# AVRCIS

OCTOBER **2019**

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## ANTELOPE VALLEY
## REGIONAL CONSERVATION INVESTMENT STRATEGY


Desert and Mountain Conservation Authority
Transition Habitat Conservancy
The Nature Conservancy
California Department of Transportation
California Energy Commission
U.S. Fish and Wildlife Service


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# ANTELOPE VALLEY – REGIONAL CONSERVATION INVESTMENT STRATEGY

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October 2019

ICF. 2019. Public Draft Antelope Valley Regional Conservation Investment Strategy. October. (ICF 462.16.) San Diego, California. Prepared for Desert Mountains Conservation Authority, Lancaster, California.

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# Acronyms and Abbreviations

| | |
|---|---|
| °F | degrees Fahrenheit |
| AB | Assembly Bill |
| Area Plan | Antelope Valley Area Plan |
| BLM | Bureau of Land Management |
| BLM | Bureau of Land Management |
| CDFW | California Department of Fish and Wildlife |
| CEQA | California Environmental Quality Act |
| CESA | California Endangered Species Act |
| CFGC | California Fish and Game Code |
| CFR | Code of Federal Regulations |
| CNDDB | California Natural Diversity Database |
| cores | core habitat areas |
| DMCA | Desert and Mountains Conservation Authority |
| DRECP | Draft Desert Renewable Energy Conservation Plan and Environmental Impact Report/Environmental Impact Statement |
| EEMS | Environmental Evaluation Modeling System |
| EOA | Economic Opportunity Area |
| ESA | Endangered Species Act |
| GAP | Gap Analysis Project |
| General Plan | Los Angeles County General Plan 2035 |
| GIS | geographic information systems |
| HCP | habitat conservation plan |
| km/km2 | kilometer per square kilometer |
| Legislature | California State Legislature |
| MCA | mitigation credit agreement |
| NCCP | natural community conservation plan |
| NVCS | National Vegetation Classification Standard |
| OHV | off-highway vehicle |
| Program Guidelines | Regional Conservation Investment Strategies Program Guidelines |

| | |
|---|---|
| RCIS | Regional Conservation Investment Strategy |
| SCE | Southern California Edison |
| SEA | Significant Ecological Area |
| SWAP | State Wildlife Action Plan |
| TRTP | Tehachapi Renewable Transmission Project |
| USFWS | U.S. Fish and Wildlife Service |

Chapter 1
# Introduction

## 1.1 Background

In 2016, the California State Legislature (Legislature) worked with the California Department of Fish and Wildlife (CDFW) and a variety of other entities and stakeholders to find creative ways to guide voluntary conservation actions and mitigation actions for the state's most vulnerable species and resources, in conjunction with public infrastructure or forest management. This collaboration resulted in Assembly Bill 2087 (AB 2087), which outlines a program for identifying and prioritizing the conservation needs of vulnerable species and resources at a regional scale. The program includes actions to address the impacts of climate change and other stressors and pressures that influence the resiliency of those species and natural resources. AB 2087, signed by the Governor on September 22, 2016, amends the California Fish and Game Code (CFGC) Division 2, Chapter 9, to add Sections 1850–1861, which create a pilot regional conservation investment strategy (RCIS) program through January 1, 2020.

The program allows for CDFW or any public agency[1] to develop an RCIS to guide protection of focal plant and wildlife species and other important conservation elements. A regional approach to advance mitigation planning can ensure that compensatory mitigation actions ultimately provide conservation benefit for affected species. A regional approach can also facilitate faster environmental review for development projects (Thorne et al. 2009). The RCIS must include specific information about conservation actions necessary to reduce stressors and negative pressures on those species, including identifying conservation priorities within the region, where appropriate. Once approved by CDFW, an RCIS can be used to identify areas of highest conservation priority for conservation investments by public agencies or conservation organizations. An approved RCIS can also be used voluntarily by public infrastructure agencies or private developers to help with their selection of appropriate mitigation sites or actions.

To support and guide development of RCISs, CDFW released the *Regional Conservation Investment Strategies Program Guidelines* (Program Guidelines) in April 2017. These Program Guidelines were revised in June 2017. This Antelope Valley RCIS was developed consistent with CFGC 1850–1861, as well as the current (June 2017) Program Guidelines. A key component of the Program Guidelines is Section 2, *Standard Terminology*, which contains a detailed list of terms, abbreviations, and definitions applicable to RCISs. Appendix A, *Glossary*, includes those terms used in this Antelope Valley RCIS.

