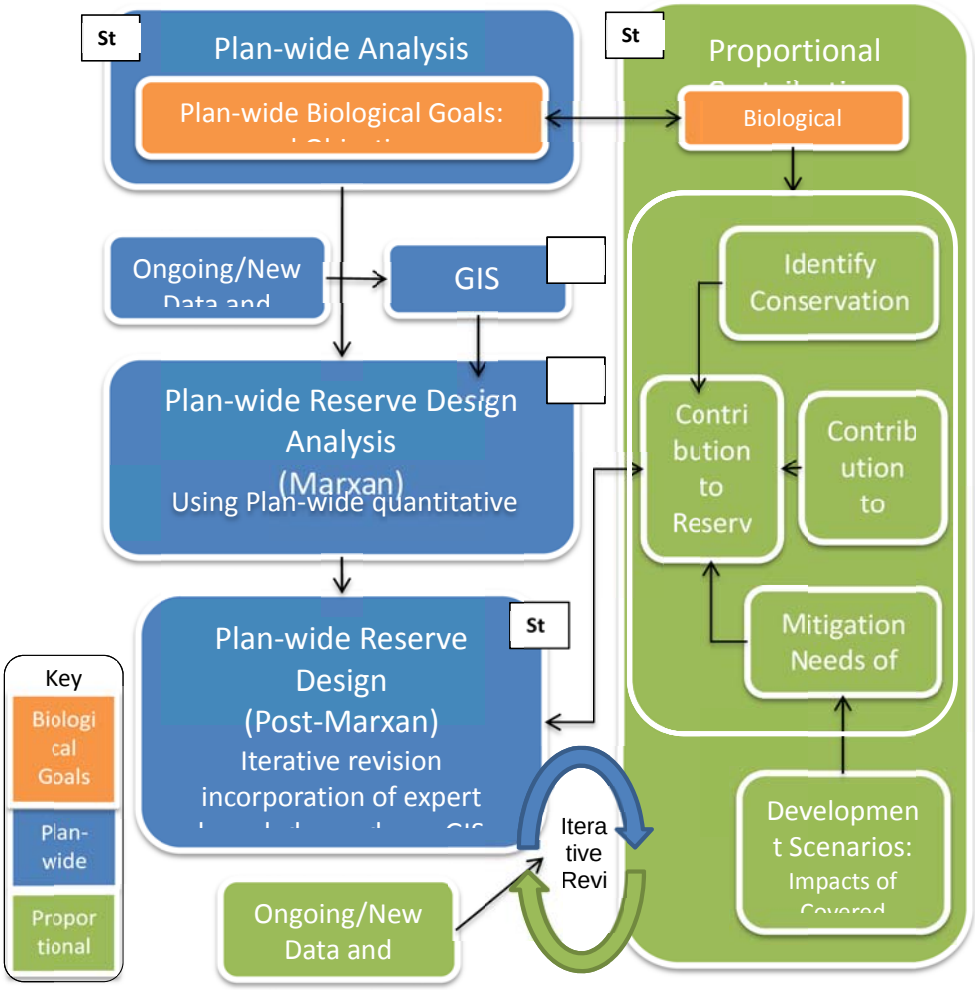

Figure 2. Integration of DRECP Biological Goals with the Plan-wide Reserve Design Process

The current iteration of the BGOs reflects DRECP goals and objectives for the entire Plan Area. Once, Marxan and post-Marxan analyses are complete and the development scenarios are evaluated that information will be used to establish the proportional contribution of the DRECP, including

identification of high-priority conservation areas within the reserve design. The BGOs for the DRECP will be made specific, measurable, and time-bound, as applicable. Some items currently listed as sub-bullets under the DRECP plan-wide objectives may ultimately be integrated into the proportional HCP/NCCP objectives.

Table 1 lists the codes used for the different goals and objectives.

Table 1. Landscape, Natural Community, Species Group, and Species Codes

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Subject: DRAFT Revised DRECP Biological Goals and Objectives

Landscape, Natural Community, Species or Species Group	Code
Landscape	L
Dune Community	DUNC
Forest Community	FORC
Grassland Community	GRAC
Riparian Community	RIPC
Rocky, Barren and Unvegetated Community	RBUC
Scrub and Chaparral Community	SCCC
Wetland Community	WETC
Woodland Community	WOOC
Carbonate Plants Species	CAPL
Dune Species	DUPL
Fish Species	FISH
Narrow Endemic Plants	NEPL
Raptors	RAPT
Riparian Birds	RIBI
Wetland Birds	WEBI
Scrub and Chaparral Species	SCCP
Bell's Vireo	BEVI
Amargosa River Vole	ARVO
Arroyo Toad	ARTO
Bakersfield Cactus	BACA
Barefoot Gecko	BAGE
Bighorn Sheep	BHSH
Burrowing Owl	BUOW
California Black Rail	CABR
California Condor	CACO
Coast Horned Lizard	CHLI
Desert Tortoise	DETO
Golden Eagle	GOEA
Mojave Ground Squirrel	MGSQ
Mojave Tarplant	MOTA
Swainson's Hawk	SWHA
Tehachapi Pocket Mouse	TEPM
Willow Flycatcher	WIFL

Table 2. Summary of Conservation Targets for NVCS Constituents

Natural Communities and NVCS Constituents	Conservation Target Acreage (TBD)
Dune Community	—
North American warm desert dunes and sand flats	—
Forest Community	—
California montane conifer forest	—
Grassland Community	—
California Annual and Perennial Grassland	—
Mediterranean California naturalized annual & perennial grassland	—
Southern Great Basin semi-desert grassland	—
Riparian Community	—
Southwestern North American Riparian, Flooded and Swamp Forest/Scrubland	—
Southwestern North American introduced riparian scrub	—
Southwestern North American riparian evergreen and deciduous woodland	—
Southwestern North American riparian/wash scrub	—
Rocky, Barren, and Unvegetated Community	—
California Cliff, Scree, and Other Rock Vegetation	—
Desert Playa	—
North American warm desert bedrock cliff and outcrop	—
Sierra Nevada cliff and canyon	—
Scrub and Chaparral Community	—
California mesic chaparral	—
California pre-montane chaparral	—
California xeric chaparral	—
Central and Southern Californian coastal sage scrub	—
Shadscale-saltbush cool semi-desert scrub	—
Intermontane seral shrubland	—
Inter-Mountain Dry Shrubland and Grassland	—
Madrean Warm Semi-Desert Wash Woodland/Scrub	—
Sonoran-Coloradan semi-desert wash woodland scrub	—
Arizonan upland Sonoran desert scrub	—
Lower bajada and fan Mojavean-Sonoran desert scrub	—
Western Mojave and Western Sonoran Desert borderland chaparral	—
Inter-Mountain West mesic tall sagebrush shrubland and steppe	—

Natural Communities and NVCS Constituents	Conservation Target Acreage (TBD)
Wetland Community	—
Great Basin cool semi-desert alkali basin	—
Open Water	—
Southwestern North American salt basin and high marsh	—
Western North American Freshwater Marsh	—
Arid west freshwater emergent marsh	—
Woodland Community	—
California Forest and Woodland	—
California broadleaf forest and woodland	—
California montane conifer forest	—
Western Great Basin montane conifer woodland	—
Rocky Mountain mesic subalpline forest and woodland	—

NVS = National Vegetation Classification System

Landscape-Level Goals and Objectives

Goal L1: Create a DRECP-wide, landscape-scale reserve system consisting of a mosaic of all constituent natural communities that is adaptive to changing conditions (including activities that are not covered by the plan) and includes temperature and precipitation gradients, elevation gradients, and a diversity of geological facets accommodate range contractions and expansions in response to climate change;.

Comment [EB2]: TNC: As noted in comment letter, we recommend the goals and objectives start with an overarching goal for the plan. We recommend that the ISA recommended goal for DRECP be adopted as the overarching goal.

- **Objective L1.1:** Conserve a total of __acres of natural habitat (Table 2) within the Plan Area supporting an interconnected network of core conservation areas.
- **Objective L1.2:** Conserve critical landscape-level habitat linkages within the Plan Area to allow movement and gene flow for covered and other native species between core conservation areas identified by the DRECP Reserve Design Analysis.
- **Objective L1.3:** Conserve all connections between neighboring mountain ranges to allow passage of resident wildlife by protecting corridors that are at least three miles wide.
  - Chuckwalla-Little Chuckwalla-Palen connections
  - Bristol-Marble-Ship-Old Woman connections
  - North Rosamond-Tehachapi connection
  - Panamint-Argus connection
  - Palo Verde-Mule-Little Chuckwalla connections
  - Mule-McCoy connection
  - Chuckwalla-Eagle-Coxcomb connections

Comment [EB3]: TNC: Add connections between Spring and Kingston/Clark Mountains. Linkages to out-of-plan-area habitats should be included.

- Old Woman-Turtle-Whipple connections
- Bullion-Sheephole-Coxcomb connections
- Clark-Mesquite-Kingston connections
- Big Maria-Little Maria-McCoy connections
- Soda-Avawatz-Ord-Funeral connections
- Eagle-Granite-Palen-Little Maria connections
- Granite-Iron-Old Woman connections
- McCoy-Little Maria-Big Maria connections
- Big Maria-Little Maria-Turtle connections
- Northeast edge of the San Bernardino Mountains between Arrastre Creek and Furnace Canyon, including Arctic and Cushenbury canyons, Terrace and Jacoby springs, along Nelson Ridge, and near Onyx Peak.

- **Objective L1.4:** Protect unique landscape features, important landforms, and rare or unique vegetation types identified within the Plan Area.
  - *Many of these features will be identified by on-the-ground knowledge from agency resource specialists and field biologists. Important mapped datasets are listed below for context.*
    - Desert wash resource elements including areas mapped by the United States Geological Survey (USGS), National Wetlands Inventory (NWI), National Hydrography Dataset (NHD), USGS, including the Central Mojave Vegetation Map Project, and the Bureau of Land Management (BLM).
    - Riparian, playa, seeps/springs, and desert wash resource elements, including areas mapped by the USGS; NWI; NHD; USGS, including the Central Mojave Vegetation Map Project; and BLM.

Goal L2: Promote ecological processes in the Plan Area that sustain and reestablish natural communities and native species.

- **Objective L2.1:** Maintain natural surface- and ground-water processes in the DRECP reserve system, including runoff regimes, percolation, storage, and recharge that serve to maintain vegetation for natural communities, including riparian, playa, seeps/springs, and desert wash resource elements.

Comment [EB4]: TNC: This objective may require restoration and enhancement of out-of-plan-area resources that contribute to in-reserve resources. This should be contemplated and addressed within the BGOs.

- **Objective L2.2**: Maintain geomorphic processes that create bank habitat and regeneration sites (through sediment transport and sand/silt deposition) for plants and wildlife.
- **Objective L2.3:** Conserve floodplain groundwater recharge, input of large wood and other organic matter, and sediment deposition in the floodplain by maintaining floodplain fluvial

processes and protecting natural floodplain inundation zones to the 100-year flood plain. Focus protection in target areas within the following riverine systems and drainages:

- Owens River
- New River
- Carrizo Creek
- San Felipe Creek
- Big Rock Creek
- Amargosa River
- Lower Colorado River
- Alamo River
- Vallecito Creek
- Little Rock Creek
- Mojave River (especially Mojave River Fork Regional Park, Mojave Narrows Regional Park, George Air Force Base to Hinkley Road, and Barstow to Afton Canyon).

Comment [EB5]: TNC recommends that Salt Creek/Death Valley watershed, Panamint Valley watershed, and the Mojave Narrows to Helendale reach of the Mojave River, be added to this list.

- **Objective L2.4:** Conserve undeveloped and natural areas within the watersheds of important riverine and drainage systems identified in the DRECP reserve system, including:
  - Owens watershed (Owens River)
  - Amargosa watershed (Amargosa River)
  - Mojave watershed (Mojave River)
  - Colorado watershed (Lower Colorado River)
  - Imperial watershed (New and Alamo rivers)
  - Anza Borrego watershed (Vallecito, Carrizo, and San Felipe creeks)
  - Antelope watershed (Little Rock and Big Rock creeks)

Comment [EB6]: TNC recommends that Salt Creek/Death Valley watershed and Panamint Valley watershed be added to this list.

- **Objective L2.5.** Promote a fire regime that supports natural communities and covered species in areas where reduced or increased fire frequency is a known cause of the decline of natural communities, vegetation or wildlife.
- **Objective L2.6:** Prevent new infestations and decrease from existing baseline conditions invasive plant species that negatively affect natural communities and covered and native species where such impacts are a known or likely cause of decline, especially Sahara mustard, African mustard, Russian thistle, Tamarisk, Arundo, and invasive annual grasses.

Comment [LC7]: TNC: A decrease of existing baseline conditions will be difficult to achieve, especially for grass species. We suggest reconsidering this objective to ensure that it is attainable.

- **Objective L2.7:** Conserve sand transport corridors between the sand dunes and their sand sources, including upland sediment source areas (usually dry lakes or ephemeral rivers, and mountainous canyons/associated alluvial fans)
  - Afton Canyon—Soda Lake—Devil's Playground—Kelso dunes
  - Ward– Rice – McCoy
  - Bristol Trough—Cadiz dunes—Danby—Rice dunes
  - Pinto Wash—Palen—Ford Dry Lake—Palo

- Clark's Pass/Pinto Valley—Dale Lake dunes—Ford-Palen dunes
- Panamint Valley
- Shadow—Ivanpah—Kelso
- Superior—Grass
- Stewart—Pahrump—Mesquite
- Greenwater—McLain Park
- Verde Mesa (collectively the Chuckwalla Valley dune system)
- Death Valley—Amargosa River—Dumont dunes
- Fenner—Clipper
- Death Valley—Amargosa—Silurian
- Silurain—Valjean
- Pahrump—California

Natural Community-level Goals and Objectives

Comment [EB8]: TNC: The BGOs reference creosote bush (*Larrea tridentata*) scrub, saltbush *(Atriplex spp.*) scrub, or Joshua tree (*Yucca brevifolia*) woodland infrequently, despite the fact that these common species constitute the dominant plants in the most widespread and common vegetation communities within the planning area. Many desert species (including desert tortoise and Mohave ground squirrel) depend on the scrub communities, and Joshua trees are endemic to the Mojave Desert. Why are these communities so infrequently mentioned in this document? Why are they not listed as natural community targets?

Dune Community

In addition to the landscape goals and objectives that will contribute to conserving the Dune Community and its NVCS constituents (North American warm desert dunes) (Table 2), the following goals and objectives have also been developed for this community.

Goal DUNC1: Protect and enhance extensive dune systems with diverse morphology and structure distributed within the Plan Area.

- **Objective DUNC1.1:** Conserve __acres existing North American warm desert active and stabilized dunes, including adjacent transitional sand sheet and hummock habitats within the deposition zones, within the 16 major dune systems in the Plan Area:
  - Olancha dunes
  - Death Valley (Mesquite) dunes
  - Dumont dunes
  - Cadiz dunes
  - Algodones dunes/East Mesa
  - Danby dunes
  - Means dunes
  - Rice Valley dunes
  - Panamint dunes
  - Ibex–Saratoga dunes
  - Kelso dunes
  - Palen sand dunes
  - Chuckwalla Valley dunes
  - Little Dumont dunes
  - Salton Sea dunes
  - Ballarat dunes
- **Objective DUNC1.2:** Conserve dry lake beds that function as sand sources for transport corridors and dune systems:
  - Rosamond Dry Lake
  - Harper Dry Lake

- China Lake
- Twentynine Palms
- Searles Lake
- Melville Lake
- Cronese Lakes
- Bicycle Lake
- Lavic Lake
- Mesquite Lake
- Leach Lake
- Ford Dry Lake
- Cadiz Lake
- Kelso Wash/Dry Lake
- Dale Lake
- Bristol Lake
- Cuddeback Lake
- Silurian Lake
- Coyote Lake
- Bagdad Lake
- Silver Dry Lake
- Palen Lake
- Danby Lake

Goal DUNC2: Promote a biologically diverse dune community characterized by endemic or other native plant and wildlife species unique to psammophytic communities, including transitional areas encompassing the full array of sand-related habitats, including sand sheets, creosote and mesquite hummocks, etc.

- **Objective DUNC2.1:** Enhance __ acres of the dune community by promoting a diverse mosaic of open sand types and native dune vegetation structure.
- **Objective DUNC2.2:** Maintain soil conditions (increasing productivity or maintaining soil sterility as applicable) conducive to native dune plant communities.
- **Objective DUNC2.3:** Decrease non-native invasive plants (e.g., Russian thistle, Sahara mustard, non-native grasses (e.g., *Schismus*, *Bromus*, *Stipa capensis*) and non-native forbs (e.g., *Erodium*) and prevent new infestations through integrated management of dune systems where such impacts are a known or suspected cause of decline in dune habitat quality, including loss or reduction of native dune plants (e.g., Algodones Dunes sunflower, Peirson's milk-vetch, sand food, and Wiggin's croton) or wildlife (e.g., Mojave fringe-toed lizard).
- **Objective DUNC2.4:** Decrease populations of common ravens[1] in dune systems where such impacts are a known or suspected cause of decline in wildlife species (e.g., Mojave fringe-toed lizard).

[1] A raven management plan will be developed as a management action to achieve the BGOS and described as part of the Conservation Strategy

Forest Community

In addition to the landscape goals and objectives that will contribute to conserving the Forest Community and its NVCS constituents (Table 2), the following goals and objectives have also been developed for this community.

Goal FORC1: Protect the forest natural community to promote biodiversity and ecological function and to benefit covered or native species dependent on, or closely associated with, forest habitats throughout the Plan Area.

- **Objective FORC1.1:** Conserve __ acres of California montane conifer forest within the DRECP reserve system, including important habitat elements such as cavity and snag nesting habitat.

*[**Note to Reader:** BGOs for this community are under review and may be expanded to include additional goals and objectives.]*

Grassland Community

In addition to the landscape goals and objectives that will contribute to conserving the Grassland Community and its NVCS constituents (Table 2), the following goals and objectives have also been developed for this community.

Goal GRAC1: Protect and enhance the grassland community to promote biodiversity and ecological function and to benefit covered and other species dependent on or closely associated with grassland habitat throughout the Plan Area.

- **Objective GRAC1.1:** Conserve a total of __ acres of the grassland community (Table 2) within the DRECP reserve system such that grassland vegetation is conserved in the following general regions and habitat areas:
  - California Annual and Perennial Grassland, primarily along the western edge of the Plan Area from the Tehachapi-Piute Mountains in Kern County south to the San Gorgonio Mountains in San Bernardino County.
  - California Annual and Perennial Grassland along the western Plan Area boundary near Borrego Springs and farther south at Anza-Borrego Desert State Park.
- **Objective GRAC1.2**: Increase the quality and extent of the native species of the grassland natural community by restoring or enhancing __ acres of grassland vegetation by maintaining native perennial grasses, reducing non-native grasses, and promoting historical fire frequency to create habitat suitable for target species[2].

[2] Any enhancement actions proposed, including weed removal, will be refined in a Methods Section of the Conservation Strategy if determined to be part of the DRECP proportional contribution BGOs.

- Manage livestock grazing in target areas to promote rangeland health and improve habitat for covered grassland species.
- Manage wild horse and burro populations in target areas to reduce vegetation trampling and soil compaction to improve habitat for covered grassland species.
- Enhance California Annual and Perennial Grassland through the removal of invasive plants.

- **Objective GRAC1.3:** Reduce the threat of invasive competitors and nonnative predators (or reduce conditions that subsidize native predators) that negatively impact covered and other native species in target grassland areas.
  - Decrease populations of common ravens in grasslands where such impacts are a known or suspected cause of decline in covered grassland species.
- **Objective GRAC1.4:** Increase the number of underground burrows in target grassland areas by promoting burrowing rodents and maintaining soil conditions suitable for burrows (i.e., preventing anthropogenic uses that compact soil).
  - Ground squirrels in burrowing owl habitat in grassland communities.
  - Grassland areas in the Tehachapi Mountains.
  - Desert tortoise habitat in grassland communities.

Riparian Community

In addition to the landscape goals and objectives that will contribute to conserving the Riparian Community and its NVCS constituents (Table 2), the following goals and objectives have also been developed for this community.

Goal RIPC1: Protect and enhance the riparian community to promote biodiversity and ecological function and to benefit covered and other species dependent on or closely associated with the community throughout the Plan Area.

- **Objective RIPC1.1:** Conserve a total of __ acres of the riparian community (Table 2) within the DRECP reserve system such that riparian vegetation is conserved in the following general regions or habitat areas:
  - Lower Colorado River, including Havasu National Wildlife Refuge (NWR), Palo Verde Ecological Reserve, Cibola NWR, Imperial NWR, Laguna Dam, and Mittry Lake State Wildlife Area (SWA).
  - Mojave River
  - Whitewater Canyon
  - Saratoga Springs

- Amargosa Canyon
- Kane Spring
- Old Woman Springs
- Salt Creek
- Horse Thief Canyon
- Dove Spring
- Cottonwood Spring
- Bonanza Spring
- Mopah Spring
- Iron Mt. Pumping Station

*[**Note to Reader:** This list is under review and may be substantially expanded to include additional riparian areas.]*

- **Objective RIPC1.2**: Increase the quality and extent of the riparian natural community (e.g., cover and biomass) by restoring or enhancing __ acres of riparian vegetation to create habitat for target species within each system and by reducing anthropogenic impacts in the riparian community, including the following areas:
  - Lower Colorado River area in Bell's vireo, elf owl, and gilded flicker habitat.
  - In habitat for least Bell's vireo and other native nesting birds at target sites in the Borrego Population Unit.
  - In habitat for arroyo toad in Mojave Forks area, Little Rock Creek, and Little Horsethief Creek.
  - In habitat in the Amargosa River area for Amargosa River vole, Amargosa niterwort, ~~and~~ Ash Meadows gumplant, Least Bell's Vireo, Southwestern Willow Flycatcher, Amargosa and Shoshone pupfish, and speckled dace. Access by wild horses to Amargosa River habitat for Amargosa River vole and Ash Meadows gumplant.
- **Objective RIPC1.3:** Reduce the threat of invasive plant species in riparian areas that negatively affect covered and native species.
  - Tamarisk in suitable habitat for least Bell's vireo and other native nesting birds at target sites in the Borrego Population Unit.
  - Tamarisk in selected areas along the Lower Colorado River to benefit Bell's vireo, western yellow-billed cuckoo, elf owl, and Gila woodpecker (note: tamarisk management in areas occupied by nesting willow flycatchers along the Lower Colorado River should only be undertaken with extreme caution to prevent large-scale habitat loss for the flycatcher).

Comment [EB9]: TNC notes that this list is not complete. We suggest you add all the Kingston Mountain Springs and Amargosa drainage springs.

Comment [EB10]: TNC: Anthropogenic impacts should be inclusive of groundwater pumping.

- Tamarisk in the Amargosa River and tributaries to improve habitat quality for the Amargosa River vole, ~~and~~ Ash Meadows gumplant, Least Bell's Vireo, Southwestern Willow Flycatcher, Amargosa and Shoshone pupfish, and speckled dace.
- Tamarisk in Red Rock Canyon and Last Chance Canyon to improve habitat quality for Red Rock tarplant and possibly Mojave tarplant.

- **Objective RIPC1.4:** Maintain and enhance natural hydrological and geomorphological conditions in riverine and drainage systems to promote riparian vegetation and to increase habitat for target species.
  - Natural streams, springs and seeps feeding the Amargosa River to restore natural surface and subsurface hydrology to benefit species such as Amargosa River vole, ~~and~~ Ash Meadows gumplant, Least Bell's Vireo, Southwestern Willow Flycatcher, Amargosa and Shoshone pupfish, and speckled dace.
  - Manage the Mojave River to benefit species such as arroyo toad in the upper Mojave River and native riparian birds throughout system.
  - Manage the Lower Colorado River to restore or maintain natural surface and subsurface hydrology to augment habitat value for Bell's vireo, willow flycatcher, western yellow-billed cuckoo, elf owl, Gila woodpecker, gilded flicker, and other native riparian birds.
  - Manage and enhance natural hydrological conditions along the alkali meadows and springs along the Owens River to prevent competition of upland species such as rabbitbrush and rhizomatous grass species with Owens Valley checkerbloom and to prevent meadow succession.

Goal RIPC2: Protect rare habitats associated with the riparian natural community.

- **Objective RIPC2.1:** Conserve seeps, springs, and areas of surface water (oases) associated with desert riparian and dry wash woodland communities to provide water, shade, and food resources for native birds and other covered species including the following named areas and general regions of high value.
  - Riparian vegetation associated with the Salton Sea border (Imperial County)
  - New River (Imperial County)
  - Alamo River (Imperial County)
  - Agua Caliente Springs (San Diego County)
  - Borrego Springs (San Diego County)
  - Bow Willow Springs (San Diego County)
  - Dos Cabezas Spring (San Diego County)
  - Twentynine Palms (San Bernardino County)
  - Box S Spring (San Bernardino County)
  - Old Woman Spring (San Bernardino County)
  - Amargosa River (especially in Shoshone, Tecopa and Amargosa Valley areas) (Inyo County)
  - Shoshone thermal springs and alkali seeps (Inyo County)

Comment [EB11]: TNC: Suggest adding Kingston Mountain springs, Grimshaw lake complex, and Amargosa Canyon springs.

- Carrizo Marsh (San Diego County)
- Sarasota Spring (San Bernardino County)
- Mojave River (especially in Victorville, Camp Cady, and Afton Canyon areas) (San Bernardino County)
- Morongo Valley (San Bernardino County)
- Lower Colorado River (e.g., Adobe Lake, Big Hole Slough, Blankenship, BR Lagoon, Cibola Lake, Clear Lake, Draper Lake, Ehrenberg, Ferguson Lake, Gila Confluence, Headgate Dam, Lake Havasu-Neptune, Mittry Lake SWA, Picacho East, Taylor Lake, Topock Marsh, and Walker Lake) (San Bernardino, Riverside, Imperial counties)
- Tecopa thermal springs and alkali seeps (Inyo County)
- Furnace Creek Ranch (Inyo County)
- Scotty's Castle (Inyo County)
- Owens River (Inyo County)
- Indian Joe Spring Ecological Reserve
- Other saline and alkaline springs in Death Valley
- Other various unnamed seep/springs in the Owens Valley; Inyo, Coso and Argus ranges; eastern Mojave mountain ranges; eastern slopes of the Tehachapi Range; northern slopes of the San Gabriel Mountains; northern and eastern slopes of the San Bernardino Mountains; and Chocolate Mountains in Imperial County.

Comment [EB12]: TNC: Suggest adding area from the Narrows to Helendale.

- **Objective RIPC2.2:** Conserve migration stopover and wintering sites for migrant birds and sub-regional dispersers in the following riverine systems.
  - Lower Colorado River
  - Mojave River
  - Amargosa River
  - Alamo River
  - Salton Sea
  - Owens River
  - New River

Rocky, Barren, and Unvegetated Community

In addition to the landscape goals and objectives that will contribute to conserving the Rocky, Barren, and Unvegetated Community and its NVCS constituents (Table 2), the following goals and objectives have also been developed for this community.

Goal RBUC1: Protect the rocky, barren, and unvegetated natural community to promote biodiversity and ecological function and to benefit species dependent on, or closely associated with, rocky, barren, and unvegetated habitats (e.g., playas and dry lakes) throughout the Plan Area.

- **Objective RBUC1.1.** Conserve __ acres of rocky, barren, and unvegetated vegetation types (Table 2) within the DRECP reserve system such that unique habitat elements associated with this vegetation type are preserved.

- California cliff, scree and other rock vegetation
- desert playa
- North American warm desert bedrock cliff and outcrop
- Sierra Nevada cliff and canyon

- **Objective RBUC1.2:** Conserve migration stopover sites for migrant birds and sub-regional dispersers in the following playas:
  - Searles Dry Lake east of Trona and Koehn Dry Lake northeast of California City where spring fed wetlands expand with winter rains that produce highly productive alkali meadows and mudflats
  - Harper Dry Lake near Barstow

*[**Note to Reader:** This list is under review and may be substantially expanded to include additional dry lakes and playas.]*

Scrub Chaparral Community

In addition to the landscape goals and objectives that will contribute to conserving the Scrub and Chaparral Community and its NVCS constituents (Table 2), the following goals and objectives have also been developed for this community.

Goal SCCC1: Protect the scrub and chaparral communities to promote biodiversity and ecological function and to benefit species dependent on, or closely associated with, scrub and chaparral habitats throughout the Plan Area.

- **Objective SCCC1.1:** Conserve __ acres of scrub and chaparral community vegetation types (Table 2) within the reserve system such that scrub and chaparral vegetation is conserved in the following general regions and habitat areas and along environmental gradients (including elevation) and in transitional areas.
  - California mesic chaparral
  - Central and Southern Californian coastal sage scrub
  - Intermontane seral shrubland
  - Arizonan upland Sonoran desert scrub
  - Western Mojave and Western Sonoran Desert Borderland chaparral
  - California pre-montane chaparral
  - Shadscale-saltbush cool semi-desert scrub
  - Sonoran-Coloradan semi-desert wash woodland scrub
  - Lower bajada and fan Mojavean-Sonoran desert scrub
  - Inter-Mountain West mesic tall sagebrush shrubland and steppe.

- **Objective SCCC1.2:** Increase the quality and extent of the desert scrub community in degraded areas by removing invasive species and reducing stressors to create suitable habitat for target species.
    - Reduce anthropogenic uses that cause ground surface and vegetation disturbances, including uses that damage cryptobiotic (biological soil) crust and the soils structure and texture depended upon by burrowing covered species.

Goal SCCC2: Protect rare habitats associated with the scrub and chaparral natural community.

- **Objective SCCC2.1:** Conserve and protect representative examples of rare vegetation association and alliances identified within the scrub/chaparral community to maintain the integrity of the following (additional community types and specific areas to be identified through the Reserve Design Analysis).
    - Joshua Tree Woodland
    - Warm Interior Chaparral
    - Colorado Desert scrub, wash, and microphyllous woodland habitats including ironwood, mesquite, palo verde, smoke tree, condalia, and other associated species.

*[**Note to Reader**: This list is under review and may be substantially expanded to include additional rare habitats.]*

Wetland Community

In addition to the landscape goals and objectives that will contribute to conserving the Wetland Community and its NVCS constituents (Table 2), the following goals and objectives have also been developed for this community.

Goal WETC1: Protect the wetland community to promote biodiversity and ecological function and to benefit covered and other species dependent on or closely associated with wetland systems throughout the Plan Area.

- **Objective WETC1.1:** Conserve a total of __ acres of the wetland community (Table 2) within the DRECP reserve system such that wetland vegetation is conserved in the following general regions or habitat areas.
    - Marshes along the Salton Sea shoreline and associated drainages that provide habitat for American peregrine falcon, California black rail, greater sandhill crane, Yuma clapper rail, and desert pupfish.
    - Marshes along the New River (e.g., near Seeley and the entrance to the Salton Sea), All American Canal (e.g., southeast of El Centro), Coachella Canal, Holtville main drain, and Alamo River (e.g., Finney Lake) that provide habitat for California black rail, greater sandhill crane, and Yuma clapper rail.

- Wetland habitats along the Mojave River that provide habitat for Mojave tui chub, including the Camp Cady Wildlife Area and isolated ponds at the terminus of the Mojave River at Soda Springs.
- Wetland habitats along and associated with the Owens River and Valley, including Tinemaha Reservoir that provide habitat for American peregrine falcon and bald eagle, and the Owens River areas that provide habitat for Owens pupfish (i.e., Well 368 and Mule Springs), Owens tui chub (i.e., Owens Lake, irrigation ditches and ponds near Lone Pine and Big Pine, and elsewhere along the Owens River), and/or Owens Valley checkerbloom (moist alkaline meadows and seeps).
- Marshes associated with the Amargosa River that provide habitat for Amargosa River vole, Amargosa niterwort (Carson Slough and Tecopa Hot Springs), and Ash Meadows gumplant (Carson Slough) and open water and bank habitat that supports the Least Bell's Vireo, Southwestern Willow Flycatcher, Amargosa and Shoshone pupfish, and speckled dace.
- Areas of the Lower Colorado River not proposed for conservation by the Lower Colorado River MSCHP and within the DRECP plan area, including potential sites within [update this list once new Arizona BLM boundary is incorporated into plan area] the Havasu NWR, Palo Verde Ecological Reserve, Cibola NWR, Imperial NWR, Laguna Dam, Imperial Wildlife Area, and Mittry Lake SWA and Imperial Division lands of the Bureau of Land Management that provide habitat for American peregrine falcon, bald eagle, California black rail, greater sandhill crane, and Yuma clapper rail.

Comment [EB13]: TNC: Suggest expanding to include other important species, such as resident and neotropical birds, waterfowl, etc.

Comment [EB14]: TNC: Suggest adding Grimshaw Lake and Amargosa Canyon.

Goal WETC2: Increase the quality and extent of the wetland community by improving hydrology and water quality and reducing non-native species to create habitat for covered and other native species.

- **Objective WETC2.1:** Maintain adequate hydrology and increase the cover of native marsh species such as bulrush (*Scirpus* spp.), rush (*Juncus* spp.) cattail (*Typha* spp.), and pickleweed (*Salicornia* spp.) that provide nesting, cover and/or foraging habitat for native birds (including California black rail, and greater sandhill crane) and other marsh species, including Amargosa River vole.
  - Lower Colorado River, Salton Sea, Alamo River, and New River for California black rail, greater sandhill crane, and Yuma clapper rail.
- **Objective WETC2.2:** Maintain alkaline soils and salt grass-dominated meadow that provide habitat for wetland species, including Amargosa River vole (adjacent to marsh), Amargosa niterwort, and Ash Meadows gumplant.
  - Lower Colorado River, New River, All American Canal, Coachella Canal, Alamo River, and Holtville main drainage.
  - Mojave River in the Camp Cady and Soda Springs area.

- Amargosa River area.
- Targeted areas on Salton Sea shoreline.

- **Objective WETC2.3:** Eradicate, if feasible, decrease relative to baseline conditions, or prevent the spread of predators, invasive competitors, and other non-native species that negatively impact covered and other native species in target wetland areas.[3]
  - Wild horses along the Amargosa River.
  - Largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieui*), brown trout (*Salmo trutta*), bluegill (*Lepomis macrochirus*), mosquitofish (*Gambusia affinis*), crayfish (*Pastifasticus leniusculus*), and bullfrogs (*Lithobates catesbeianus*) in Owens River and associated ditches and drainages.
  - Bass, catfish (Ictaluridae), mosquitofish, and bullfrog in the Mojave River.
  - Tilapia (*Tilapia* spp.), sailfin molly (*Poecilia latipinna*), longjaw mudsucker (*Gillichthys mirabilis*), mosquitofish, pothole livebearers (*Poeciliposis gruci*), and several members of the families Centrarchidae (sunfishes), Ictaluridae (catfish), and Cyprinidae (minnows), as well as freshwater snails (*Melanoides tuberculata* and *M. granifera*), crayfish, Rio Grande leopard frog (*Lithobates berlandieri*), and bullfrogs in desert pupfish habitats.
- **Objective WETC2.4:** Prevent new infestations, eradicate if feasible, and decrease from existing baseline conditions invasive plant species that negatively affect covered and native species, including:
  - Tamarisk in selected areas along the Lower Colorado River to benefit California black rail and other native species such as bighorn sheep and mule deer (note: tamarisk management in areas occupied by nesting southwestern willow flycatchers along the Lower Colorado River should only be undertaken with extreme caution to prevent large-scale habitat loss for the flycatcher).
  - Cattails in Owens pupfish habitat.
  - Tamarisk in the Amargosa River to improve habitat suitability for wetland species, including Amargosa River vole and Ash Meadows gumplant.
  - Nonnative plant species in Rabbit Spring to benefit endemic plant species including Parish's alkali grass.

Goal WETC3: Protect rare habitats associated with the wetland community.

- **Objective WETC3.1:** Conserve open water, marshes, seeps, springs, and areas of surface water (oases), associated with wetland communities to provide water, cover, and food resources for

[3] The DRECP does not intend to conduct management actions in the waters of the Salton Sea, but in wetland and riparian areas that are part of the DRECP reserve system.

covered and other native species, including the following named areas and general regions of high value.

Comment [EB15]: TNC: Suggest adding Willow Creek Canyon and Kingston Mountain Springs.

- Open water and marsh habitat associated with the Salton Sea border (Imperial County)
- Open water and marsh habitat associated with Lower Colorado River (San Bernardino, Riverside, Imperial counties)
- Marsh habitat associated with New River (Imperial County)
- Marsh habitat associated with Alamo River (Imperial County)
- San Felipe Springs/San Sebastian Marsh (desert pupfish, San Diego County)
- Anza Borrego State (desert pupfish, San Diego County)
- Hot Mineral Spa Wash (desert pupfish, Imperial County)
- Rabbit Springs (Parish's alkali grass, San Bernardino County)
- Mojave River (Camp Cady and Soda Springs area) (Mojave tui chub, San Bernardino County)
- Morningstar Mine at Mojave National Preserve (Mojave tui chub, San Bernardino County)
- Amargosa River (especially in Shoshone, Tecopa and Amargosa ~~Valley~~ Canyon areas) (Inyo County)
- Shoshone thermal springs and alkali seeps (Inyo County)
- Tecopa thermal springs and alkali seeps (Inyo County)
- Saratoga Springs (San Bernardino County)
- Salt Creek (Death Valley)
- Cottonball Marsh (Death Valley)
- Big Sand Spring (Sodaville milk-vetch, Death Valley)
- Saline-alkaline wetlands along the Owens River (Inyo County)
- Seasonal wetlands at Searles Dry Lake east of Trona (San Bernardino County)
- Seasonal wetlands at Koehn Dry Lake (Kern County)
- Harper Dry Lake northwest of Barstow (San Bernardino County)

- **Objective WETC3.2:** Conserve migration stopover and wintering sites for migrant birds and sub-regional dispersers in the following wetland areas:
  - Lower Colorado River
  - Salton Sea
  - Mojave River
  - Owens River
  - Amargosa River
  - New River
  - Alamo River
  - Searles Dry Lake
  - Koehn Dry Lake
  - Harper Dry Lake

Woodland Community

In addition to the landscape goals and objectives that will contribute to conserving the Woodland Community and its NVCS constituents (Table 2), the following goals and objectives have also been developed for this community.

Goal WOOC1: Protect and enhance the woodland community to promote biodiversity and ecological function and to benefit covered and other native species dependent on or closely associated with woodland habitat throughout the Plan Area.

- **Objective WOOC1.1:** Conserve a total of __ acres of woodland community vegetation types (Table 2) within the DRECP reserve system such that woodland vegetation is protected in the following general or habitat areas.
    - California forest and woodland along the eastern flanks of the Tehachapi and southern Sierra Nevada Mountain ranges.
    - California forest and woodland along the northern flanks of the San Bernardino and San Gabriel Mountain ranges.
    - Californian-Vancouverian montane and foothill forest along the northern and eastern flanks of the San Bernardino Mountain and northern flank of San Gabriel Mountain ranges.
    - Californian-Vancouverian montane and foothill forest along the eastern flanks of the Tehachapi and southern Sierra Nevada Mountain ranges.
    - Intermountain basins pinyon-juniper woodland in eastern Mojave mountain ranges, including the Kingston Range, Clark Mountain Range, Nopah Range, Funeral Mountains, New York Mountains, Providence Mountains, Granite Mountains.
    - Intermountain basins pinyon-juniper woodland along the northern and eastern flanks of the San Bernardino Mountain and northern flank of San Gabriel Mountain ranges.
    - Intermountain basins pinyon-juniper woodland along the eastern flanks of the Tehachapi and southern Sierra Nevada Mountain ranges.
    - Rocky Mountains subalpine and high montane coniferous forest along the eastern flanks of the Tehachapi and Southern Sierra Nevada Mountain ranges.
    - California montane coniferous forest within the Plan Area, including important habitat elements such as cavity and snag nesting habitat.
- **Objective WOOC1.2:** Increase the quality and extent of the woodland natural community to create habitat suitable for covered and other native species within each system.
    - Reduce rates of cowbird parasitism in riparian nesting birds.
    - Maintain or re-establish native perennial grasses in the woodlands understory.

- Reduce anthropogenic impacts in the following areas:
  - Intermountain basins pinyon-juniper woodland in eastern Mojave mountain ranges, including the Kingston Range, Clark Mountain Range, Nopah Range, Funeral Mountains, New York Mountains, Providence Mountains, Granite Mountains.
  - Broadleaf woodland systems in the Tehachapi and southern Sierra Mountain ranges that provide habitat for Tehachapi slender salamander.
  - Pinyon-juniper woodland in the Tehachapi Mountains that provides habitat for Tehachapi pocket mouse.

- **Objective WOOC1.3:** Decrease relative to baseline conditions and prevent the spread of disease, predators, parasites, invasive competitors, and other invasive species that negatively impact covered and other native species in target woodland areas, including:
  - Diseases, destructive insects, and parasites of broad-leaf woodlands and forests and coniferous forests.
  - Competition by European starlings with native cavity nesters in broad-leaf and coniferous forests and woodlands.
  - Access by pet and feral cats.
  - Access by feral pigs, including broad-leaf woodland areas in the Tehachapi and southern Sierra Mountain ranges occupied by Tehachapi slender salamander.
  - Access by wild horses and feral burros to intermountain basins pinyon-juniper woodland in eastern Mojave mountain ranges, including the Kingston Range, Clark Mountain Range, Nopah Range, Funeral Mountains, New York Mountains, Providence Mountains, Granite Mountains.
  - ~~Mistletoe infestations of pinyon-juniper woodlands~~.
  - Invasion by Argentine ants.
- **Objective WOOC1.4:** Prevent new infestations of invasive plant species and decrease from existing baseline conditions species that negatively affect woodlands and their constituent covered and other native species where such impacts are a known or likely cause of decline:
  - Non-native grasses such as cheatgrass (*Bromus tectorum*) in intermountain basins pinyon-juniper woodland that compete with seedlings and saplings for water and nutrients.
  - Non-native grasses and forbs such as cheat grass, slender wild oat (*Avena barbata*), wild oat (*A. fatua*), ripgut brome (*B. diandrus*), Japanese brome (*A. japonicas*), red brome (*B. madritensis spp, rubens*), and tocolate (*Centurea melitensis*) in California forest and woodland and Californian-Vancouverian montane and foothill forest.

Comment [LC16]: : TNC: It is our understanding that mistletoe fruits are an important food source for phainopepla, and that this management practice may be outdated

Comment [EB17]: TNC: This objective will be difficult to achieve, as these are already widespread and difficult to control. The objective should be re-worked to ensure that the objective is achievable.

Goal WOOC2: Promote a biologically diverse woodland community characterized by endemic or other native plant wildlife species unique to the woodland community.

- **Objective WOOC2.1:** Maintain or increase woodland stands with diverse age structures (i.e., a natural mix of adults, saplings, and seedlings); tree sizes including snags and large oaks >50 cm diameter at breast height (DBH); and a mix of dense and open canopy and sparse woodlands (i.e., savannahs) to protect old trees, to promote natural recruitment of woodlands, and to benefit woodland species.
- **Objective WOOC2.2:** Maintain or re-establish through wildfire management a natural fire regime in woodlands, including pinyon-juniper woodland.

Species-Level Goals and Objectives

The primary overarching goal for all covered species is as follows:

Goal SPEC1: Protect, manage, and contribute to recovery of viable self-sustaining populations throughout the species natural distribution in the Plan Area, including sufficient habitat to adapt to environmental fluxuations and habitat connectivity to facilitate genetic exchange among populations.