Adoption of the Antelope Valley RCIS by CDFW is consistent with CFGC 1850(e) and 1852(c)(7). By authorizing CDFW to approve RCISs, it is not the intent of the Legislature to regulate the use of land, establish land use designations, or to affect, limit, or restrict the land use authority of any public agency. Nothing in the Antelope Valley RCIS is intended to, nor should it be interpreted to, conflict with state law or local ordinances. Therefore, actions carried out because of this RCIS will comply with all applicable state and local requirements.

[1] Any state agency, board, or commission; any county, city and county, city, regional agency, public district, redevelopment agency, or other political subdivision.

In addition, this Antelope Valley RCIS does not conflict with the following requirements of CFGC 1855(b)).

1. This RCIS does not modify in any way the standards for issuance of incidental take permits or consistency determinations pursuant to Section 2081 or 2080.1, issuance of take authorizations pursuant to Section 2835, issuance of lake or streambed alteration agreements pursuant to Section 1602, or any other provision of this code or regulations adopted pursuant to this code.
2. This RCIS does not modify in any way the standards under the California Environmental Quality Act (CEQA) (Division 13 [commencing with Section 21000] of the Public Resources Code), or in any way limit a lead agency's or responsible agency's discretion, in connection with any determination of whether a proposed project may or may not result in significant environmental effects or in any way establish a presumption in connection with any determination of whether a proposed project may or may not result in significant environmental effects or whether a proposed project's impacts would be mitigated.
3. This RCIS does not prohibit or authorize any project or project impacts.
4. This RCIS does not create a presumption or guarantee that any proposed project will be approved or permitted, or that any proposed impact will be authorized, by any state or local agency.
5. This RCIS does not create a presumption that any proposed project will be disapproved or prohibited, or that any proposed impact will be prohibited, by any state or local agency.
6. This RCIS does not alter or affect, or create additional requirements for, the general plan of the city, county, or city and county, in which it is located.
7. This RCIS does not constitute any of the following, for the purposes of CEQA (Division 13 [commencing with Section 21000] of the Public Resources Code):
    a. A plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.
    b. A local policy or ordinance protecting biological resources.
    c. An adopted local, regional, or state habitat conservation plan (HCP).

Once an RCIS is approved by CDFW, an applicant may prepare a mitigation credit agreement (MCA) and request its approval by CDFW. An MCA identifies the type and number of credits a person or entity proposes to create by implementing one or more conservation actions or habitat enhancement actions, as well as the terms and conditions under which those credits may be used. MCAs enable advance mitigation, which is compensatory mitigation for estimated impacts on ecological resources (species and their habitat) and other natural resources that contributes to the fulfillment of regional conservation priorities and that is implemented prior to impacts occurring. The MCA can be designed to satisfy a range of state wildlife laws, including the California Endangered Species Act, CEQA, and lake or streambed alteration requirements of the CFGC.

# 1.2 Purpose and Need

As stated in CFGC Section 1852(b), the purpose of an RCIS is to provide voluntary guidance for one or more of the following, in ways that will enhance the long-term viability of native species, habitat, and other natural resources.

1. Identification of wildlife and habitat conservation priorities, including actions to address the impacts of climate change and other wildlife stressors.
2. Investments in natural resource conservation.
3. Infrastructure planning.
4. Identification of areas for compensatory mitigation for impacts on species and natural resources.

The RCIS encourages a voluntary, nonbinding, non-regulatory regional planning process intended to result in higher-quality conservation outcomes. An RCIS establishes conservation goals and objectives and describes conservation actions that may be used as a basis to provide advance mitigation or to inform other conservation planning processes and investments.

This Antelope Valley RCIS was selected as a pilot RCIS in part because of the substantial available scientific data to support development of a robust RCIS in a short period. Much of these data were developed as part of the *Draft Desert Renewable Energy Conservation Plan and Environmental Impact Report/Environmental Impact Statement* (DRECP) (California Energy Commission et al. 2014), which presented a range of alternative conservation strategies and conservation actions on public and private lands to address the effects of renewable energy and associated development. The body of information underlying the DRECP was published in the California Desert Biological Conservation Framework (California Energy Commission et al. 2016) and is used to inform the foundational biological components of this Antelope Valley RCIS.