This overarching species goal will be met through the landscape and natural community level goals and objectives for the following list of covered species. Therefore, additional specific-specific goals and objectives were not developed:

- western yellow-billed cuckoo
- American peregrine falcon
- greater sandhill crane
- bald eagle
- bank swallow
- Tehachapi slender salamander
- flat-tailed horned lizard
- Mojave fringe-toed lizard

For the other covered species not listed above, additional species-specific goals and objectives are needed to meet this overarching species goal. Those additional species-specific goals are listed below for the following species:

- Swainson's hawk
- gilded flicker
- willow flycatcher (southwestern willow flycatcher)
- California condor
- Gila woodpecker
- Cushenbury buckwheat
- Algodones Dunes sunflower
- Bakersfield cactus
- Owens Valley checkerbloom
- arroyo toad

- elf owl
- Yuma clapper rail
- Bell's vireo (Arizona and Least)
- desert pupfish
- Owens pupfish
- Mohave tui chub
- Amargosa River vole
- bighorn sheep (peninsular and desert)
- Mohave ground squirrel
- Cushenbury oxytheca
- Cushenbury milk-vetch
- Peirson's milk-vetch
- triple-ribbed milk-vetch
- Mojave tarplant
- Parish's daisy
- barefoot gecko
- desert tortoise
- golden eagle
- burrowing owl
- white-tailed kite
- Tehachapi pocket mouse
- alkali mariposa-lily
- desert cymopterus
- Barstow woolly sunflower
- Little San Bernardino Mtns. linanthus
- Mojave monkeyflower
- White-margined beardtongue
- Parish's phacelia
- Parish's alkali grass
- coast horned lizard

Comment [EB18]: TNC: Recommended replacing generic desert pupfish with specific types, including Amargosa and Shoshone pupfish and speckled dace.

In some cases, the additional species-specific goals are apply to a group of similar species (e.g., raptors, riparian birds) and so were combined to minimize redundancy.

Plants

Carbonate Plants

In addition to the goals and objectives developed for landscapes and natural communities that will benefit covered carbonate plants, the following goal and objectives will contribute to SPEC1 for carbonate plants.

Comment [EB19]: TNC recommends that authors consult and reference the Carbonate Habitat Management Strategy Document (2003). http://www.fs.fed.us/r5/scfpr/projects/lmp/docs/carbonate-strategy.pdf

Goal CAPL1 (SPEC1): Maintain or increase the distribution of covered carbonate plant (Cushenbury buckwheat, Cushenbury milk-vetch, Cushenbury oxytheca, Parish's daisy) populations in suitable carbonate substrates in the northeastern San Bernardino Mountains foothills by __%.

- **Objective CAPL1.1:** Protect and enhance carbonate substrates in the northeastern San Bernardino Mountains foothills that provide suitable habitat for the covered carbonate plants.

- **Objective CAPL1.2:** Increase the distribution of covered carbonate plants by restoring carbonate vegetation communities, including restoring populations of covered carbonate plants by revegetation with seed/cuttings.
- **Objective CAPL1.3:** Enhance degraded carbonate substrates by restoring the soil surface characteristics and open vegetation communities suitable for covered carbonate plants, including providing a supply of carbonate material derived from upstream or upslope limestone, dolomite, or quartz monzonite parent rock.

Goal CAPL2: Increase the number of populations of covered carbonate plant species by __%.

- **Objective CAPL2.1:** Promote the restoration of degraded carbonate soils and vegetation communities, including restoring populations of covered plants by revegetation with carbonate plant propagules.
- **Objective CAPL2.2:** Protect or enhance carbonate substrates and vegetation communities in the vicinity of existing populations of covered carbonate plants to allow for expansion of populations into those areas.

Dune Plants

In addition to the goals and objectives developed for landscapes and natural communities that will benefit covered dune plant species, the following goal and objectives will contribute to SPEC1 for dune plants.

Goal DUPL1 (SPEC1): Maintain or increase the distribution, population size, or number of populations of covered dune plant species (Algodones Dunes sunflower, Peirson's milk-vetch) and contribute to their recovery in the Plan Area.

- **Objective DUPL1.1:** Increase the reproductive success of dune plants by __% over the permit term in target areas where low seed set has caused a decline in covered dune plants.
- **Objective DUPL1.2:** Increase critical pollinators such as the white-faced digger bee (for Peirson's milk-vetch at Algodones Dunes) in areas where plants are not regenerating relative to baseline conditions.

Narrow Endemic Plants

In addition to the goals and objectives developed for landscapes and natural communities that will benefit covered narrow endemic plants, the following goal and objectives will contribute to SPEC1 for narrow endemic plants.

Goal NEPL1 (SPEC1): Maintain or increase the distribution, population size, or number of populations of covered narrow endemic plant species (Owens Valley checkerbloom, Parish's alkali grass) and contribute to their recovery in the Plan Area.

- **Objective NEPL1.1:** Decrease non-native invasive plants and prevent new infestations through an integrated management approach where such impacts are a known or suspected cause of decline in habitat quality for narrow endemic plants.

Parish's Alkali Grass

The following objectives for Parish's alkali grass will contribute to NEPL1/SPEC1.

- **Objective PAGR1.1:** Conserve Rabbit Spring, the single occurrence of Parish's alkali grass.
- **Objective PAGR1.2:** Preserve the hydrological regime and water table that maintain suitable moist soil conditions during the growing season at Rabbit Spring required by Parish's alkali grass.

Owen's Valley Checkerbloom

The following objectives for Owen's Valley checkerbloom will contribute to NEPL/SPEC1.

- **Objective OVCH1.1:** Conserve ___ occurrences of Owens Valley checkerbloom.
- **Objective OVCH1.2:** Maintain the groundwater-sustained water table that supports the mesic meadow conditions required by Owens Valley checkerbloom at target sites in the Owens Valley.

Scrub and Chaparral Community Plants

In addition to the goals and objectives developed for landscapes and natural communities that will benefit scrub and chaparral community plants, the following goal and objectives will contribute to SPEC1 for these plants.

Goal SCCP1: Maintain or increase the distribution, population size, or number of populations of covered scrub and chaparral community plant species (alkali mariposa lily, Barstow woolly sunflower, desert cymopterus, Little San Bernardino Mountains linanthus, Mojave monkeyflower, triple-ribbed milk-vetch, White-margined beardtongue) and contribute to theIR recovery in the Plan Area.

- **Objective SCCP1.1:** Increase the reproductive success of covered scrub/chaparral plants by __%.

Bakersfield Cactus

The following objectives for Bakersfield cactus will contribute to SCCP1/SPEC1.

- **Objective BACA1.1**: Conserve Bakersfield cactus habitat in the vicinity of the Eastern Slopes and Tehachapi-Piute Mountains ecoregion subsections.
- **Objective BACA1.2:** Conserve__ known occurrences of Bakersfield cactus.

Mojave Tarplant

The following objectives for Bakersfield cactus will contribute to SCCP1/SPEC1.

Goal MOTA1: Contribute to the recovery of the Mojave tarplant by protecting, enhancing, and managing habitat and promoting the ecosystem functions that maintain the species throughout the Plan Area.

- **Objective MOTA1.1:** Conserve __ known occurrences of Mojave tarplant.

Fish

In addition to the goals and objectives developed for landscapes and natural communities, the following goals and objectives will contribute to SPEC1 for covered fish species.

Goal FISH1 (SPEC1): Maintain or increase the distribution, population size, or number of populations of covered fish species (desert pupfish, Owens pupfish, Mohave tui chub, Owens tui chub) and contribute to their recovery in the Plan Area.

- **Objective FISH1.1:** Promote low-turbidity, low-velocity waters and well-developed beds of aquatic plants in the Owens Valley with a focus on enhancing habitat suitability for native fish species, including Owens pupfish and Owens tui chub.
    - Occupied sites at Well 368 and Mule Spring, and potential recovery sites by introduction of native fish species at Cartago Springs Wildlife Area and Blackrock Waterfowl Management Area.
    - Mule Spring, Black Rock, and Southern Owens (Cabin Bar Ranch population was found on the southwest shore of Owens Dry Lake).

Goal FISH2: Protect the genetic integrity of covered fish (desert pupfish, Owens pupfish, Mohave tui chub, Owens tui chub, Amargosa and Shoshone pupfish, speckled dace) in the Plan Area.

- **Objective FISH2.1:** Where and when appropriate, establish __ new native populations of desert pupfish, Mojave tui chub, Owens pupfish, and Owens tui chub.
- **Objective FISH2.2:** Maintain or enhance genetic connectivity of covered fish species.
- **Objective FISH2.3:** Prevent hybridization between Owens tui chub and Lahontan tui chub (*Siphateles bicolor obesus*) by establishing isolated populations of Owens tui chub with barriers to prevent mixing~~invasion~~.

Desert Pupfish

The following objectives for desert pupfish will contribute to FISH1/SPEC1.

- **Objective FISH2.4:** Prevent new infestations, eradicate if feasible, and decrease from existing baseline conditions Hydrilla (*Hydrilla verticillata*) in known desert pupfish habitat.

Reptiles and Amphibians

Arroyo Toad

In addition to the goals and objectives developed for landscapes and natural communities that will benefit arroyo toad, the following goal and objectives will contribute to SPEC1 for arroyo toad.

Goal ARTO1 (SPEC1): Maintain or increase the distribution, population size, or number of populations of arroyo toad and contribute to its recovery by protecting, enhancing, and managing habitat and promoting the ecosystem functions that maintain the species throughout the Plan Area.

- **Objective ARTO1.1**: Conserve Arroyo toad habitat within the Desert Slope Recovery Unit, including the following areas:
  - Subregion 9—Little Rock Creek, Little Horsethief Creek, Rancho Los Flores area, Mojave River (West Fork, Mojave Forks Dam area).
  - Subregion 10—San Felipe and Vallecito creeks.
- **Objective ARTO1.2:** Decrease, relative to baseline conditions, and prevent the spread of Crayfish, bullfrog, and non-native fish that adversely impact arroyo toad in Little Rock Creek, Horsethief Creek, and occupied areas of the Mojave River.

Barefoot Gecko

In addition to the goals and objectives developed for landscapes and natural communities that will benefit barefoot gecko, the following goal and objectives will contribute to SPEC1 for barefoot gecko.

Goal BAGE1 (SPEC1): Maintain or increase the distribution, population size, or number of populations of barefoot gecko and contribute to its recovery in the Plan Area.

- **Objective BAGE1.1:** Conserve __% of suitable habitat for barefoot gecko.
- **Objective BAGE1.2**: Conserve __ acres of suitable habitat for barefoot gecko along the eastern face of the Peninsular Ranges in eastern San Diego County and extreme western Imperial County.
- **Objective BAGE1.3:** Decrease human-caused mortality, relative to baseline conditions, by patrolling target areas.

Coast Horned Lizard

In addition to the goals and objectives developed for landscapes and natural communities that will benefit coast horned lizard, the following goal and objective will contribute to SPEC1 for coast horned lizard.

Goal CHLI1 (SPEC1): Maintain or increase the distribution, population size, or number of populations of coast horned lizard and contribute to its recovery in the Plan Area.

- **Objective CHLI1.1:** Prevent access by domestic dogs and cats to occupied coast horned lizard habitat within the Plan-wide reserve system. Decrease, relative to baseline conditions, prevent the spread of, or preclude access to predators or invasive competitors that negatively impact covered and other native species in target grassland areas.

Desert Tortoise

In addition to the goals and objectives developed for landscapes and natural communities that will benefit desert tortoise, the following goal and objectives will contribute to SPEC1 for desert tortoise.

Goal DETO1 (SPEC1): Maintain or increase the distribution, population size, or number of populations of desert tortoise and contribute to its recovery in the Plan Area.

- **Objective DETO1.1:** Acquire and maintain _acres of suitable habitat for desert tortoise (e.g., Maxtent habitat model score >0.5; USGS 2010).
- **Objective DETO1.2:** Reduce the spread of disease, especially upper respiratory disease syndrome (URDS) in desert tortoises, relative to baseline conditions, in target areas.
- **Objective DETO1.3:** Reduce the level of predation, particularly to young and juvenile desert tortoises, caused by increases in opportunistic predators (e.g., common raven, coyote).
- **Objective DETO1.4:** Decrease human-caused mortality, including vehicular collision, relative to baseline conditions, by patrolling target areas.
- **Objective DETO1.5:** Increase burrow availability in areas where burrows are limiting by establishing artificial burrows.
- **Objective DETO1.6:** Establish a desert tortoise education program for the general public.

Birds

Raptors

In addition to the goals and objectives developed for landscapes and natural communities, the following goals and objectives will contribute to SPEC1 for covered raptor species.

Goal RAPT1 (SPEC1): Maintain the distribution, population size, or number of populations of covered raptor species (burrowing owl, California condor, Golden eagle, Swainson's hawk, white-tailed kite) and contribute their recovery in the Plan Area.

- **Objective RAPT1.1:** Reduce, relative to baseline, mortality of covered raptor species related to ingestive poisoning of anthropogenic waste (e.g., microtrash, lead, antifreeze, and other contaminants).
- **Objective RAPT1.2**: Eliminate the use of rodenticides and promote prey populations for Swainson's hawk, white-tailed kite, and burrowing owl in target grassland areas.
- **Objective RAPT1.3:** Minimize wind turbine- and transmission-related mortality of covered raptor species through proper site characterization, turbine siting, turbine and related facility design criteria, and best management practices related to facility and turbine operation.
- **Objective RAPT1.4:** Conserve __ acres to protect foraging habitat for Swainson's hawk and white-tailed kite.
    - Imperial Valley within five miles of perennial water bodies
    - Lower Colorado River Valley
- **Objective RAPT1.5:** Protect __ acres of agriculture in the Imperial Valley, Lower Colorado River Valley, or West Mojave within three miles of forested riparian areas, or other stands of deciduous trees suitable for nesting white-tailed kite and Swainson's hawk (West Mojave only).
- **Objective RAPT1.6:** Conserve Swainson's hawk habitat in Southern Great Basin semi-desert grassland in the Homer, Antelope, Fremont, Indian Wells, and Owens watersheds, within the Mojave National Preserve and near Haiwee Reservoir.
- **Objective RAPT1.7:** Conserve __ acres of agricultural in the West Mojave to support of bird-friendly farming.
    - conservation easements
    - agricultural preserves
    - subsidies to alfalfa farmers
- **Objective RAPT1.8:** Increase raptor viability by reducing the preponderance of illegal dumping and hunting with lead throughout the Plan Area for all raptors and in the following areas specifically for golden eagle:
    - Piute Range including Piute Creek area
    - Newberry Mountains and Granite Mountains
    - Red Mountain/El Paso Mountains
    - Calico Mountains

- Clark Mountains

Burrowing Owl

The following objectives for burrowing owl will contribute to RAPT1/SPEC1.

- **Objective BUOW1.1:** Acquire and maintain _acres of suitable habitat for burrowing owl in and around population centers and parts of historic range that allow for maintenance and expansion of populations.
  - Southern Owens River Valley
  - West Mojave including areas west of Victorville
  - Eastern Mojave desert within large areas of suitable habitat near documented occurrence records
  - Imperial Valley east of Brawley and south of the Salton Sea
  - Lower Colorado River Valley
- **Objective BUOW1.2:** Increase burrowing owl viability by reducing mortality from vehicle traffic in occupied areas or suitable habitat.
  - provide roadway signage and, where feasible
  - implement and patrol speed limits
  - restrict nighttime traffic.

Riparian Birds

In addition to the goals and objectives developed for landscapes and natural communities that will benefit covered riparian birds, the following goal and objectives will contribute to SPEC1 for riparian birds.

Goal RIBI1 (SPEC1): Maintain or increase the distribution, population size, or number of populations of covered riparian bird species (Bell's vireo, least Bell's vireo, willow flycatcher, southwestern willow flycatcher, Gila woodpecker, gilded woodpecker, elf owl) and contribute to their recovery in the Plan Area.

- **Objective RIBI1.1:** Increase the reproductive success of covered riparian birds by __%.
- **Objective RIBI1.2:** Decrease, relative to baseline conditions, and prevent the spread of brown-headed cowbird parasitism on Bell's vireo, willow flycatcher, southwestern willow flycatcher and other native passerines in the Lower Colorado River, Amargosa River and potentially Mojave River.

- **Objective RIBI1.3:** Decrease, relative to baseline conditions, and prevent the spread of competition for cavity nesting sites by European starlings with Gila woodpecker, gilded woodpecker and elf owl in the Lower Colorado River.

Bell's Vireo

The following objectives for Bell's vireo will contribute to RIBI1/SPEC1.

- **Objective BEVI1.1:** Increase the quality and extent of early to mid-successional riparian vegetation with a well-developed understory of dense shrubs.
  - Vallecito, San Felipe, Carrizo (including Carrizo Marsh), Agua Caliente, Bow Willow, and Coyote creeks in the Borrego Population Unit.
  - Lower Colorado River
  - Mojave River (including Willow Creek)
  - Amargosa River
  - Owens River

Willow Flycatcher

The following objectives for willow flycatcher will contribute to RIBI1/SPEC1.

- **Objective WIFL1.1:** Increase the quality and extent of a dense mid-story and understory riparian vegetation location near surface water or saturated soils:
  - Lower Colorado River Recovery Unit, including the following sites: Adobe Lake, Big Hole Slough, Blankenship, BR Lagoon, Cibola Lake, Clear Lake, Draper Lake, Ehrenberg, Ferguson Lake, Gila Confluence, Headgate Dam, Lake Havasu-Neptune, Mittry Lake SWA, Picacho East, Taylor Lake, Topock Marsh, and Walker Lake.
  - Basin and Mojave Recovery Unit, including the following sites: Owens River—Big Pine, Owens River—Lone Pine Creek, Mojave River—Mojave Forks, Mojave River—Oro Grande, Mojave River—Upper Narrows, Mojave River—Victorville I-15, Holcomb Creek—Little Bear, and San Felipe Creek—San Felipe.

Wetland Birds

In addition to the goals and objectives developed for landscapes and natural communities that will benefit covered wetland birds, the following goal and objectives will contribute to SPEC1 for wetland birds.

Goal WEBI1 (SPEC1): Maintain or increase the distribution, population size, or number of populations of covered wetland bird species (California black rail, Yuma clapper rail) and contribute to their recovery in the Plan Area.

- **Objective WEBI1.1:** Eradicate, if feasible, decrease relative to baseline conditions, or prevent the spread of common ravens and raccoons in wetlands where such impacts are known or suspected to cause the decline of covered wetland bird species (e.g., California black rail, Yuma clapper rail).

California Black Rail

The following objectives for California black rail will contribute to WEBI/SPEC1.

- **Objective CBRA1.1**: Increase the quality and extent of marsh habitat with a focus on maintaining adequate hydrology and increasing the cover of common threesquare (*Schoenoplectus pungens*) and arrowweed (*Pluchea sericea*), specifically associated with California black rail habitat.

Mammals

Amargosa River Vole

In addition to the goals and objectives developed for landscapes and natural communities that will benefit Amargosa river vole, the following goal and objectives will contribute to SPEC1 for Amargosa river vole.

Goal AMVO1 (SPEC1): Maintain or increase the distribution, population size, or number of populations of Amargosa river vole and contribute to its recovery in the Plan Area.

- **Objective AMVO1.1:** Decrease, relative to baseline conditions, access by cats to Amargosa River habitat for Amargosa River vole in the Plan-wide reserve system.

Bighorn Sheep

In addition to the goals and objectives developed for landscapes and natural communities that will benefit bighorn sheep, the following goals and objectives will contribute to SPEC1 for bighorn sheep.

Goal BISH1: Create a landscape-scale reserve system for the desert bighorn metapopulation (Nelson's bighorn sheep and Peninsular distinct population segment [DPS]) that is adaptive to changing conditions, including range shifts, contractions, expansions, and recolonizations in response to local extirpations and to climate change, temperature and precipitation gradients.