This Antelope Valley RCIS was also selected as a pilot RCIS because of the rapid growth anticipated in the region over the next 10 years, including a number of large transportation, renewable energy, and housing projects that will be designed and proposed for construction. Currently, there is no HCP or natural community conservation plan (NCCP) in the Los Angeles County portion of Antelope Valley (i.e., the RCIS area) to meet the species mitigation needs of these projects. This RCIS can support the mitigation needs for these projects, including ongoing development in the two cities within the RCIS area (Lancaster and Palmdale) and other development in unincorporated Los Angeles County.

Additionally, this Antelope Valley RCIS can support regional conservation investments by informing where organizations, such as land trusts, can focus acquisition, restoration, or enhancement where it will have the largest benefit for focal species and other conservation elements. This RCIS also provides information on the different organizations that are active in the RCIS area, with the intent that agencies or organizations using this RCIS will consider sharing information beyond that contained in this RCIS or partnering in implementation of conservation actions and conservation investments.

# 1.3 Potential RCIS Users

There are no limits to who can use the RCIS. RCIS users can include any public or private entity or party interested in understanding the conservation needs of the RCIS area for focal species and natural communities for the sake of biological mitigation, development of advance mitigation, and all other activities that further the conservation goals and objectives of the RCIS, including acquisition and easements for conservation purposes; restoration, enhancement, and other conservation-oriented management; monitoring; and additional habitat conservation planning. The RCIS can be of use to anyone seeking to implement mitigation and conservation actions for listed species under the state and federal endangered species acts, mitigation for aquatic resources, and mitigation and conservation for any other natural resources through CEQA, the National Environmental Policy Act, or other regulatory or non-regulatory programs.

The biological resource information and guidance in this RCIS is intended to improve the coordination, cost-effectiveness, and efficiency of conservation investments of any kind throughout the Antelope Valley RCIS area. The biological information and conservation goals and objectives to conservation priorities in the RCIS area may be implemented independently, or through coordination and conservation partnerships that are established and/or sustained through the RCIS implementation process.

# 1.4 Overview

## 1.4.1 Building Blocks for Conservation Planning

The building blocks for conservation planning of the Antelope Valley RCIS include the best available science and modeling tools, existing and planned land use information, and stakeholder involvement and guidance.

The Antelope Valley RCIS is based on the best available biological and land use planning information, including empirical biological resource data (e.g., mapping of habitats and species occurrences), current scientific literature, state-of-the-art modeling and mapping of biological resources and climate change effects, and existing and future planned land use and ownership.

This Antelope Valley RCIS was developed in concert with other key planning efforts that overlap in the RCIS area. Primarily, it builds on existing information provided in the State Wildlife Action Plan (SWAP), DRECP, California Desert Biological Conservation Framework, and the Significant Ecological Areas identified in the *Los Angeles County 2035 General Plan*.

This Antelope Valley RCIS presents conservation goals and objectives for the RCIS area (Chapter 3, *Conservation Strategy*) that were developed for the focal species of the RCIS and the natural communities and other conservation elements that support the biological diversity and ecological processes. Incorporated into those goals and objectives are conservation actions for land acquisition, restoration, enhancement, management, and monitoring.

The conservation actions are intended to be used in multiple ways. First, conservation organizations can use these priorities to inform the work they do to align their efforts with the conservation goals and objectives of the RCIS. This alignment includes the pursuit of funding for land acquisition, restoration, and enhancement. Second, the conservation actions presented in this RCIS can also support project permitting and regulatory processes by providing project proponents, regulatory agencies, and agencies that have local land use authority with information to identify conservation actions that can be used to meet project mitigation needs. Guidance on how this RCIS can be used voluntarily to support various state and federal permits that typically require mitigation can be found in Appendix B, *Regulatory Processes*.

#### 1.4.1.1 Primary Steps to Determine Conservation Priorities

The following 12 steps describe the sequence of information collection, analysis, and stakeholder input that has resulted in the conservation priorities for the Antelope Valley RCIS area.