- **Objective BISH1.1:** Conserve__ acres of mountain habitat for Nelson's bighorn sheep throughout its range in the Plan Area, in the following mountain range management units known to support bighorn sheep (defined by CDFG):

- Marble Mountains
- Clipper Mountains
- Kelso Peak and Old Dad Peak
- Clark, Kingston, and Mesquite Mountains
- Sheephole Mountains
- South Bristol Mountains
- Cady Mountains
- San Gorgonio Wilderness Area (eastern portion within Plan Area)

- **Objective BISH1.2:** Conserve __ acres of mountain habitat for Nelson's bighorn sheep throughout its range in the Plan Area in the following other mountain ranges:
  - Amargosa Range/Funeral Mountains
  - Southern Panamint Range
  - Southern Argus Range
  - Slate Range
  - Greenwater Range
  - Black Mountains
  - Owlshead Mountains
  - Avawatz Mountains
  - Granite Mountains (in northeast Mojave)
  - Black Hills/Pilot Knob/Robbers Mountain area
  - Resting Spring Range
  - Nopah Range
  - Sperry Hills
  - Mescal Range
  - Ivanpah Mountains
  - Silurian Hills
  - Soda Mountains
  - Providence Mountains
  - New York Mountains
  - Piute Range
  - Piute Mountains
  - Newberry Mountains
  - Rodman Mountains
  - Ord Mountains
  - Granite Mountains (in southern Mojave)
  - Bullion Mountains
  - Old Woman Mountains
  - Dead Mountains
  - Sacramento Mountains
  - Chemehuevi Mountains
  - Whipple Mountains
  - Turtle Mountains
  - Iron Mountains
  - Pinto Mountains
  - Hexie Mountains
  - Eagle Mountains
  - Coxcomb Mountains
  - Palen-McCoy Mountains
  - Little Maria Mountains
  - Big Maria Mountains
  - Riverside Mountains
  - Chuckwalla Mountains
  - Chocolate Mountains

- Old Dad Mountains
- Mule Mountains
- Little Chuckwalla Mountains
- Palo Verde Mountains
- Little Mule Mountains

- **Objective BISH1.3:** Conserve __ acres of intermountain habitat for Nelson's bighorn sheep throughout its range in the Plan Area in the following areas:
  - Death Valley between the Panamint Range and the Amargosa Range/Funeral Mountains, Greenwater Range, Black Mountains, and Avawatz Mountains
  - Panamint Valley between Argus Range and Panamint Range
  - Searles Valley between the Argus Range, Slate Range, Granite Mountains (northeast Mojave), and Black Hills/Pilot Knob/Robbers Mountain area
  - Pilot Knob Valley between the Slate Range, the Granite Mountains (northeast Mojave), Owlshead Mountains, and the Avawatz Mountains
  - Greenwater Valley between the Black Mountains and Greenwater Range
  - Amargosa Valley between the Greenwater Range and Resting Spring Range
  - Chicago Valley between the Resting Spring Range and Nopah Range
  - California Valley between the Nopah Range and the Kingston Range
  - Silurean Valley between the Avawatz Mountains and the Silurian Hills
  - Valley habitat between Avawatz and Granite Mountains (northeast Mojave) and Soda and Cronese Mountains
  - Habitat between Soda and Cronese
  - Habitat between Shadow Mountain and Turquoise Mountain area and Old Dad Mountain
  - Mojave River Wash and Devil's Playground between the Cady Mountains and Bristol Mountains and the Kelso Mountains and Old Dad Mountain
  - Ivanpah Valley between Ivanpah Mountains and New York Mountains
  - Clipper Valley between the Bristol Mountains, Granite Mountains (east-central Mojave), and Providence Mountains and the Clipper Mountains
  - Fenner Valley between Clipper Mountains and Old Woman Mountains
  - Piute Valley between Piute Range and Dead Mountains
  - Habitat in Amboy area between Bristol Mountains and Bullion Mountains
  - Johnson Valley between the Rodman Mountains and Lava Bed Mountains and the San Bernardino Mountains
  - Pinto Basin between the Pinto Mountains and Eagle Mountains
  - Valley habitats between the Palen-McCoy Mountains, Little Maria and Big Maria Mountains, and the Riverside Mountains
  - Chuckwalla Valley between the Eagle Mountains and the Chuckwalla Mountains

Mountains and Cady Mountains

- Valley habitats between the Little Chuckwalla Mountains, Palo Verde Mountains, Mule Mountains, Little Mule Mountains, and the Chocolate Mountains

- **Objective BISH1.4:** Protect critical corridors/crossing points to maintain connectivity between mountain habitats at the following locations:
  - Crossing of Interstate 15 (I-15) at Soda/Cronese Mountains-Cady Mountains habitat connection
  - Crossings of I-15 at Clark Mountains-Mescal Range habitat connection and/or Clark Mountains-Ivanpah Mountains habitat connection
  - Crossing of I-40 at the Cady Mountains-Bullion Mountains habitat connection east of Ludlow
  - Crossing of I-40 in the western portion of the Bristol Mountains
  - Crossing of I-40 in the eastern portion of the Bristol Mountains and Old Dad Mountains area
  - Crossing of I-40 at the Granite Mountains-Marble Mountains habitat connection
  - Crossing of I-40 at the Dead Mountain-Sacramento Mountains habitat connection
  - Crossing of I-10 at the Eagle Mountains-Orocopia Mountains habitat connection via Chuckwalla Valley (this connection is just on the western edge of Plan Area boundary but is a critical connection across I-10 that would serve populations in the Eagle Mountains and Chuckwalla Mountains in the Plan Area)
- **Objective BISH1.5:** Conserve __ acres of mountain habitat for the Peninsular bighorn sheep DPS within the Plan Area in the following areas:
  - Along the lower slopes of the Fish Creek Mountains and Coyote Mountains and in the Carrizo Wash area connecting the two ranges.
  - Along the eastern slopes of the Jacumba Mountains and Tierra Blanca Mountains.
  - Along the lower slopes of the Vallecito Mountains.
  - Along the lower slopes of the Santa Rosa Mountains.
- **Objective BISH1.6:** Maintain or enhance access to available water sources in mountain habitats to support drinking, lactation and lambing, including perennial and seasonal (i.e., winter storm monsoonal runoff) streams and rivers, springs, oases, and potholes in rocks, as available, or artificial water catchments (guzzlers).
  - Julian Wash (bighorn sheep, Imperial County)

- Marshes, seeps, and springs associated with the East Mesa, Imperial County.

- **Objective BISH1.7:** Increase the number of subpopulations in the metapopulations by restoring bighorn sheep to suitable but currently vacant mountain habitats that are connected to occupied areas by maintainable intermountain travel corridors.

Goal BISH2: Remove or reduce potential threats and environmental stressors to maintain and enhance bighorn sheep populations.

- **Objective BISH2.1:** Increase relative to baseline conditions access to water and food sources by minimizing competition with bighorn sheep, domestic livestock, and feral burros and reducing anthropogenic uses that inhibit access to water sources, especially during the lambing season.
- **Objective BISH2.2:** Control transmission of livestock diseases to bighorn sheep by eliminating direct contact between bighorn sheep and cattle, domestic sheep, and domestic and feral goats in target areas.
- **Objective BISH2.3:** Decrease relative to baseline conditions mountain lion predation where predation levels are artificially high due to deer introductions.
- **Objective BISH2.4:** Prevent accidental drowning and pathogen transmission at artificial water catchments (guzzlers).

Comment [EB20]: TNC recommends that this objective be re-worded to ensure that deer are controlled rather than mountain lions in order to decrease prey base that lures and supports mountains.

Mojave Ground Squirrel

In addition to the goals and objectives developed for landscapes and natural communities that will benefit Mohave ground squirrel, the following goal and objectives will contribute to SPEC1 for Mohave ground squirrel.

Goal MGS1: Create a landscape-scale reserve system for Mohave ground squirrel that is adaptive to changing conditions, including range shifts, contractions and expansions in response to climate change, and temperature and precipitation gradients.

- **Objective MGS1.1:** Conserve __ acres of desert scrub habitat for Mohave ground squirrel in relatively undisturbed areas that include historic records and would maintain the historic range of the population to accommodate expansion and contraction of the species, including the following target areas.
  - Fort Irwin area
  - Lucerne Valley area
- **Objective MGS1.2:** Decrease relative to baseline conditions and restrict future use of rodenticides and other harmful pesticides adjacent or in close proximity to occupied or suitable unoccupied Mohave ground squirrel habitat.

- **Objective MGS1.3**: Mojave ground squirrel habitat around population centers and parts of its historic range that allow for conservation and recovery of the species, including within and surrounding the four core areas identified by Leitner (2008).
  - Coso Range—Olancha
  - Little Dixie Wash
  - Coolgardie Mesa—Superior Valley
  - Edwards Air Force Base
- **Objective MGS1.4:** Increase the quality and extent of the Mojave ground squirrel habitat in degraded areas by restoring ___ acres of desert scrub in the following core and linkage areas:
  - Edwards AFB-Kramer Junction-Boron area northwest to Fremont Valley via Peerless Valley area lands north of California City (part of the Sierra Nevada–Edwards AFB linkage identified by Penrod et al. 2012).
  - Edwards AFB-Kramer Junction-Boron area north to Rand Mountains via linkage west of and parallel to Highway 395 (part of the China Lake South Range–Edwards AFB linkage identified by Penrod et al. 2012).
  - Fremont Valley to Indian Wells Valley-Little Dixie Wash via Red Rock Canyon State Park (part of the Sierra Nevada–Edwards AFB linkage identified by Penrod et al. 2012).
  - Indian Wells Valley-Little Dixie Wash to Searles Valley via valley between El Paso Mountains and Ridgecrest (part of the southern branch of the China Lake North Range–China Lake South Range linkage identified by Penrod et al. 2012).
  - Indian Wells Valley-Little Dixie Wash to Ross Valley (Cosa/Olancha core area) via linkage paralleling Highway 395 (part of the Sierra Nevada–China Lake North linkage identified by Penrod et al. 2012).
  - Coolgardie Mesa to Pilot Knob via Superior Valley (contained within the China Lake South Range Landscape Block identified by Penrod et al. 2012).
  - Pilot Knob to Searles Valley via Christmas Canyon (mostly contained within the China Lake South Range Landscape Block identified by Penrod et al. 2012).
  - Pilot Knob to Peerless Valley- Edwards AFB-Kramer Junction-Boron areas via Almond Cove-Cuddeback Dry Lake area (part of east branch of China Lake South Range–Edwards AFB linkage identified by Penrod et al. 2012).

Comment [EB21]: As discussed at workshop, verb needed. TNC recommends "conserve".

Comment [EB22]: TNC: Restoration of shrubland habitat is extraordinarily difficult to achieve in the Mojave. This objective should be re-worked to ensure that the objective is achievable. Suggest adding additional information about the kind of desert scrub that needs to be restored for MGS and the feasibility of this type of restoration.

Tehachapi Pocket Mouse

In addition to the goals and objectives developed for landscapes and natural communities that will benefit Tehachapi pocket mouse, the following goal and objectives will contribute to SPEC1 for Tehachapi pocket mouse.

Goal TPMO1(SPEC1): Maintain or increase the distribution, population size, or number of populations of Tehachapi pocket mouse and contribute to its recovery in the Plan Area.

- **Objective TPMO1.1**: Conserve Tehachapi pocket mouse habitat within the Santa Clara–Calleguas, Antelope, Fremont, and Grapevine watersheds.

  Objective TPMO1.2: Prevent access by domestic dogs and cats to occupied Tehachapi pocket mouse habitat within the Plan-wide reserve system.

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DRAFT

March 21, 2012

Draft Memorandum – Appendix A

Subject: DRAFT Revised DRECP Biological Goals and Objectives

Appendix A

Explanation of DRECP Conservation Strategy Conceptual Model

Desert Renewable Energy Conservation Plan
Conservation Strategy Conceptual Model

1.0 Introduction

The following describes a proposed architecture (or conceptual model) for developing a Conservation Strategy for the Desert Renewable Energy Conservation Plan (DRECP). The proposed approach is adopted from a similar process (referred to as the Logic Chain) developed for use in crafting a conservation strategy for the Bay Delta Conservation Plan.

The purpose of the conceptual model is to (1) standardize terminology used in the planning process, (2) increase clarity and specificity regarding the expected outcomes of plan implementation, and (3) illustrate how monitoring and new information would inform plan implementation through adaptive management. By articulating what the conservation strategy is trying to accomplish and how it intends to achieve its objectives, the DRECP conceptual model facilitates both evaluation of the initial plan and assessment of its efficacy during implementation.

2.0 DRECP Conceptual Model

Figure A-1 below shows a graphical representation of the DRECP Conceptual Model. Key elements of the model are described on the following pages.

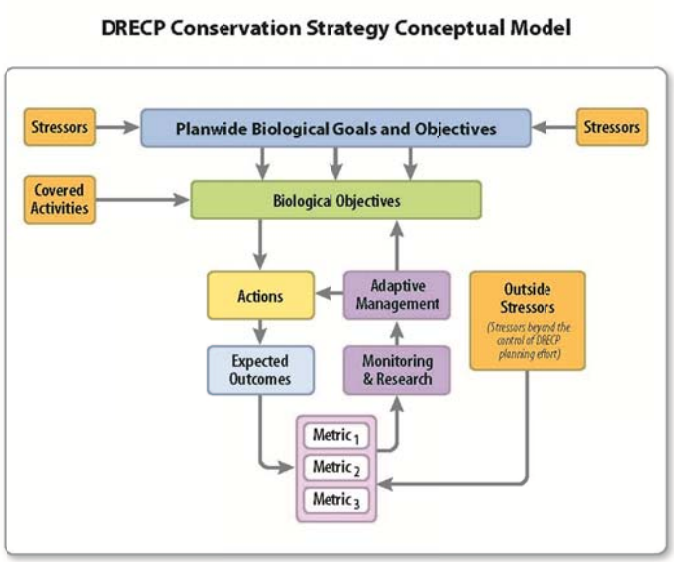

Figure A-1. DRECP Conservation Strategy Conceptual Model

2.1 Overall Architecture

As shown in Figure A-1, the conceptual model consists of three basic tiers that reflect different aspects of plan development and implementation. The first tier, shown in the first three rows in Figure A-1, involves identifying overarching goals (Global/Planwide Goals), identifying stressors or threats to the species, articulating Covered Activities, and then establishing specific biological goals and objectives that reflect the Planwide Goals, Stressors, and Covered Activities. The second tier, shown as a yellow box in Figure A-1, involves formulating actions or conservation measures (including reserve design) and assessing the expected outcomes associated with those actions. The third tier, shown in purple and blue in Figure A-1, involves monitoring and adjustments during implementation through the adaptive management program, including potential revisions to the conservation measures and/or adjustments to the biological goals and objectives. Each element of the conceptual model is described in more detail below.

2.2 Global/Planwide Goals

Broad plan goals established in the DRECP Planning Agreement as well as appropriate existing species recovery plan goals. Overall DRECP program goals, as outlined in the Planning Agreement include:

- Provide for the long-term conservation and management of Covered Species within the Planning Area
- Preserve, restore, and enhance natural communities and ecosystems that support Covered Species within the Planning Area

2.3 Stressors

Stressors are physical, chemical, or biological factors (or conditions) that affect covered species, natural communities, and/or important ecosystem processes. The precise contribution of each stressor to a species' population may be uncertain and there may be disagreement regarding which stressors are having the biggest affect. In many case stressors interact and it may be a combination of various stressors that are affecting a species. Describing the stressors (and assumptions about them) is an important step in constructing a conservation plan and in managing adaptively as the plan is implemented. For example, clear statements regarding where a stressor occurs, which species it impacts, and how certain we are that the stressor is important will help focus DRECP and prioritize conservation measures. Some stressors may be beyond our control (e.g. annual weather patterns). Similarly, some problems may be beyond the geographical or legal scope of any given conservation plan. These are referred to as "*Outside Stressors*" in the conceptual model.

2.4 Covered Activities

Development activities that will be covered under the permit. The list of Stressors (including Outside Stressors) and Covered Activities are used to inform the Biological Goals and Objectives.

2.5 Biological Goals and Objectives

Identify the plan's intent to contribute to the Global Goals and Objectives. Specific definitions for goals verses objectives are provided below.

- *Biological Goals*: Broad guiding principles for the conservation strategy that define the overall vision of the Plan. Biological goals are typically qualitative.
- *Biological Objectives*: Conservation targets or desired conditions. They articulate a desired outcome resulting from implementation of the Plan's conservation measures. Objectives provide a basis for assessing whether the conservation measures will cumulatively achieve the Plans Goals. To the extent feasible, objectives should be measurable and quantitative.

2.6 Actions

Specific actions implemented to achieve the biological goals and objectives. Conservation measures should be described in terms of their relation to identified stressors and how they would be expected to benefit natural communities and covered species. The collection of all conservation measures reflects the overall "*Conservation Strategy*".

2.7 Expected Outcomes

Expected results of implementing the conservation measures. In order to understand the value of each action, and to assess the overall conservation strategy, the planning process will include various tools and analyses to make detailed and, where possible, quantitative estimates of expected outcomes from each conservation measure.

2.8 Metrics

Specific attributes that will be measured to assess the performance of the conservation measures. Several metrics may be established for each conservation measure. Metrics will feed into the overall monitoring program.

2.9 Monitoring and Research

Implementation activities intended to evaluate performance of the plan and develop new information that can be used to improve plan implementation through the adaptive management program. Information gathered from monitoring and research will be synthesized and evaluated to assess the performance of the overall conservation strategy.

2.10 Adaptive Management

Process for assimilating monitoring and research data and assessing the need to potentially adjust conservation measures.

3.0 Application to Plan Development

How the DRECP Conservation Strategy Conceptual Model will be applied to plan development is shown graphically in Figure A-2 on the next page. The figure shows when different elements of the conceptual model will be engaged through the planning process and how they relate to specific plan deliverables. Figure A-3, shows an example of how the various elements of the conceptual model would be applied to a particular species.

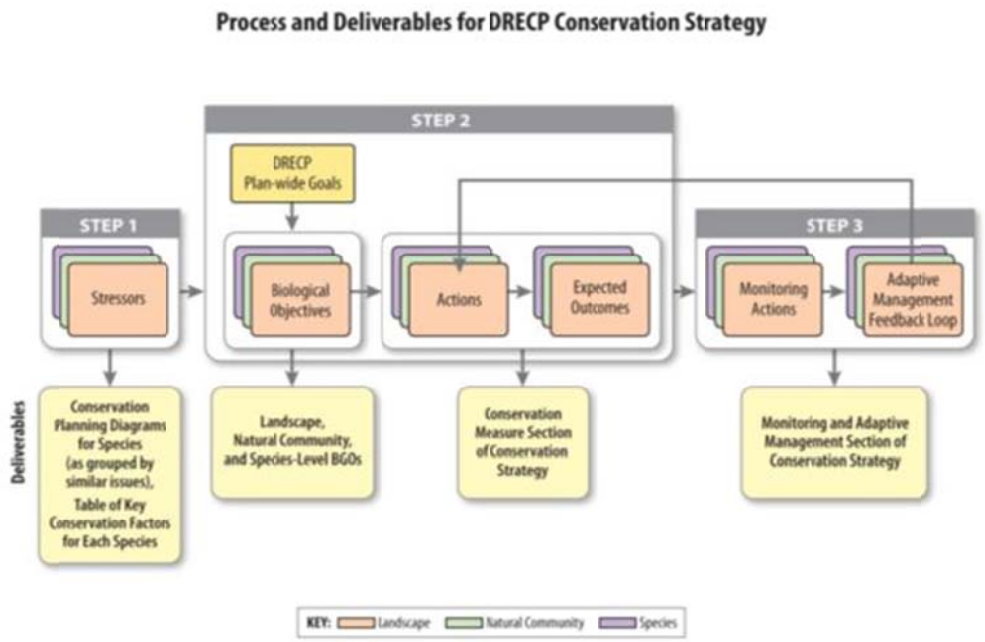

Figure A-2. Process and Deliverables for DRECP Conservation Strategy

Comment [EB23]: TNC recommends the addition of an arrow indicating that the Adaptive Management Feedback Loop may cause/require changes in Biological Objectives, as well as changes in Management Actions.

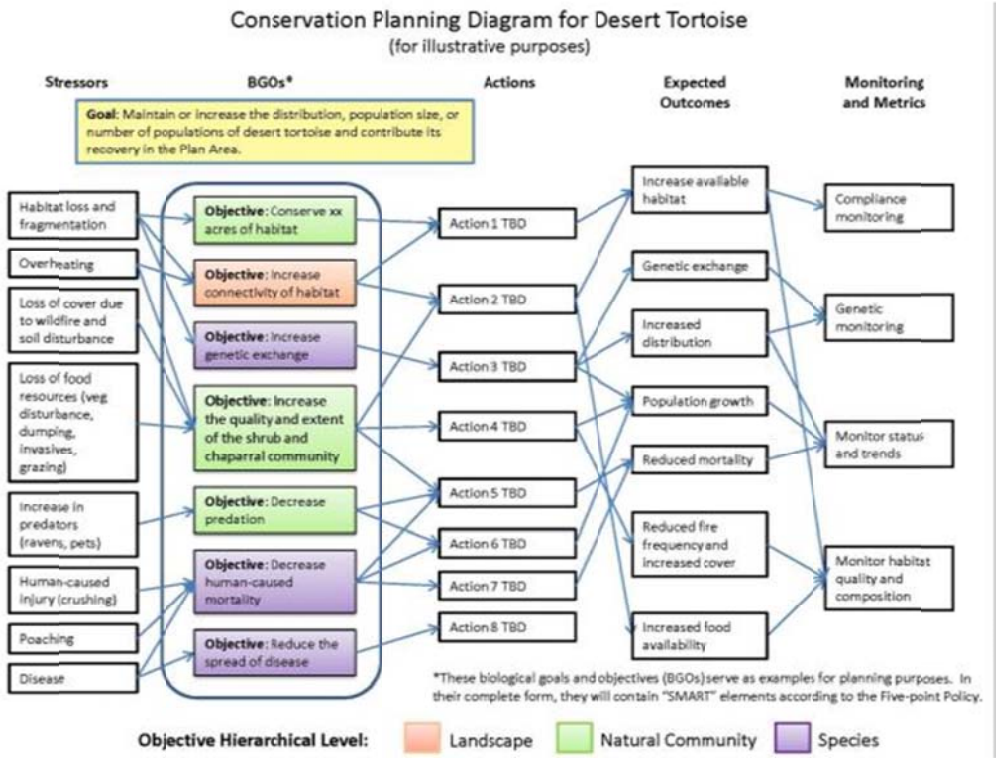

Figure A-3. DRECP Conservation Planning Conceptual Diagram for Desert Tortoise

Appendix B
Factors Critical to Species and Community Conservation

TableB-1. Summary of Key Conservation Factors for DRECP Covered Species based on Natural Communities, Landscape and 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 Endemics				
Amargosa beardtongue	• Scrub and Chaparral community • Woodland community	• 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	• Host to the silvery blue butterfly (*Glaucopsyche lygdamus*) • Pollination	• Habitat degradation and fragmentation • Road expansion • Cattle and over-grazing • Mine tailings and trash • Off-highway vehicle use • Human activity/trampling
Amargosa niterwort	• Wetlands community	• Endemic to Carson Slough and Ash Meadows • Sub-regional habitat connectivity within DRECP Plan Area	• Moist alkaline soils • Subsurface irrigation	• Hydrological alteration[2] • Climate change[2] • Soil disturbance (soil crust)[2] • Development (road construction) • Mining (mineral) • Trampling (wild horses)[2] • Recreation (OHVs)[2] • Invasive plants[2]

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Amargosa vole	• Wetlands community	• Endemic to Amargosa River • Sub-regional habitat connectivity within DRECP Plan Area	• Marsh habitat and hydrology	• Habitat loss and/or degradation (burning, grazing, development of marsh habitat)[2] • Hydrological alteration (diversions, channelization, barriers to natural springs)[2] • Invasive plants (tamarisk)[2] • Climate change[2] • Predation (cats) • Competition (potentially house mouse)
Ash meadows gumplant	• Scrub and Chaparral community • Grassland community • Rocky, Barren, and Unvegetated community	• Endemic to mesic meadows within Carson Slough • Sub-regional habitat connectivity within DRECP Plan Area (?)	• Standing water or high groundwater levels and areas with sun exposure • Fine-textured alkali and alkali clay soils (?)	• Habitat fragmentation[3] • Invasive plants (tamarisk)[2] • Hydrological alterations (surface and ground water reductions)[2] • Climate change[2] • Mining (clay) • Trampling (wild horses)[2] • Recreation (OHVs)[2]

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Bats				
California leaf - nosed bat	• Mines and Caves • Riparian community • Scrub and Chaparral community	• 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.	• Inter-specific competition • Management of desert riparian communities, including hydrology and species composition, is important for maintaining a diverse bat community.	• 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
Pallid bat	• Rocky, Barren, and Unvegetated Community • All land covers (except developed and disturbed)	• Widespread throughout the western United States • Inhabits rocky outcrops, cliffs, and spacious crevices with access to open habitats for foraging	• Day roost selection, fidelity, and liability (flexibility) and social roosting • Ectoparasites • Foraging and food partitioning mechanisms • Lighting • Predation	• 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). • Predation by urban-related predators • Wind energy facilities

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Townsend's big -eared bat	• Abandoned mines • Woodland community • Forest community • Riparian community • Scrub and Chaparral community	• 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.	• Inter-specific competition • Lighting may affect predator-prey relationships among bats	• Human disturbances of roost sites • Reduced foraging habitat from agricultural conversion • Pesticides • Wind energy facilities
Western mastiff bat	• Rocky, Barren, and Unvegetated Community • Woodland community • Forest community • Scrub and Chaparral community Grassland community • Agriculture	• It is widespread in the southwestern United States, the northern portion of Baja California, Mexico, and south into central mainland Mexico.	• Inter-specific competition	• 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 • 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
Hoary bat	• Woodland community • Forest community • Riparian community • Scrub and Chaparral community Wetland community	• Most widespread of all North American bat species.	• Inter-specific competition • Lighting may affect predator-prey relationships among bats • Maternity roost site selection	• 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

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Western red bat	• Woodland community • Forest community • Riparian community • Scrub and Chaparral community	• 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.	• Inter-specific competition • Lighting may affect predator-prey relationships among bats	• 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
Carbonate Plants				
Cushenbury buckwheat	• Woodland community • Scrub and Chaparral community	• Probably endemic to the San Bernardino Mountains • Sub-regional habitat connectivity	• Intact natural carbonate substrates (primarily limestone) • Open areas with low accumulation of organic material	• Mining (including dust)[2] • Recreation (OHVs, camping, firewood collection, and dust generation)[2] • Fire suppression[2] • Climate change[2] • Lighting (pollinators and seed dispersers)
Cushenbury milk-vetch	• Woodland community • Scrub and Chaparral community	• Endemic to the San Bernardino Mountains • Sub-regional habitat connectivity	• Intact natural carbonate substrates (both limestone and dolomite) • Open areas with low accumulation of organic material	• Mining (including dust)[2] • Recreation (OHVs, camping, firewood collection, and dust generation)[2] • Fire suppression[2] • Climate change[2] • Lighting (pollinators and seed dispersers)
Cushenbury oxytheca	• Woodland community • Scrub and Chaparral community	• Endemic to the San Bernardino Mountains • Sub-regional habitat connectivity	• Intact natural carbonate substrates (both limestone and dolomite) • Open areas with low accumulation of organic material	• Mining (limestone) (including dust)[2] • Lighting (pollinators and seed dispersers) • Invasive plants[2] • Development (powerline maintenance, hydrolelectric development)

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Parish's daisy	• Woodland community • Scrub and Chaparral community	• 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	• Carbonate alluvium • Pollination	• Mining (limestone) (including dust)[2] • Lighting (pollinators and seed dispersers) • Recreation (camping, firewood collection, and dust generation)[2] • Fire suppression[2] • Climate change[2] • Energy development • Road and residential development
San Bernardino Mountains dudleya	• Woodland community • Forest community	• Known only from the San Bernardino Mountains.	• Associated with limited pebble plain habitat	• Development • Foot traffic • Limestone mining • Vehicles. • Non-native plants • Illegal dumping
Desert Scrub and Chaparral				
Alkali mariposa-lily	• Scrub and Chaparral community • Wetland community	•	• Hydrology (periodic natural inundation)	• Urbanization and road construction • Grazing and trampling • Hydrological alternations and water diversions that lower the water table • Military operations • Dumping • Grading

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Barstow woolly sunflower	• Scrub and Chaparral community • Grassland community • Rocky, Barren, and Unvegetated community	• Endemic to the west-central Mojave Desert • Sub-regional habitat connectivity	• Bare areas with little soil that frequently contain a shallow subsurface caliche layer	• Development activities (energy and housing, highway and road improvements, pipelines) • Grazing (sheep)2 • Recreation (OHVs)[2] • Mining • Other human activities (dumping)[2]
Desert cymopterus	• Scrub and Chaparral community • Rocky, Barren, and Unvegetated community	• Primarily Rogers Dry Lake, Harper Dry Lake, Cuddeback Dry Lake, and Superior Dry Lake basins • Sub-regional habitat connectivity (?)	• Sandy soils on alluvial fans and basins and stabilized sand fields • Precipitation	• Habitat loss and fragmentation[3] • Development (oil, gas, utilities, renewable energy)[2] • Recreation (OHVs)[2] • Grazing (sheep)[2] • Climate change[2]
Flat-tailed horned lizard	• Dune community • Scrub and Chaparral community	• Endemic to southeastern California within 3 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 sub-divided by Interstates 8 and 10)	• Stabilized sand dunes (species tends to avoid active and unstable wind-blown dunes)	• 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 plants[2] • Wildfire[2] • Pesticides and contaminants • Grazing (cattle)[2]

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Little San Bernardino Mtns. linanthus	• Scrub and Chaparral community	• 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.	• Hydrology • Competition for resources from invading non-native species	• Urbanization • Off-Highway Vehicle (OHV) use • Flood control activities • Illegal dumping • Invasive non-native species • Increased fire frequency • Ground water loss • Soil erosion
Mojave monkeyflower	• Scrub and Chaparral community • Rocky, Barren, and Unvegetated community	• Endemic to west-central Mojave Desert, primarily Barstow southeast to Newberry Springs • Sub-regional habitat connectivity	• Precipitation • Pollination and dispersal	• Development (solar, wind and roads) • Mining • Grazing[2] • Invasive plants[2] • Habitat Fragmentation/potential inbreeding • Climate change[2] • BLM land exchanges
Orocopia sage	• Scrub and Chaparral community	• Restricted to extreme southeastern California, in Imperial, Riverside, and San Bernardino counties	• Pollination • Hydrology (associated with alluvial fans adjacent to desert washes)	• Increased dust levels resulting from vehicle movement or explosions of ordnance • Off-highway vehicles • Invasive species • Human trampling • Changes to hydrological regimes • Threats to pollinators

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Parish's phacelia	• Scrub and Chaparral community	• 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.	• Associated with clay and alkaline soils on playas and alkali sinks • Pollination • Hydrology	• Military expansion and activities • Off-road vehicles • Access road construction • Powerlines • Overgrazing by cattle and horses
Triple-ribbed milk-vetch	• Scrub and Chaparral community	• Limited to western portion of DRECP 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	• Barren rocky slopes and ridges • Precipitation (?) • Pollination/dispersal (deme populations, waifs) (?)	• Development (construction/maintenance of gas and oil pipelines, residential) • Recreation (OHVs)[2] • Fire suppression[2] • Flooding[2] • Climate change[2]
White-margined beardtongue	• Scrub and Chaparral community • Dune community	• 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.	• Pollination • Vegetation structure of habitat (more likely in canopy inter-spaces) • Fluvial processes and sediment transport	• Wind and solar project development • Military expansion and activities • Highways, roads, and off-road vehicles • Powerlines and pipelines • Trampling

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Dune				
Algodones Dunes sunflower	• Dune community	• Mainly endemic to Algodones Dunes system and other isolated areas • Sub-regional habitat connectivity	• Aeolian processes/dune systems • Accumulated sand microhabitat	• Recreation (off-highway vehicles (OHVs)) • Other anthropogenic disturbances • Sand transport alteration[2]
Mojave fringe-toed lizard	• Dune community • Scrub and Chaparral community	• 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	• Predation • Rodent burrows for protection from predators and thermal protection • Potentially competition for food with the zebra-tailed lizard (*Callisaurus draconoides*) • Sand movement	• Off-road vehicles • Disruption of the natural movement of sand caused by roads, windbreaks, and other man-made alterations • Habitat loss caused by urban development.
Peirson's milk-vetch	• Dune community	• Endemic to Algodones Dunes • Local habitat connectivity	• Aeolian processes/active dune systems; slopes less than 20-30% • Precipitation • Pollination (white-faced digger bee)	• Recreation (OHVs and associated development, trampling)[2] • Climate change/hydrological alterations[2] • Grazing[2] • Invasive plants[2] • Other development

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Sand food	• Dune community • Scrub and Chaparral community	• Occurs in the Sonoran Desert in southeastern Imperial County, as well as western Arizona and northwestern Mexico	• Root parasite primarily dependent on perennial desert shrub hosts • Dune stability • Non-native plants •	• 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
Wiggins' croton	• Dune community	• Primarily limited to southeastern Imperial County, including Algodones Dunes • Sub-regional habitat connectivity	• Stabilized or partially stabilized sand dunes • Pollination (?)	• Recreation (OHVs)[2]
Fish				
Desert pupfish	• Wetland Community and Riparian Community (shallow water of desert springs, small streams, and marshes)	• Occurs in desert springs, marshes, and tributary streams of the lower Gila and Colorado River drainages in Arizona, California, and Mexico.	• Hydrology • Predation, competition, and behavioral interference from non-native fish and invasive snails • Natural weather patterns influence cycles of expansion and contraction	• 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

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Mohave tui chub	• Wetland Community and Riparian Community (Lacustrine Ponds/Pools)	• Restricted to the Mojave River.	• Hydrology • Water quality and quantity • Adaptation to lacustrine conditions rather than riverine • Tapeworms • Predation, competition, and habitat alteration from non-native plants and wildlife	• 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 Mohave River • A parasitic Asian tapeworm was found in Lake Tuendae • Non-native plant and wildlife species • Inadequacy of existing regulatory mechanisms
Owens pupfish	• Wetland Community and Riparian Community (Warm, clear, shallow aquatic habitat)	• Restricted to the Owens Valley portion of the Owens River in Mono and Inyo counties, California. • Small, isolated populations	• Predation and competition from non-native species • Hydrology • Habitat alteration from emergent vegetation	• Non-native predators • Habitat modification for water diversions that altered Owens River flows • Cattail (*Typha* spp.) encroachment and other emergent vegetation • Extinction from stochastic (random) demographic, genetic, and catastrophic environmental events because populations are small and isolated.

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Owens tui chub	• Wetland Community and Riparian Community (Low-velocity waters)	• Endemic to the Owens Basin (Owens Valley, Round Valley, and Long Valley) of Inyo and Mono Counties, California. • Small, isolated populations	• Predation and competition from, and hybridization with, non-native aquatic predators and other tui chub subspecies and hybrids • Requires aquatic vegetation and gravel substrates for spawning • Hydrology and water quality • Alteration of aquatic habitat by invasive emergent plants • Disease	• Extensive habitat destruction and modification • Invasive emergent plants that alter aquatic habitat • Non-native invasive predators • Poor water quality • Inappropriate water quantity (including 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.
Grassland and Agriculture				
Greater sandhill crane	• Wetland community • 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

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Mountain plover	• Grassland community • Agriculture	• Highly mobile/able to access disjunct wintering habitats • Migration routes	• None identified in literature	• Wintering habitat loss and degradation (urban development) • Collisions (farm equipment) • Pesticides • Human disturbance
Swainson's hawk	• Grassland community • Riparian community • Agriculture	• Highly mobile/able to access disjunct foraging habitats and nesting habitat in Antelope Valley • Migration routes	• Hydrology/riparian systems	• Nesting and foraging habitat conversion • Insecticides/pesticides • Wildfire[2] • Climate change[2] • Recreation (OHVs)[2] • Human disturbances • Interactions/competition with ravens
White-tailed kite	• Grassland community • Agriculture • Woodland community • Forest community • Scrub and Chaparral community	• 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.	• Prey availability and abundance • Competition for nest sites with other raptors and corvids •	• 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

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Wide-Ranging Species				
Bighorn sheep	• Grassland community • Scrub and Chaparral community • Riparian community • Woodland community • Forest community	• 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	• Water resources near escape terrain to support reproduction • Available nutritious forage to support reproduction	• Habitat loss and/or degradation[2] • 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)
Desert tortoise	• Scrub and Chaparral community • Grassland community	• Widespread throughout DRECP Plan Area • Sub-regional and regional habitat connectivity throughout range in Plan Area • Movement affected by incompatible land uses and available refuge (mainly suitable burrow sites)	• Soil conditions (soil digability) suitable for burrows • Forage quality • Temperature and reproduction	• Habitat loss and fragmentation (development and agriculture)[3] • Predation (ravens, dogs, coyotes) • Disease • Grazing[2] • Recreation (OHVs)[2] • Other human activities (military activities, collecting, trash and garbage) • Wildfires[2] • Invasive plants[2] • Climate change[2]

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Mohave ground squirrel	• Scrub and Chaparral community • Rocky, Barren, and Unvegetated community	• Endemic to Western Mojave • Sub-regional connectivity, including dispersal habitat	• None identified in literature	• Habitat loss and fragmentation (urban, agriculture, military, energy, and transportation)[3] • Recreation (OHVs)[2] • Grazing (cattle and sheep)[2] • Invasive plants[2] • Climate change (especially prolonged drought)[2] • Predation (cats, dogs and ravens) • Rodenticides/pesticides
Western burrowing owl	• Grassland community • Scrub and Chaparral community • Rocky, Barren, and Unvegetated community • Agriculture • Developed and Disturbed Areas	• Highly mobile/able to access disjunct nesting and foraging habitats • Migration and dispersal routes	• Suitable burrow sites (e.g., ground squirrel burrows) and prey	• Habitat conversion (urban and non-compatible agriculture, flood control) • Collisions (vehicles, wind turbins) • Pesticides and other contaminants • Invasive plants[2] • Climate change[2] • Rodent controls (especially ground squirrels) • Predation by dogs and cats
Narrow Endemic Species				
Barefoot gecko	• Rocky, Barren and Unvegetated community	• Endemic to rocky/boulder habitat in eastern San Diego and western Imperial counties • Sub-regional habitat connectivity	• None identified in literature	• Recreation (camping, hiking, rock hounding, collection and habitat destruction by hobbyists and commercial collectors) • Development (highway construction) • Mining

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Inyo California towhee	• Riparian community • Scrub and Chaparral community	• Endemic to southern portion of Argus Range • Local habitat connectivity within DRECP Plan Area	• Hydrology/dense riparian thickets	• Habitat loss and/or degradation (water diversion, trampling by burros, horses, and cattle)[2] • Recreation (OHVs, noise, light, general activity)[2] • Climate change[2]
Kelso Creek monkeyflower	• Scrub and Chaparral community • Woodland community	• Limited to the southern Sierra Nevada Foothills and western edge of the Mojave Desert within the Kern River drainage in the Lake Isabella area	• Competition from non-native species • Hydrology	• Urbanization • Off-highway vehicles • 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	• Scrub and Chaparral community • Woodland community	• 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.	• 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	• Development of private land for wind turbine generators and other construction • Vehicles • Stochastic extinction events • Grazing • Logging and mining

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Lane Mountain milk-vetch	• Scrub and Chaparral community	• Endemic to Brinkman Wash, Coolgardie Mesa, Paradise Valley, and NASA Goldstone north of Barstow • Sub-regional habitat connectivity	• Host shrubs • Thin soils (Jurassic or Cretaceous granitic bedrock) • Hydrology and precipitation • Pollination •	• Habitat loss and degradation (surface mining, military training) • Recreation (OHVs)[2] • Climate change (drought and loss of host shrubs)[2] • Wildfire[2] • Invasive plants[2]
Owens Valley checkerbloom	• Scrub and Chaparral community • Riparian community • Rocky, Barren, and Unvegetated community • Woodland community	• Endemic to southern Owens Valley • Local habitat connectivity among alkali meadow and spring communities scattered along about 125 kilometers of the Owens River drainage	• Moist alkaline meadows and seeps and chenopod (saltbush) scrub • Fine, sandy loam with alkaline crusts • Pollination	• Hydrological alteration (diversion of Owens River and groundwater pumping)[2] • Climate change[2] • Grazing (cattle)[2] • Competition (rhizomatous grass species and upland rubber rabbitbrush)[2] • Meadow succession[2] • Invasive plants (Russian olive, knapweed)[2]
Parish's alkali grass	• Wetland community (Alkali springs and seeps)	• 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	• Hydrology/Soil Moisture • Invasion by non-native plant species	• 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

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Piute Mountains jewel-flower	• Woodland community • Forest community	• Restricted to the Piute Mountains of southern High Sierra Nevada in Kern County	• Pollination	• Maintenance of wind energy facilities • Roads and off-highway vehicle use • Construction • Cattle grazing • Logging or mining
Sodaville milk-vetch	• Wetland community (meadows and seeps)	• Endemic to Death Valley/Big Sand Spring in DRECP Plan Area • Local habitat connectivity	• Hydrology associated with meadows and seeps and moist, open hummocks, flats, and drainages near cool springs • Pollination/dispersal (?)	• Climate change/ hydrological alterations[2] • Trampling (burros and livestock)[2] • Development • Water diversions[2] • Vehicles[2] • Extinction for stochastic impacts related to small distribution and abundance
Thorne's buckwheat	• Woodland community	• Endemic to Fourth of July Canyon in the New York Mountains within Mojave National Park • Local habitat connectivity	• Soil association with copper (?) • Pollination/dispersal (?)	• None identified in literature

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
(Mountain and Foothill) Woodland				
Bakersfield cactus	• Grassland community • Riparian community • Scrub and Chaparral community • Woodland community	• Restricted to a limited area of central Kern County near Bakersfield in the southern San Joaquin Valley	• Competition with non-native grasses for water • Pollination	• Residential and urban as well as oil development, • Off-road vehicle use • Sand mining • Competition from non-native grasses. • Climate change • Air pollution (including elevated nitrogen deposition) • Loss of pollinators • Flooding • Loss of genetic diversity
Charlotte's phacelia	• Scrub and Chaparral community • Woodland community	• This endemic species occurs in the desert-facing foothills of the Sierra Nevada and the adjacent El Paso Mountains, in Tulare, Inyo, and Kern counties.	• Grazing cattle may play a role in seed dispersal, but are also a potential threat	• Grazing • Off-road vehicles • Trampling and collecting by hikers • Mining • Military expansion and activities
Coast horned lizard	• Scrub and Chaparral community • Grassland community • Woodland community • Forest community	• 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	• Requires sandy soils • Availability and abundance of native ant prey (ant specialists) • Invasion of non-native ants • Predation	• Urbanization • Disturbance and decline in vegetative density • Vehicles • Pets increase predation pressure • Expansion of the Argentine ant • Wildland fires • Collecting for pets •

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Mojave tarplant	• Riparian community • Scrub and Chaparral community	• 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	• Hydrology/seasonally saturated clay and silty soils (seeps and along grassy swales and intermittent creeks) • Precipitation • Pollination (?)	• Hydrological alterations[2] • Recreation (OHVs, (trampling/crushing and soils disturbance)[2] • Climate change[2] • Grazing (livestock trampling at water sources)[2] • Development • Road maintenance
Spanish Needle onion	• Woodland community	• 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 Mountains area • Found in remote, rugged areas	• Soil associations (grows in rocky soil and the edge of rock outcrops and talus derived from volcanic and metamorphic rock)	• Wind energy development • grazing • Off-highway vehicle use • Road/trail construction • Collection
Tehachapi pocket mouse	• Grassland community • Woodland community	• Known from a few scattered, isolated localities in the Tehachapi Mountains	• Environment modification via burrow digging • Predation	• Habitat fragmentation and isolation due to increased urbanization and agricultural intensification • Isolation of populations makes it vulnerable to local extirpation • Surface disturbance • Livestock grazing

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Tehachapi slender salamander	• Riparian community • Woodland community	• 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)	• Talus and rocky slopes and moist habitats • Precipitation	• Climate change (especially prolonged drought)[2] • Development and road construction • Mining • Grazing[2] • Flood control projects[2] • Feral pigs[2]
Tracy's eriastrum	• Scrub and Chaparral community • Woodland community	• Limited to two locations in Kern County in the DRECP; more widespread west of DRECP • Sub-regional habitat connectivity to populations west of DRECP Plan Area	• Associated with or tolerant of disturbances (?) (e.g., occurrences associated with grazing or road-blading) • Pollination/dispersal (?)	• Competition with other plant species (may not tolerate shading)[2] • Vehicles[2] • Road maintenance (?) • Development • Grazing (?)[2]
Raptors				
American peregrine falcon	• Wetland community	• Highly mobile/able to access disjunct resource areas • Migration routes	• None identified in literature	• Collisions and electrocutions • Pesticides and contaminants (e.g., organochlorines) • Predation (young by ravens and raccoons) • Human disturbance and/or pet disturbance (nest sites)

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Bald eagle	• Riparian community • Forest community • Woodland community • Wetland community	• Highly mobile/able to access disjunct resource areas • Migration routes	• Large, open water resources with nearby roosting and perching sites	• Habitat loss (suitable roosting/perching sites near foraging areas) • Pesticides and contaminants (organochlorines)[2] • Recreation • Mining • Logging[2]
California condor	• Scrub and Chaparral community • Grassland community • Rocky, Barren, and Unvegetated community	• Highly mobile/able to access disjunct foraging, nesting, and roosting areas • Traditional flight corridors (?)	• None identified in literature	• Contaminants (lead contamination of food resources, ingestion of microtrash and other contaminants such as antifreeze) • Collisions and electrocutions (powerlines, towers, and other tall structures) • Other human activities (disturbances of nesting and historic roosting areas, attraction to human activities due to habituation)
Golden eagle	• Forest community • Woodland community • Scrub and Chaparral community • Grassland community • Rocky, Barren, and Unvegetated community	• Highly mobile/able to access disjunct foraging, nesting, and roosting areas • Seasonal migration patterns	• None identified in literature	• Human activities (disturbance of nest sites) • Collisions and/or electrocutions (towers, powerlines, wind turbines, and other structures and vehicles) • Contaminants (lead contamination of prey) • Wildfires (impacts on prey densities)

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Red Rock Endemics				
Red Rock poppy	• Scrub and Chaparral community	• Known only from the Rand and El Paso mountains in Kern and San Bernardino counties in the western Mojave Desert	• Restricted to certain soil types (primarily associated with volcanic tuff)	• Off-Highway Vehicle (OHV) use
Red Rock tarplant	• Scrub and Chaparral community	• Endemic Red Rock Canyon and Last Chance Canyon • Local habitat connectivity	• Hydrology associated with seeps and seasonally moist substrates along ephemeral streams (sandy and gravelly washes), low ridges, and road shoulders • Pollination (?)	• Recreation (OHVs, camping and vehicle parking) • Non-native plans (tamarisk) • Climate change/ hydrological alterations[2]

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Riparian				
Arroyo toad	• Riparian community	• Contiguous and connected stream courses with contiguous adjacent uplands	• Hydrology (surface and ground water) • Geomorphology (e.g., sediment transport and deposition) • Natural flood disturbance regimes • Water quality	• Hydrological and geomorphological alterations (dams (including beaver dams on Mojave River), channelization, diversions)[2] • Invasive plant species (tamarisk, giant reed, ice plant, pampas grass)[2] • Pesticides and contaminants (water quality impacts)[2] • Climate change[2] • Predation (bullfrogs, African clawed frogs, crayfish, non-native fish, Argentine ant, raccoons, striped skunk) • Grazing[2] • Recreation (OHVs, fishing, camping, waterplay)[2] • Mining (sand, gravel and recreational gold mining)[2]
Bank swallow	• Riparian community	• Highly mobile/able to access disjunct resource areas • Migration routes	• 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	• 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]

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Bell's vireo	• Riparian community	• Highly mobile/able to access disjunct resource areas • Migration routes	• Hydrology (surface and ground water) • Geomorphology (e.g., sediment transport and deposition) • Natural flood disturbance regimes	• Habitat loss and/or degradation[2] • Hydrological and geomorphological alterations[2] • Invasive plants (tamarisk, giant reed, pampas grass)[2] • Grazing[2] • Recreation (OHVs)[2] • Climate change[2] • Cowbird parasitism • Predation (Argentine ants, domestic and feral cats and other mesopredators)
Elf owl	• Scrub and Chaparral community • Riparian community	• Highly mobile/able to access disjunct resource areas • Migration routes	• Hydrology/dense riparian habitat and honey mesquite bosque habitat • Nest cavities excavated by woodpeckers (primarily acorn and Gila woodpeckers and flickers)	• 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 change[2]
Gila woodpecker	• Scrub and Chaparral community • Riparian community	• Restricted to Lower Colorado River and Brawley areas • Capable of short-distance seasonal movements (non-migratory) • Sub-regional habitat connectivity	• Riparian woodlands, old growth xeric woodlands, and uplands with large, columnar cacti (e.g., giant saguaro) • Hydrology	• Habitat loss and/or degradation (agriculture, urban, development, water diversions)[2] • Competition (European starlings)[2] • Invasive plants (tamarisk)[2] • Wildfires[2] • Climate change[2]

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Gilded flicker	• Scrub and Chaparral community • Riparian community • Woodland community	• Restricted to lower Colorado River • Sedentary and territorial (i.e., lack of even seasonal movement) • Sub-regional habitat connectivity	• Large columnar cacti (giant saguaro) and riparian woodlands • Hydrology	• 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 plants[2] • Climate change[1]
Western yellow-billed cuckoo	• Riparian community	• Highly mobile/able to access disjunct nesting habitat • Migration routes	• Large, contiguous blocks of dense riparian habitat • Hydrology	• 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]
Willow flycatcher	• Riparian community	• Highly mobile/able to access disjunct nesting and foraging habitats • Migration routes	• Hydrology (surface and ground water)	• Habitat loss and fragmentation[2] • Altered hydrology and geomorphology (dams and reservoirs, water diversion and groundwater pumping, channelization, flood control)[2] • Invasive plants (tamarisk, giant reed)[2] • Wildfire[2] • Grazing[2] • Climate change[2] • Cowbird parasitism

Species	Natural Community[1]	Key Landscape Issues	Key Ecological Processes Issues	Known or Potential Environmental Stressors and Threats
Wetlands				
California black rail	• Wetland community • Riparian community	• Local habitat connectivity (including uplands and open water) between riparian marshes and wet meadows (movement by running or short distance swimming) • Potential dispersal between disjunct habitat, but undocumented	• Marsh and wet meadow with surface water or high ground water levels and low daily water fluctuations •	• 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] • Climate change[2] • Invasive plants (tamarisk)[2] • Predation (non-native rats cats, and red fox)
Tricolored blackbird	• Riparian community • Wetland community • Agriculture • Grassland community	• 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.	• Predation	• 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
Yuma clapper rail	• Riparian community • Wetland community	• Primarily limited to Lower Colorado River and Salton Sea in DRECP 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	• Hydrology (surface and ground water) • Seasonal flooding/scouring • Timing of prey availability (crayfish)	• 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)

Table B-2. 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	• North American warm desert dunes and sand flats	• Sub-regional habitat connectivity • Local habitat connectivity	• Aeolian processes • Accumulated sand microhabitat • Stabilized or partially stabilized sand dunes • Precipitation • Pollination	• Sand transport alteration • Grazing • Recreation (OHVs and associated development, trampling) • Invasive plants • Climate change, hydrological alterations	• Algodones Dunes sunflower (Dune Group) • Peirson's milk-vetch (Dune Group) • Wiggin's croton (Dune Group) • Pallid bat (Bats group) • Mojave fringe-toed lizard (Dune Group) • White-margined beardtongue (Desert Scrub and Chaparral Group) • Sand food (Dune Group) • Flat-tailed horned lizard (Desert Scrub and Chaparral Group)
Wetlands	• Great Basin cool semi-desert alkali basin • Open Water • Southwestern North American salt basin and high marsh • Arid west freshwater emergent marsh • Western North American Freshwater Marsh	• Local habitat connectivity for residents • Sub-regional habitat connectivity (stopover habitats for migrants and winter residents)	• Surface and ground water hydrology • Daily and season water fluctuations • Water quality	• Habitat loss and degradation • Pesticides and organochlorines • Climate change • Invasive plants	• American peregrine falcon (Raptors Group) • Bald eagle (Raptors Group) • California black rail (Wetlands Group) • Yuma clapper rail (Wetlands Group) • Pallid bat (Bats group) • Hoary bat (Bats group) • Alkali mariposa-lily (Desert Scrub and Chaparral Group) • Greater sandhill crane (Grassland and Agriculture Group) • Tricolored blackbird (Wetlands Group) • Desert pupfish (Fish Group) • Mohave tui chub (Fish Group) • Owens pupfish (Fish Group) • Owens tui chub (Fish Group)

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
					• Amargosa niterwort (Amargosa Endemics group) • Amargosa vole (Amargosa Endemics group) • Parish's alkali grass (Narrow Endemic Species Group) • Sodaville milk-vetch (Narrow Endemic Species Group)
Riparian	• 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 scrub	• Local habitat connectivity (within stream) • Sub-regional habitat connectivity (stopover habitats for migrants and sub-regional dispersers)	• 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	• 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 • Recreation (OHVs, fishing, camping, waterplay) • Mining (sand, gravel and recreational gold mining)	• Arroyo toad (Riparian Group) • Bald eagle (Raptors Group) • Bank swallow (Riparian Group) • Bell's vireo (Riparian Group) • California black rail (Wetlands Group) • Elf owl (Riparian Group) • Gila woodpecker (Riparian Group) • Gilded flicker (Riparian Group) • Inyo California towhee (Narrow Endemic Species Group) • Mojave tarplant (Woodland Group) • Owens Valley checkerbloom (Narrow Endemic Species Group) • Swainson's hawk (Grassland and Agriculture Group) • Tehachapi slender salamander (Woodland Group) • Western yellow-billed cuckoo (Riparian Group) • Willow flycatcher (Riparian Group) • Yuma clapper rail (Wetlands Group) • California leaf -nosed bat (Bats group)

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
			availability • Nest cavities • Old growth xeric woodlands • Precipitation • Pollination	• Competition for nest cavities • Wildfire • Meadow succession to uplands • Competition with upland plants	• Pallid bat (Bats group) • Townsend's big -eared bat (Bats group) • Hoary bat (Bats group) • Western red bat (Bats group) • Bakersfield cactus (Woodland Group) • Tricolored blackbird (Wetlands Group) • Bighorn sheep (Wide-ranging Species Group)
Scrub and Chaparral	• 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 Dry Shrubland and Grassland • Inter-Mountain West mesic tall sagebrush shrubland and steppe • Lower bajada and fan Mojavean-Sonoran	• Sub-regional habitat connectivity	• 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)	• 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 • Competition with other plants	• Ash Meadows gumplant (Amargosa Endemics group) • Barstow woolly sunflower (Desert Scrub and Chaparral Group) • California condor (Raptors Group) • Desert tortoise (Wide-ranging Species Group) • Desert cymopterus (Desert Scrub and Chaparral Group) • Elf owl (Riparian Group) • Gila woodpecker (Riparian Group) • Gilded flicker (Riparian Group) • Golden eagle (Raptors Group) • Inyo California towhee (Narrow Endemic Species Group) • Mohave ground squirrel (Wide-ranging Species Group) • Mojave monkeyflower (Desert Scrub and Chaparral Group) • Mojave tarplant (Woodland Group) • Owens Valley checkerbloom (Narrow Endemic Species Group)

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
	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				• Red Rock tarplant (Red Rock Endemics Group) • Tracy's eriastrum (Woodland Group) • Triple-ribbed milk-vetch (Desert Scrub and Chaparral Group) • Western burrowing owl (Wide-ranging Species Group) • California leaf -nosed bat (Bats group) • Pallid bat (Bats group) • Townsend's big -eared bat (Bats group) • Western mastiff bat (Bats group) • Hoary bat (Bats group) • Western red bat (Bats group) • Alkali mariposa-lily (Desert Scrub and Chaparral Group) • Little San Bernardino Mtns. Linanthus (Desert Scrub and Chaparral Group) • Mojave fringe-toed lizard (Dune Group) • Orocopia sage (Desert Scrub and Chaparral Group) • Parish's phacelia (Desert Scrub and Chaparral Group) • White-margined beardtongue (Desert Scrub and Chaparral Group) • Sand food (Dune Group) • Kelso Creek monkeyflower (Narrow Endemic Species) • Kern buckwheat (Narrow Endemic Species) • Bakersfield cactus (Woodland Group)

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
					• Charlotte's phacelia (Woodland Group) • Coast horned lizard (Woodland Group) • White-tailed kite (Grassland and Agriculture Group) • Red Rock poppy (Red Rock Endemics Group) • Amargosa beardtongue (Amargosa Endemics group) • Cushenbury buckwheat (Carbonate Plants group) • Cushenbury milk-vetch (Carbonate Plants group) • Cushenbury oxytheca (Carbonate Plants group) • Parish's daisy (Carbonate Plants group) • Flat-tailed horned lizard (Desert Scrub and Chaparral Group) • Bighorn sheep (Wide-ranging Species Group) • Lane Mountain milk-vetch (Narrow Endemic Species Group)
Grasslands/ Other Herbaceous Communities	• California Annual and Perennial Grassland • Mediterranean California naturalized annual & perennial grassland • Southern Great Basin semi-desert grassland	• Sub-regional habitat connectivity	• Soil integrity (texture, openness, burrows)	• Habitat loss and fragmentation • Climate change • Invasive plants • Wildfire • Grazing • Trampling (wild horses) • Recreation (OHVs) • Other human activities (dumping)	• Ash meadows gumplant (Amargosa Endemics group) • Barstow woolly sunflower (Desert Scrub and Chaparral Group) • California condor (Raptors Group) • Desert tortoise (Wide-ranging Species Group) • Golden eagle (Raptors Group) • Mountain plover (Grassland and Agriculture Group) • Swainson's hawk (Grassland and Agriculture

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
				• Pesticides and contaminants	Group) • Western burrowing owl (Wide-ranging Species Group) • Pallid bat (Bats group) • Western mastiff bat (Bats group) • Bakersfield cactus (Woodland Group) • Coast horned lizard (Woodland Group) • Tehachapi pocket mouse (Woodland Group) • White-tailed kite (Grassland and Agriculture Group) • Tricolored blackbird (Wetlands Group) • Bighorn sheep (Wide-ranging Species Group)
Rocky, Barren and Unvegetated	• California Cliff, Scree, and Other Rock Vegetation • Desert Playa • North American warm desert bedrock cliff and outcrop • Sierra Nevada cliff and canyon	• Sub-regional habitat connectivity	• Soil integrity (texture, openness)	• Habitat loss and fragmentation • Climate change • Invasive species • Wildfire • Recreation (OHVs) • Mining • Grazing • Other human activities (dumping)	• Ash meadows gumplant (Amargosa Endemics group) • Barstow woolly sunflower (Desert Scrub and Chaparral Group) • California condor (Raptors Group) • Desert cymopterus (Desert Scrub and Chaparral Group) • Golden eagle (Raptors Group) • Mohave ground squirrel (Wide-ranging Species Group) • Mojave monkeyflower (Desert Scrub and Chaparral Group) • Owens Valley checkerbloom (Narrow Endemic Species Group) • Western burrowing owl (Wide-ranging Species Group)

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
					• Pallid bat (Bats group) • Western mastiff bat (Bats group) • Barefoot gecko (Narrow Endemic Species Group)
Forest	• California montane conifer forest	• Seasonal migration	•	• Logging	• Bald eagle (Raptors Group) • Golden eagle (Raptors Group) • Pallid bat (Bats group) • Townsend's big -eared bat (Bats group) • Western mastiff bat (Bats group) • Hoary bat (Bats group) • Western red bat (Bats group) • San Bernardino Mountains dudleya (Carbonate Plants group) • Piute Mountains jewel-flower (Narrow Endemic Species Group) • Coast horned lizard (Woodland Group) • White-tailed kite (Grassland and Agriculture Group) • Bighorn sheep (Wide-ranging Species Group)
Woodland	• California broadleaf forest and woodland • California Forest and Woodland • California montane conifer forest • Rocky Mountain mesic subalpline forest and woodland	• Sub-regional habitat connectivity	• Precipitation • Hydrology	• Logging • Habitat loss and degradation • Wildfire • Recreation (OHVs) • Grazing • Invasive plants • Climate change	• Bald eagle (Raptors Group) • Gilded flicker (Riparian Group) • Golden eagle (Raptors Group) • Owens Valley checkerbloom (Narrow Endemic Species Group) • Tehachapi slender salamander (Woodland Group) • Thorne's buckwheat (Narrow Endemic Species

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
	• Western Great Basin montane conifer woodland			• Competition with other plants	Group) • Tracy's eriastrum (Woodland Group) • Pallid bat (Bats group) • Townsend's big -eared bat (Bats group) • Western mastiff bat (Bats group) • Hoary bat (Bats group) • Western red bat (Bats group) • San Bernardino Mountains dudleya (Carbonate Plants group) • Kelso Creek monkeyflower (Narrow Endemic Species) • Kern buckwheat (Narrow Endemic Species) • Piute Mountains jewel-flower (Narrow Endemic Species Group) • Bakersfield cactus (Woodland Group) • Charlotte's phacelia (Woodland Group) • Coast horned lizard (Woodland Group) • Spanish Needle onion (Woodland Group) • Tehachapi pocket mouse (Woodland Group) • White-tailed kite (Grassland and Agriculture Group) • Amargosa beardtongue (Amargosa Endemics group) • Cushenbury buckwheat (Carbonate Plants group) • Cushenbury milk-vetch (Carbonate Plants group) • Cushenbury oxytheca (Carbonate Plants group)

Natural Community	Vegetation Types	Key Landscape Issues	Key Ecological Processes	Ecological Stressors	Associated Species
					• Parish's daisy (Carbonate Plants group) • Bighorn sheep (Wide-ranging Species Group)
Agriculture	• Agriculture	•	• Hydrology/ irrigation • Prey availability	• Pesticides and other contaminants • Reduced prey availability	• Mountain plover (Grassland and Agriculture Group) • Swainson's hawk (Grassland and Agriculture Group) • Western burrowing owl (Wide-ranging Species Group) • Pallid bat (Bats group) • Western mastiff bat (Bats group) • Greater sandhill crane (Grassland and Agriculture Group) • White-tailed kite (Grassland and Agriculture Group) • Tricolored blackbird (Wetlands Group)

Appendix C

Conservation Planning ("Stressor") Diagrams

[Note to Reader: The conservation planning ("stressor") diagrams were part of a process to formulate the Plan-wide Biological Goals and Objectives (BGOs), and only one of several components were used to inform the landscape, natural community, and species level BGOs. Since their completion, the BGOs have continued to develop and, therefore, the diagrams herein may not correspond to the BGOs presented in this memo.]

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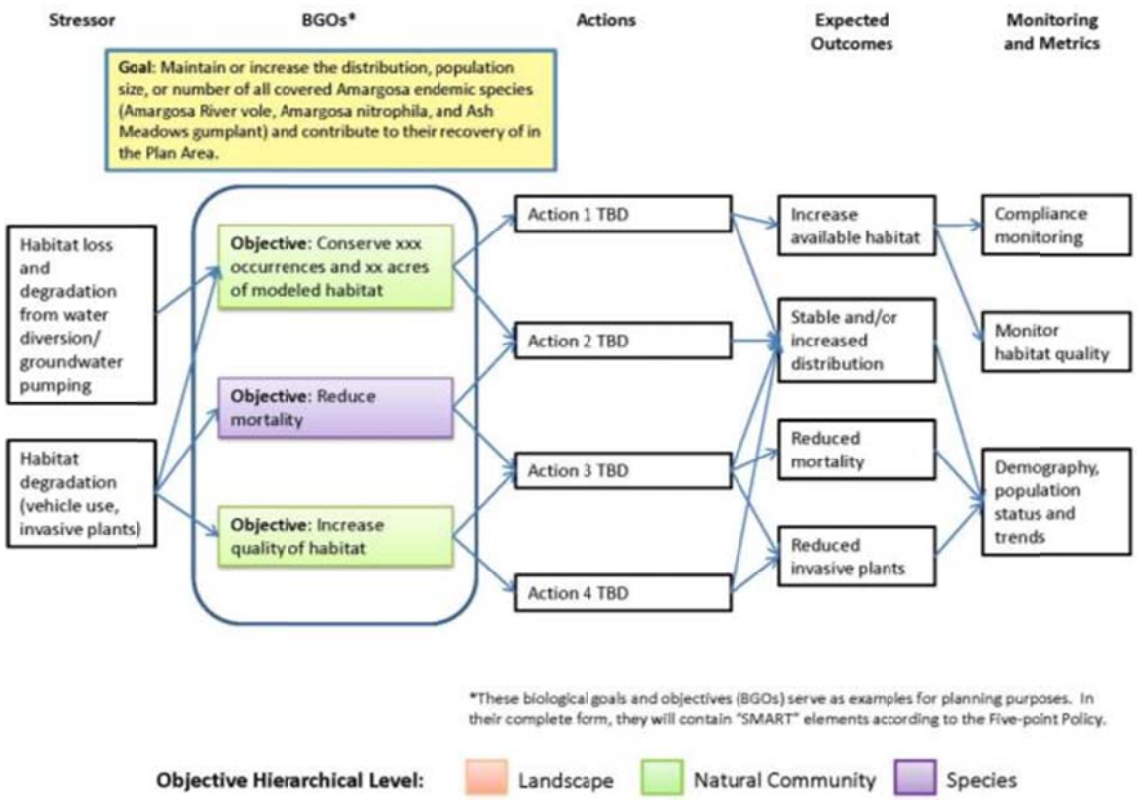

Figure C-1. Conservation Planning Diagram for Amargosa Endemics (for Illustrative Purposes)

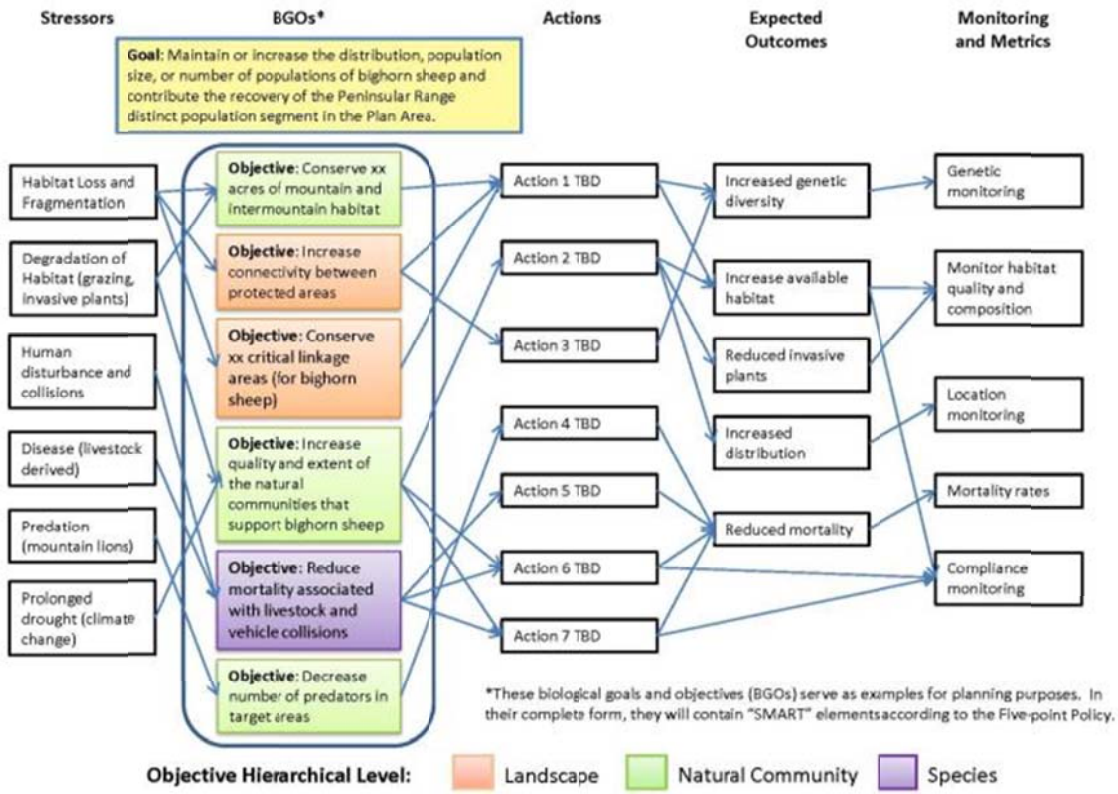

Figure C-2. Conservation Planning Diagram for Bighorn Sheep (for Illustrative Purposes)

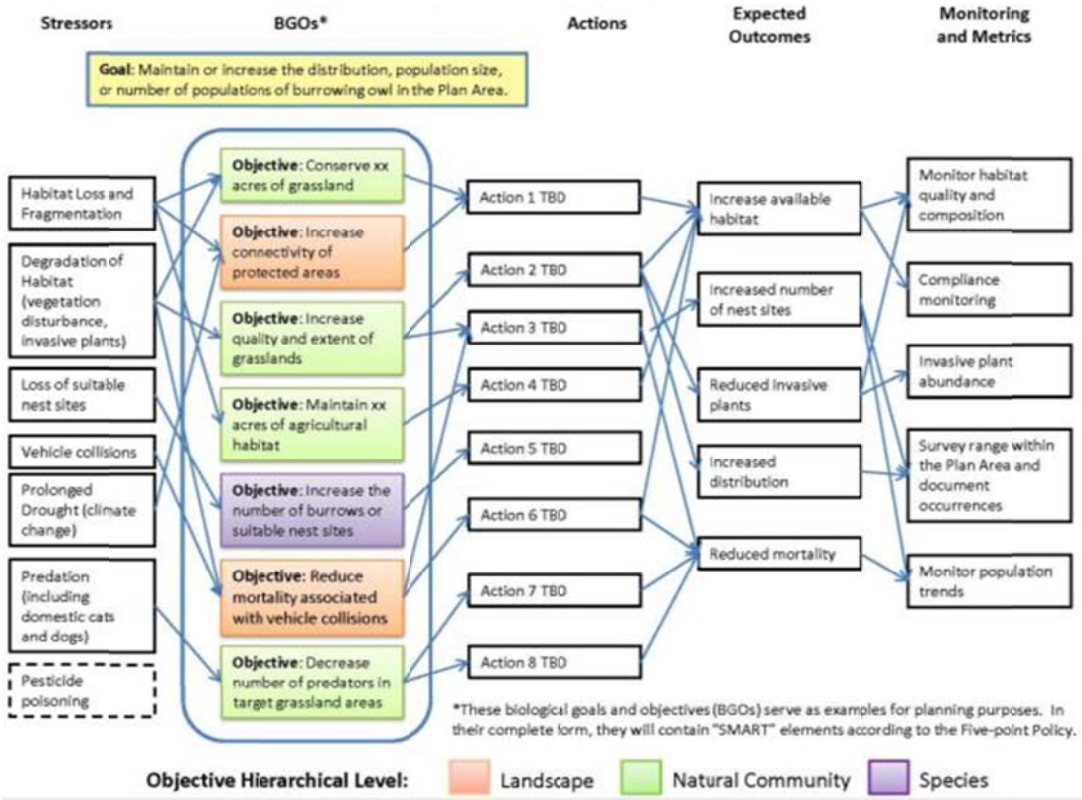

Figure C-3. Conservation Planning Diagram for Burrowing Owl (for Illustrative Purposes)

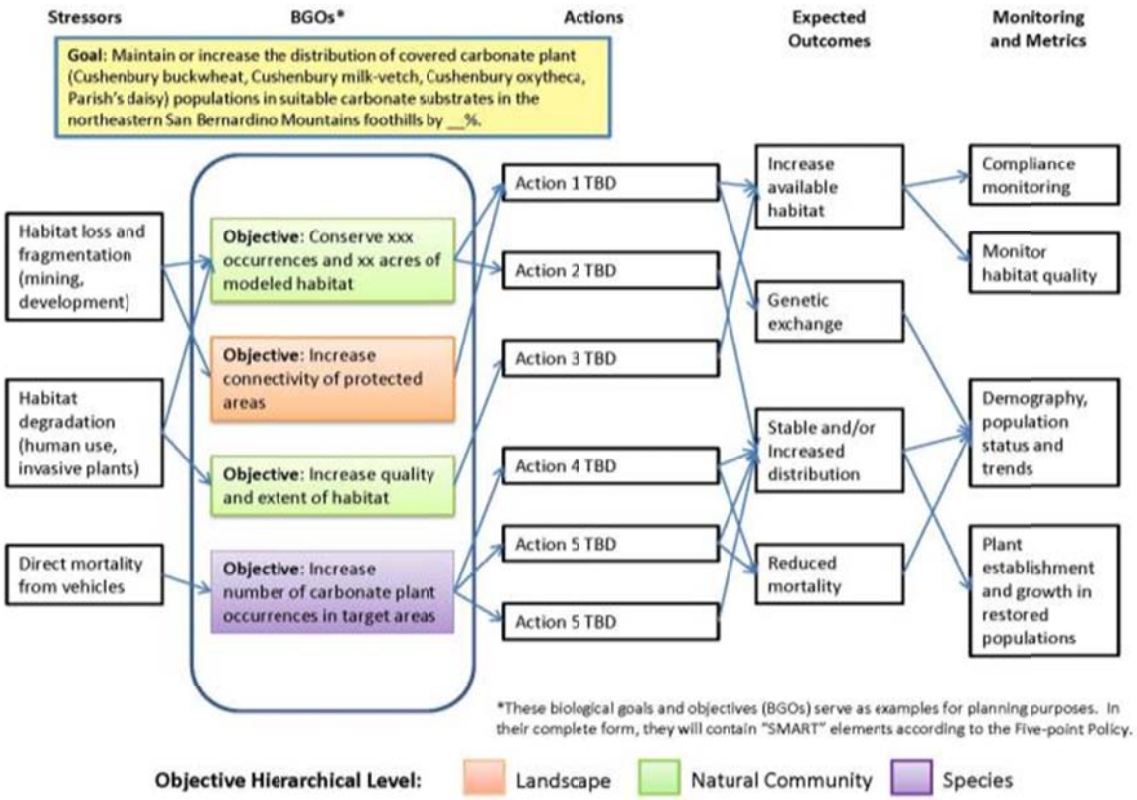

Figure C-4. Conservation Planning Diagram for Carbonate Plants (for Illustrative Purposes)

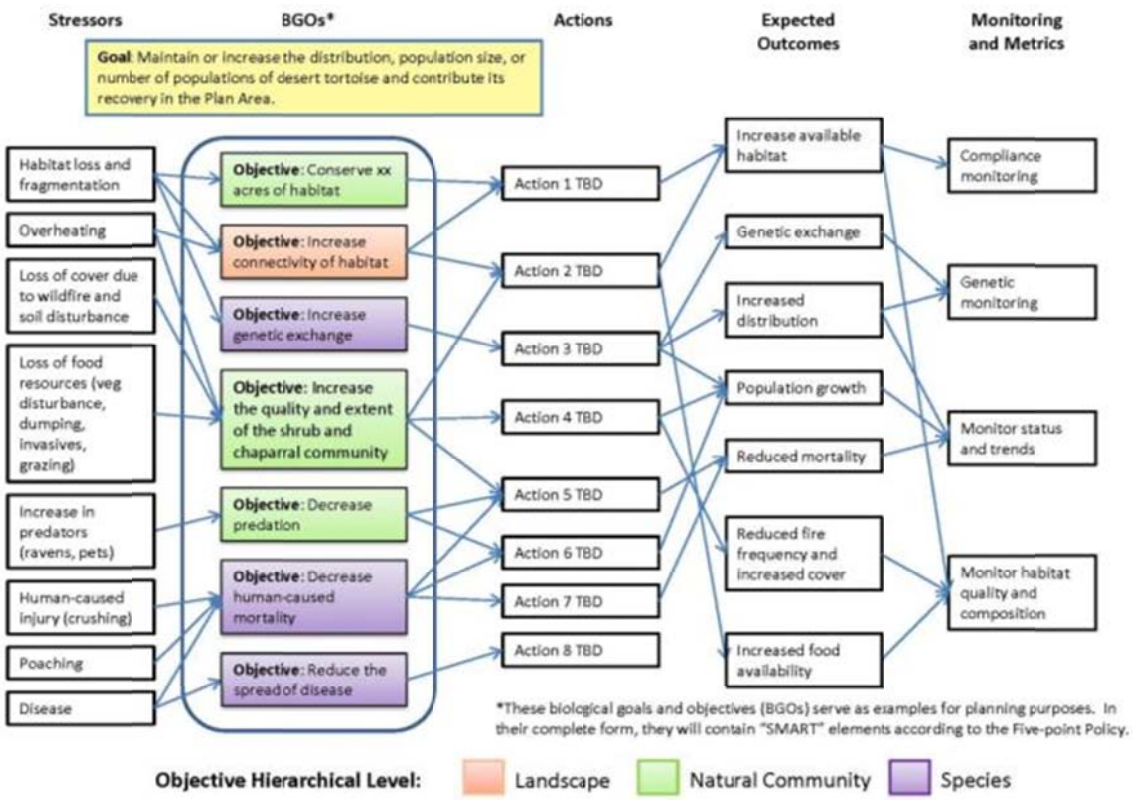

Figure C-5. Conservation Planning Diagram for Desert Tortoise (for Illustrative Purposes)

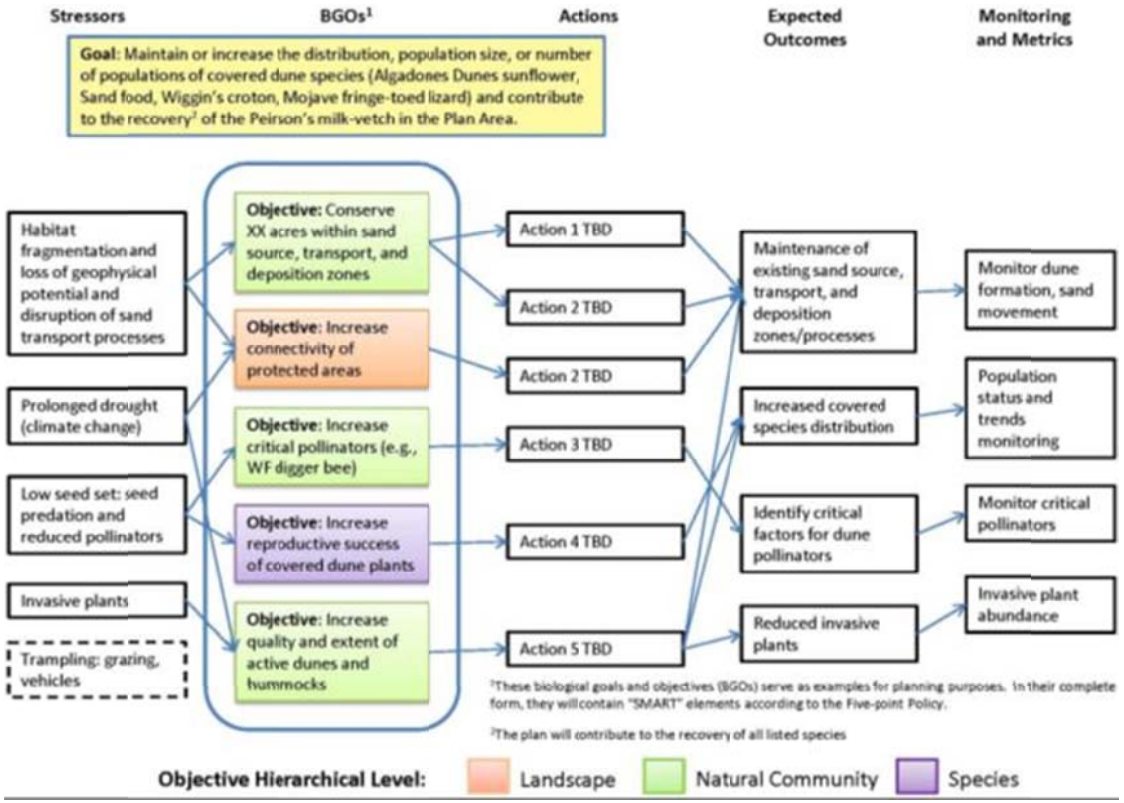

Figure C-6. Conservation Planning Diagram for Dune Community Associated Species (for Illustrative Purposes)

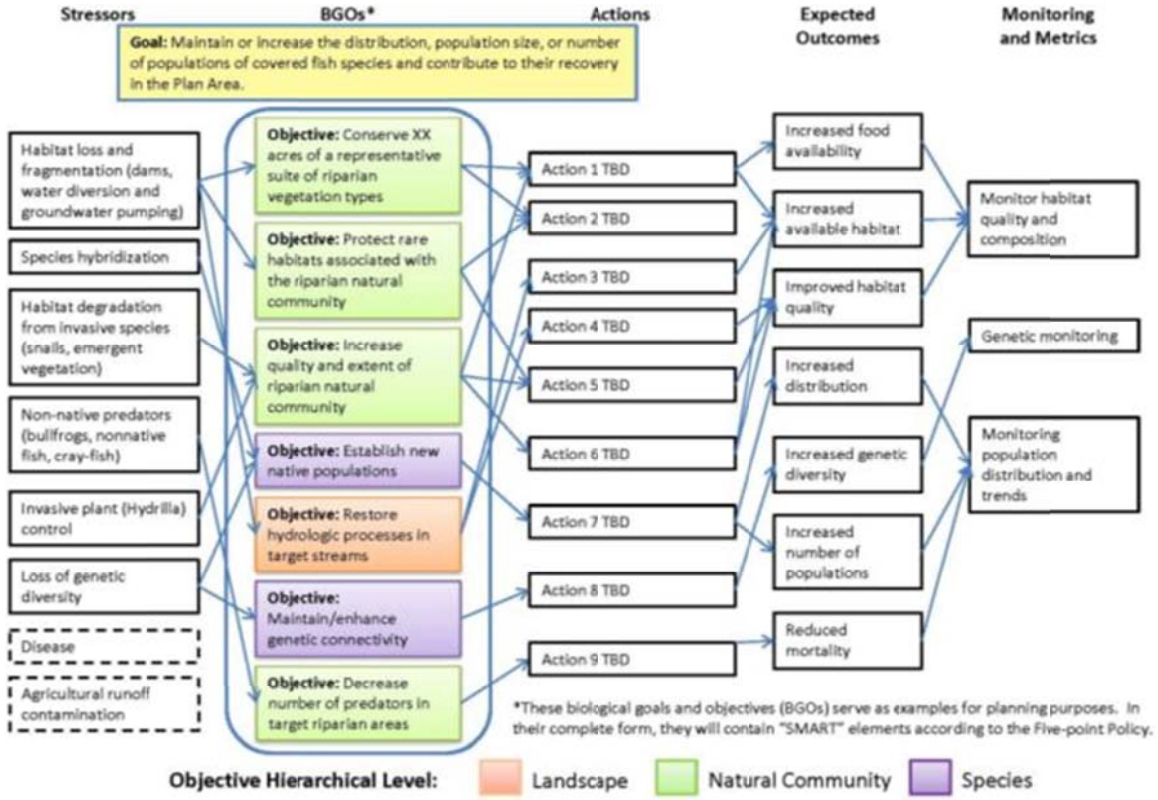

Figure C-7. Conservation Planning Diagram for Fish Species (for Illustrative Purposes)

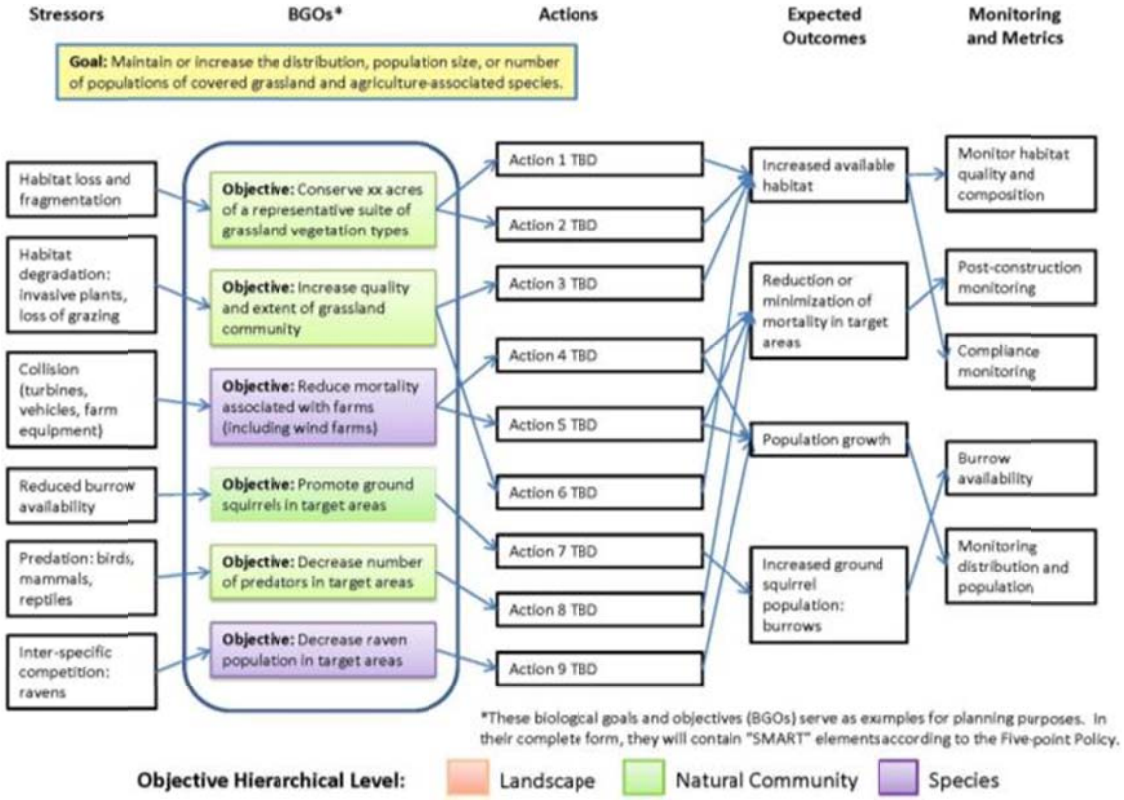

Figure C-8. Conservation Planning Diagram for Grassland and Agricultural Species (for Illustrative Purposes)

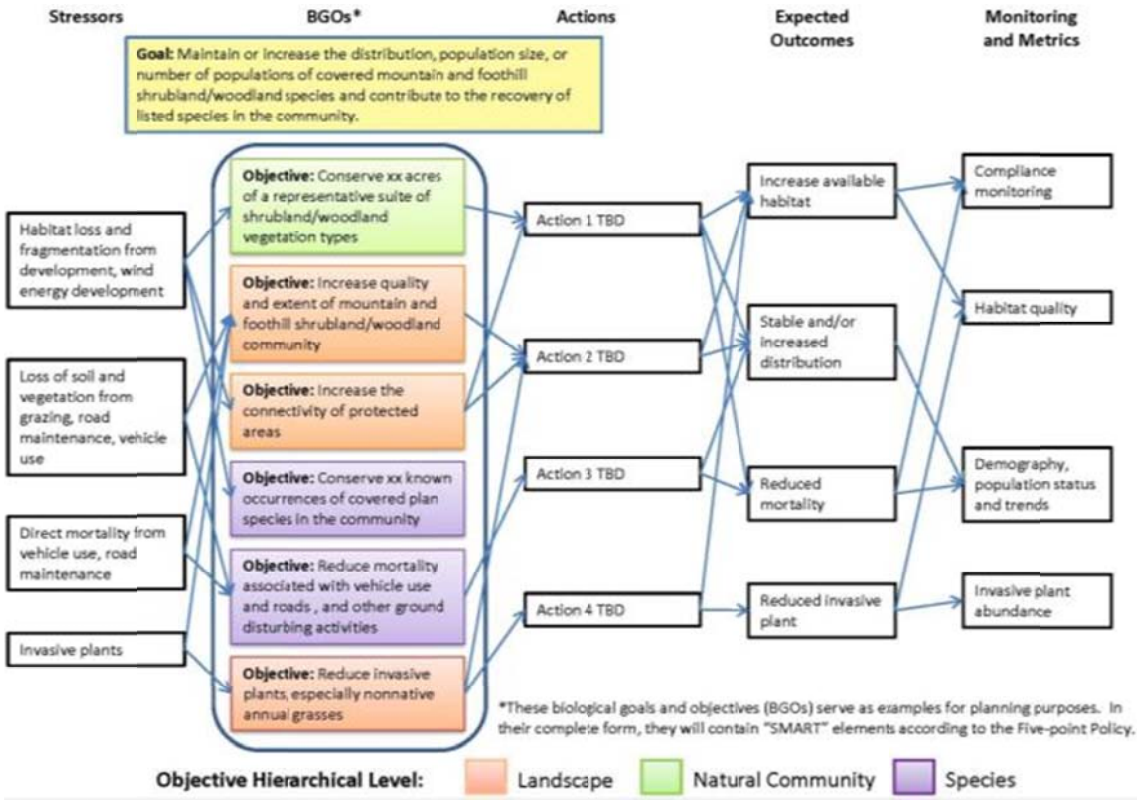

Figure C-9. Conservation Planning Diagram for Woodland Species (for Illustrative Purposes)

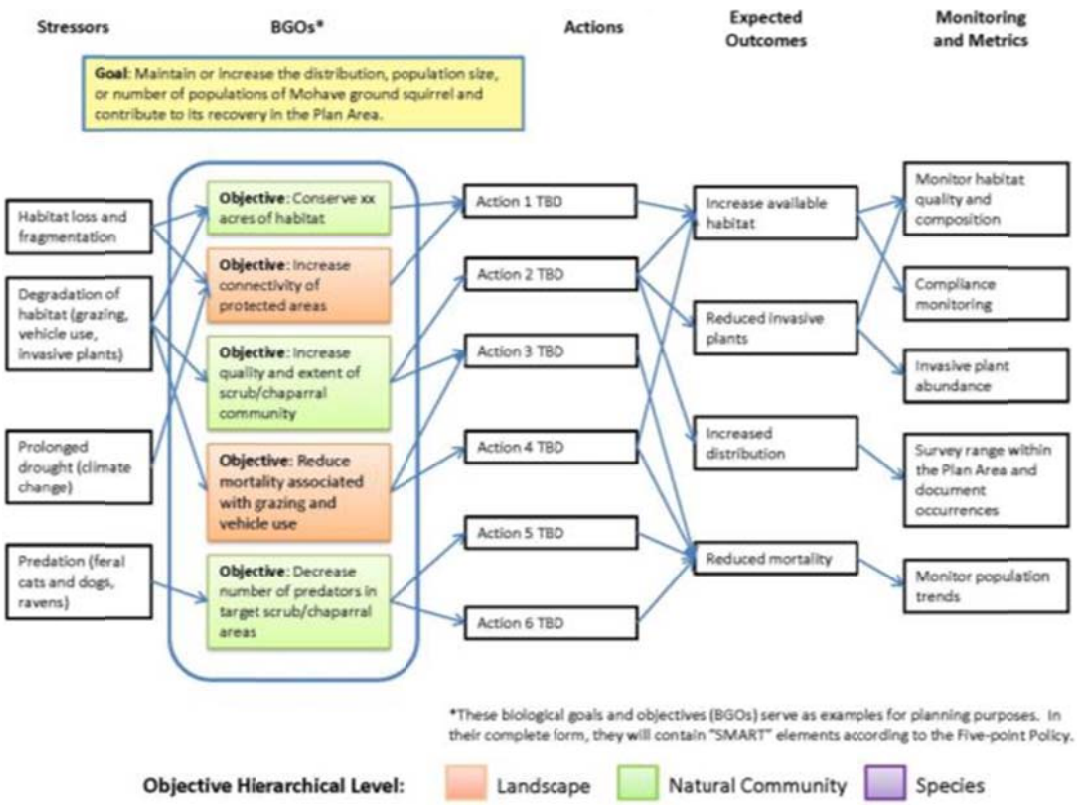

Figure C-10. Conservation Planning Diagram for Mohave Ground Squirrel (for Illustrative Purposes)

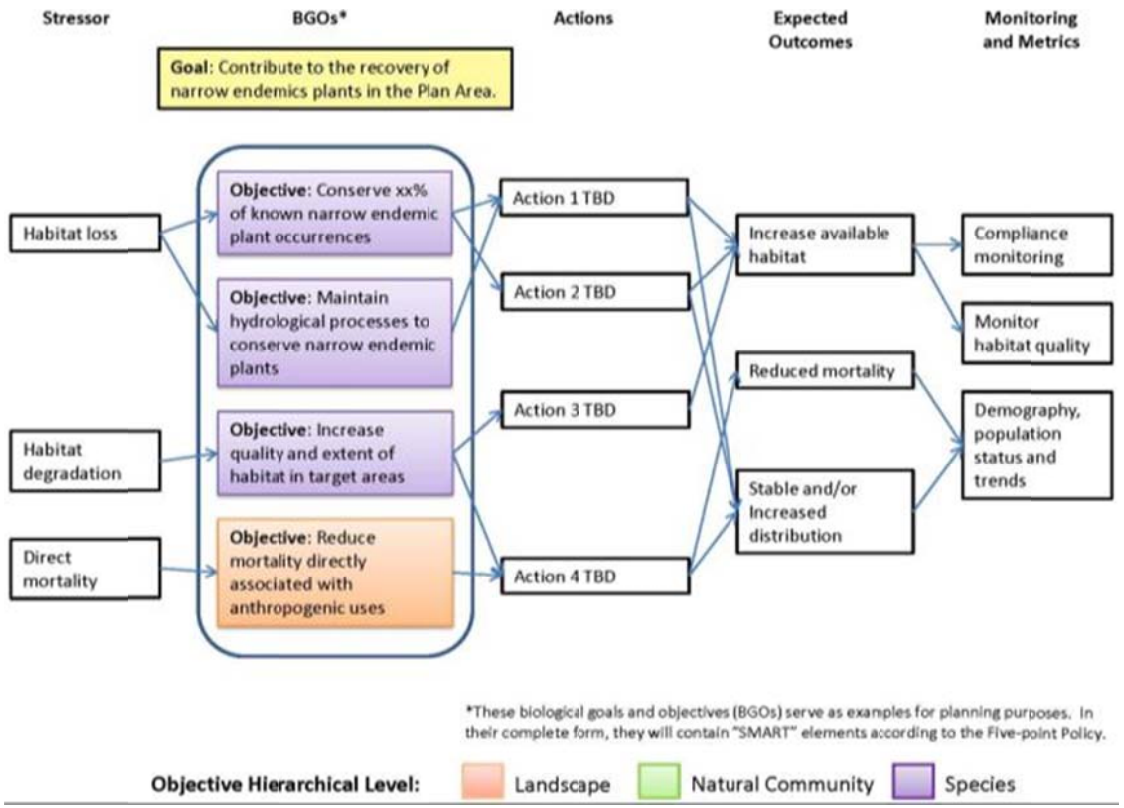

Figure C-11. Conservation Planning Diagram for Narrow Endemic Plants (for Illustrative Purposes)

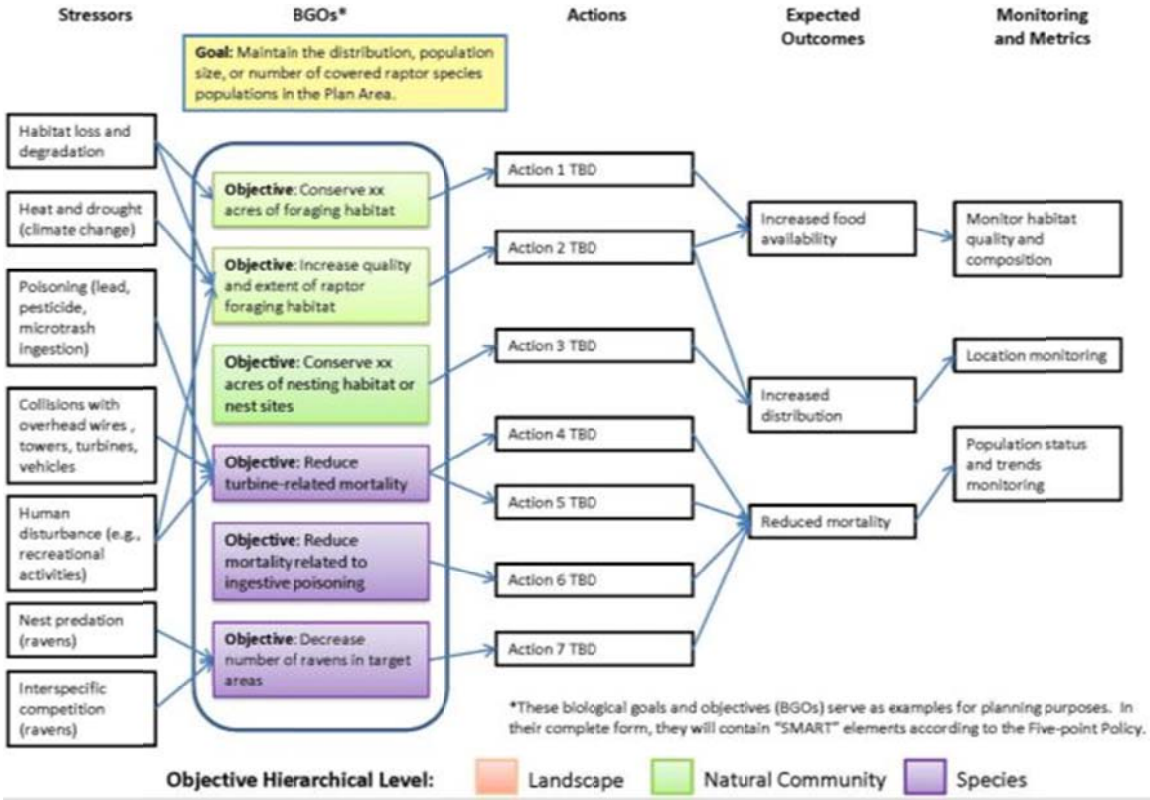

Figure C-12. Conservation Planning Diagram for Raptors (for Illustrative Purposes)

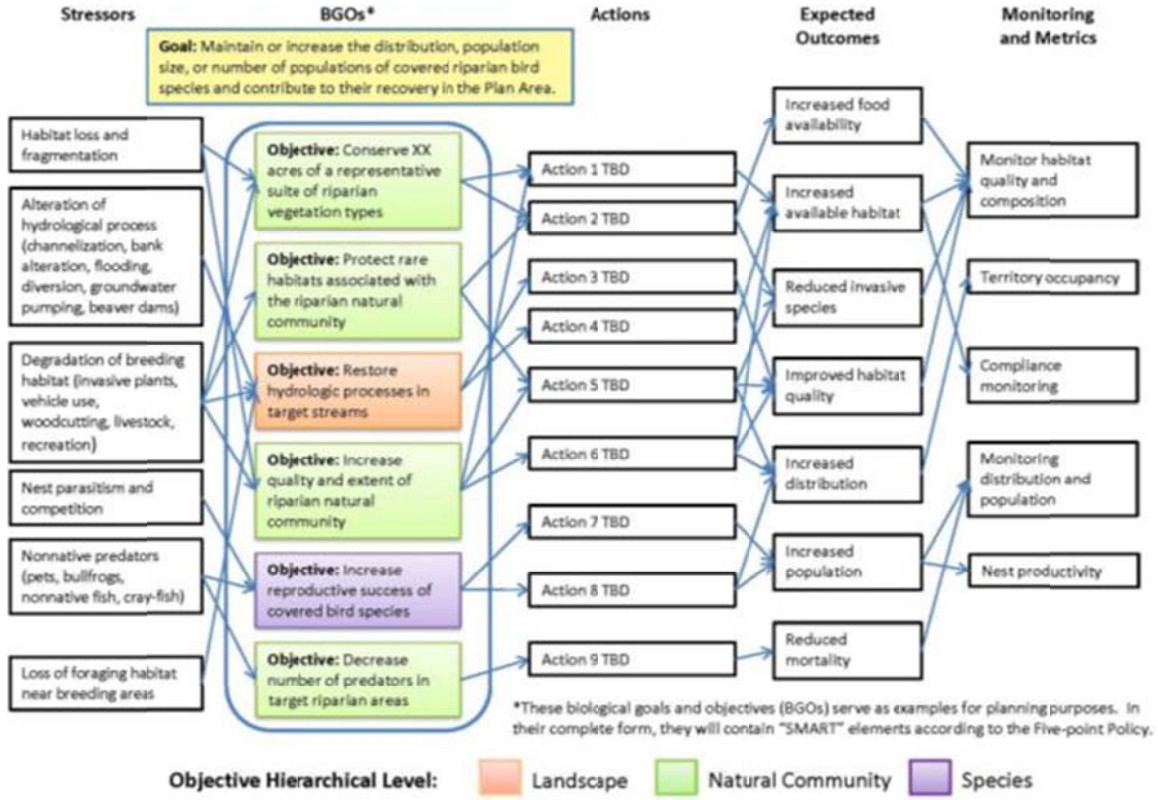

Figure C-13. Conservation Planning Diagram for Riparian Species (for Illustrative Purposes)

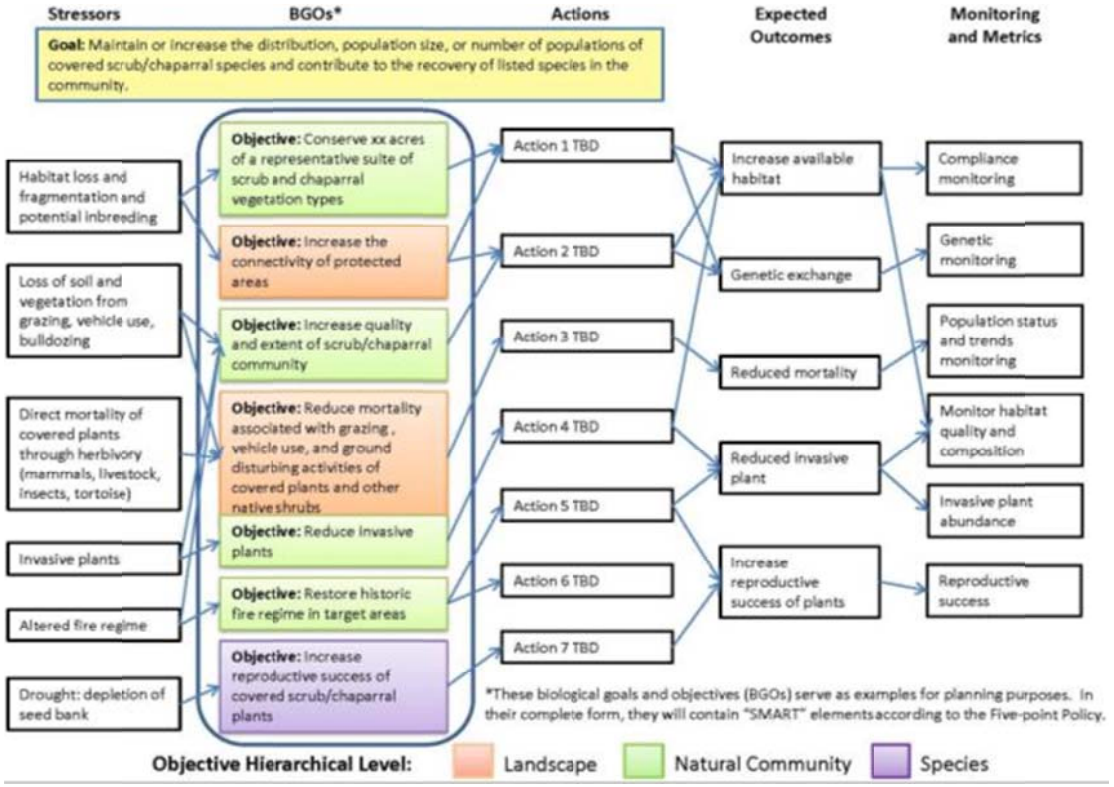

Figure C-14. Conservation Planning Diagram for Scrub and Chaparral Species (for Illustrative Purposes)

Appendix D
Example Species Goals Summaries

[*Note to reader: When the Plan-wide Biological Goals and Objectives are finalized the Species Goal Summaries will cross-reference to the specific numbers of Landscape, Natural Community, and Species Goals and Objectives.*]

Burrowing Owl

The DRECP will benefit the burrowing owl by protecting and enhancing its habitat throughout the Plan Area, promoting key ecological factors, including burrow availability, and removing stressors to the extent feasible. Burrowing owls occur across most of the Mojave and Sonoran deserts of Inyo, eastern Kern, northern Los Angeles, San Bernardino, eastern Riverside, eastern San Diego, and Imperial counties (Miller 2007, references therein). The species reaches peak abundance in agricultural areas in the Imperial Valley where the banks of irrigation ditches and roadsides provide suitable nesting sites and adjacent fields provide abundant invertebrate prey. Generally, habitat characteristics for burrowing owls include open, well-drained terrain; short, sparse vegetation generally lacking trees; and underground burrows or burrow-like structures (e.g., pipe openings) (Gervais et al. 2008; Klute et al. 2003). In California, western burrowing owls most commonly live in burrows created by ground squirrels (*Spermophilis* spp.) and other fossorial species (Gervais et al. 2008).

The most immediate threats to western burrowing owl are the conversion of grassland and agricultural lands to development (Gervais et al. 2008; Wilkerson and Siegel 2010). The spread of non-native plants and alteration of flood patterns through flood control, erosion, and other surface disturbance also reduce the amount of available habitat (Bureau of Land Management 2005). The decline of fossorial species across much of the owl's historical range (Gervais et al. 2008) has decreased the amount of suitable burrows, limiting the extent of year-round habitat throughout the burrowing owls' range (Haug et al. 1993). Vehicular collisions also pose a prominent threat of direct mortality to the species (Haug et al. 1993). The DRECP will protect the grassland community as part of a reserve system and preserve critical linkages that promote genetic exchange. A representative suite of grassland community vegetation types will be protected, as well as agricultural habitat used by burrowing owl. The DRECP will increase the quality and extent of the grassland natural community (GC1.2) and increase the number of underground burrows in target grassland areas, thereby enhancing habitat for the burrowing owl. Impacts from predation will be reduced in target areas .

In addition raptor and species-specific goals and objectives were developed to conserve additional burrowing owl habitat, increase burrowing owl viability by reducing mortality from vehicle traffic in

occupied areas or suitable habitat, minimize, wind turbine-related mortality, and eliminate rodenticides in target grassland areas.

Desert Tortoise

The DRECP will benefit the desert tortoise by acquisition and protection of its habitat and habitat connections, striving to control the spread of disease and opportunistic predators (e.g., common raven), and enhancing its habitat through a reduction in anthropogenic impacts, invasive species, and public education. The desert tortoise occurs throughout the Plan Area on alluvial fans, washes, canyons, and saltbush plains, with lower densities in areas with highest temperatures and lowest precipitation. Desert tortoises are usually associated with creosote bush (*Larrea tridentata*) scrub (U.S. Fish and Wildlife Service 2008a), but they can also be found in saltbush scrub(*Atriplex spp*.) (Stewart 1991). Tortoises generally prefer *Larrea* habitat with high diversity of perennial species and high production of herbaceous ephemeral plants, which comprise their primary diet (Esque 1994; Jennings 1997; Avery 1998). Threats to the desert tortoise include habitat loss, fragmentation and degradation from human activities; predation, disease, off-highway vehicle use; and invasive species (Boarman 2002).

The DRECP will protect the scrub community as part of a reserve system and will promote natural community ecological processes that are important for the persistence of the desert tortoise, including non-native plant invasions resulting from air pollution and altered fire regimes. The DRECP will also protect and enhance the scrub/chaparral community, which provides habitat for desert tortoise.

In addition species-specific goals and objectives were developed to conserve additional desert tortoise habitat, reduce disease, reduce predation, decrease human-caused mortality, increase burrow availability, and contribute to public education on tortoise conservation issues.

Mohave Ground Squirrel

The DRECP will benefit the Mohave ground squirrel by protecting and enhancing its habitat throughout its range within the Plan Area, promoting key ecological factors, and removing stressors to the extent feasible. The Mohave ground squirrel is exclusively found in the northwestern Mojave Desert in San Bernardino, Los Angeles, Kern, and Inyo counties. It primarily occurs in creosote bush scrub, but also desert saltbush scrub, desert sink scrub, desert greasewood scrub, shadscale scrub, and Joshua tree woodland. Threats and environmental stressors include habitat loss, fragmentation, and degradation from urban, rural, agricultural, transportation, and energy development; military activities; and off-highway vehicle use. It is also vulnerable to predation from cats, dogs, and ravens and poisoning from rodenticides and other pesticides.

The DRECP will protect the scrub and chaparral community as part of a reserve system and will reduce non-native plant invasions resulting from air pollution and altered fire regimes. The DRECP will increase the quality and extent of the scrub and chaparral natural community and will maintain landscape habitat connectivity overall and between core areas and their linkages.

In addition species-specific goals and objectives were developed to conserve additional Mohave ground squirrel habitat in undisturbed areas within its historic range and around population centers, decrease rodenticides relative to baseline conditions, and increase the quality and extent of habitat in core linkage areas.

Bighorn Sheep

The DRECP will benefit bighorn sheep by protecting and enhancing its habitat throughout the Plan Area, promoting key ecological factors, and removing stressors to the extent feasible. The Nelson's bighorn sheep subspecies occurs in the desert mountain ranges from the White Mountains in Mono and Inyo counties, south to the San Bernardino Mountains, then southeast to Mexico. An isolated population of Nelson's bighorn sheep occurs in the San Gabriel Mountains. The Peninsular bighorn sheep distinct population segment (DPS) generally occurs in the Peninsular Ranges from the San Jacinto and Santa Rosa ranges south into Mexico. Bighorn sheep prefer areas on or near mountainous terrain that are visually open, as well as steep and rocky. Steep, rugged terrain is used for escape and lambing. Alluvial fans and washes in flatter terrain are also used for forage and water and as connectivity habitat (i.e., intermountain habitat) between more rugged areas. Bighorn sheep area associated with several vegetation communities in the Plan Area, including scrub and chaparral, pinyon-juniper woodland, palm oasis, and desert and montane riparian. Bighorn sheep are threatened by loss and fragmentation of important habitats (e.g., lambing and feeding areas, escape terrain, water, travel, and dispersal routes), disease (mostly livestock derived), predation, drought, potential resource competition, and negative interactions with humans and pets.

The DRECP will conserve the mountain and intermountain habitats and a mosaic of scrub and chaparral, riparian, and wetland communities that essential to the persistence of bighorn sheep in the Plan Area. Vegetation communities supporting different life history needs will also be enhanced, including riparian and wetland communities that support lambing and drinking sources and scrub and chaparral communities that provide forage and cover. Also, the DRECP will maintain landscape habitat connectivity overall.

In addition species-specific goals and objectives were developed to conserve additional bighorn sheep habitat, including intermountain areas to create a landscape-scale reserve system for the bighorn sheep metapopulation (including Nelson's and Peninsular DPS), protect critical corridors and crossing points to maintain habitat connectivity, maintain or enhance access to water sources, and increase the number of subpopulations by restoring bighorn sheep to suitable habitat.

Mojave Fringe-Toed Lizard

The DRECP will benefit the Mojave fringe-toed lizard by protecting and enhancing its habitat throughout the Plan Area, promoting key ecological factors, and removing stressors to the extent feasible. The Mojave fringe-toed lizard is endemic to the Mojave and Sonoran deserts of Southern California and western Arizona and is restricted to deposits of loose sand. This species is currently associated with named and unnamed sand dune systems within the three major river drainages in the Plan Area: the Amargosa, Mojave, and Colorado rivers. Threats and environmental stressors include loss or degradation of habitat (including invasive plant species), disruption of aeolian sand stabilization and/or transport processes, off-road vehicle use, and predation.

The DRECP will protect the dune community as part of a reserve system and promote ecological processes essential to the persistence of Mojave fringe-toed lizard habitat in the Plan Area. Specifically, active and stabilized dunes, including transitional areas, deposition zones, and source features will be protected within the 16 major sand dune systems and other potential sand source, transport, and deposition features, including dry lakes, that are associated with smaller fringing dunes and accumulated sand habitat formation. The DRECP will enhance vegetation within these major dune systems as applicable, and protect processes that create loose, wind-blown sands thereby enhancing habitat for the Mojave fringe-toed lizard. Impacts from predation will be reduced in target areas. Collectively, these actions will maintain or increase the distribution, population size, or number of populations of Mojave fringe-toed lizard in the Plan Area.