1. **Determine RCIS Area:** The Antelope Valley RCIS area was determined in collaboration with the Steering Committee and Advisory Committee by evaluating ecoregional boundaries, jurisdictional boundaries, and major ownership boundaries. The RCIS boundary is intended to capture the natural transitional boundaries between natural communities as well as reflect the jurisdictional and ownership boundary considerations for RCIS implementation.
2. **Selection of Focal Species:** The focal species were selected in collaboration with the Steering Committee and Advisory Committee, and are intended to represent species that typically require mitigation in the RCIS area, as well as those species that are representative of sensitive communities, characteristic of the biodiversity of the RCIS area, are potentially sensitive to the effects of climate change, or are otherwise of local conservation interest.
3. **Identification of Natural Communities and Other Conservation Elements:** The identification of natural communities and other conservation elements was based on the land cover mapping and conservation status sensitivity ranking.
4. **Mapping of Biological Value:** Mapping of biological value was based on the distribution of focal species and natural communities; modeling of habitat connectivity; modeling of climate stability, climate resilience, and climate refugia; and species occurrence data.
5. **Mapping of Landscape Intactness:** Intactness is an estimate of naturalness, and is based on the level of human disturbance for an area. Terrestrial intactness is high in places where anthropogenic impacts such as urban development and natural resource extraction are low and native vegetation fragmentation is low.
6. **Mapping of Conservation Value:** Conservation value was mapped by combining the mapping of biological value with landscape intactness. Areas with moderate to high biological value and moderate to high landscape intactness were identified as areas with higher conservation value. The conservation value mapping was combined with each species habitat distribution to produce maps of relative conservation value for each species.
7. **Mapping of Habitat Cores Areas and Landscape Linkages:** The conservation value mapping for species and natural communities was used to identify large patches of habitat core areas where biological value and landscape intactness are higher. Habitat connectivity modeling results were used to identify the landscape linkages between these areas that provide important connectivity for species dispersal (wildlife movement and plant dispersal) as well as long-term shifting of habitat distributions in response to climate change.
8. **Gap Analysis:** A Gap Analysis was conducted by overlaying the protected lands with the distribution of habitat for each species relative to the habitat core areas and landscape linkages to determine the amount of habitat of higher conservation value for each species that occurred

on protected lands and the amount lacking any current level of protection. Gaps in protection (lands protected in fee title or conservation easement) and potential gaps in preservation (habitat management and monitoring of protected lands) were determined relative to quantitative conservation target acreages for each focal species.

9. **Identification of Conservation Goals, Objectives, and Actions:** The Conservation Goals and Objectives were selected in collaboration with local experts and representatives from the Steering Committee and Advisory Committee. Conservation goals and objectives were determined based on an understanding of the distribution of the high conservation value habitat for each species relative to the known threats and stressors for each species. Conservation goals and objectives provide the guidance for identifying potential conservation actions for each species.
10. **Mapping of Foreseeable Potential Future Urbanization:** Areas of known or foreseeable potential future urbanization and infrastructure development are generally not suited for achieving long-term conservation goals and objectives due to the difficulty, increased cost, and decreased effectiveness of conservation actions in an increasingly developed and fragmented landscape. Foreseeable potential future urbanizing areas were mapped based on local land use planning resources and known planned future development and infrastructure projects.
11. **Identification of Conservation Priority Areas:** Conservation priority areas are those areas where the higher conservation values occur for species, natural communities, and other conservation elements, and where the least potential conflict with foreseeable potential future urbanization is likely to occur. All else being equal, implementation of conservation actions will be most effective in priority conservation areas that avoid or minimize overlap with future urbanization. Some overlap of conservation priority areas with potential future urbanization is likely to occur (e.g., when there are no other viable alternatives for conservation actions for a given species).
12. **RCIS Implementation:** The Antelope Valley RCIS is a dynamic conservation planning tool that serves to unify and coordinate conservation investments and conservation actions implemented to achieve the goals and objectives of the RCIS. Any entity or individual may use the RCIS to identify conservation priorities and implement conservation actions to meet their own conservation and mitigation needs and interests. Implementation may occur independently, or through coordination and conservation partnerships that are established and/or sustained through the RCIS implementation process.

### 1.4.2 Development Team

The Antelope Valley RCIS development process began in March 2016. The process was initiated by the Desert and Mountains Conservation Authority (DMCA) in collaboration with the California Energy Commission. ICF was the lead technical consultant on the RCIS document, working under the direction of a Steering Committee and with input from an active Advisory Committee, both of which are described below. The RCIS process benefited from public outreach, briefings, and opportunities for input from the Antelope Valley community; non-profit organizations including environmental, conservation, and community organizations; business interests; regulatory agencies; and federal, state, and local governments.

The goals of the public outreach were as follows.

- Provide partners and the public with information on this RCIS planning effort.

- Receive information regarding the region's ecological values, planning, and conservation priorities.

This coordination is described in more detail below and in Appendix C, *Stakeholder Involvement and Public Outreach*.

#### 1.4.2.1 Applicant

As the RCIS applicant, DMCA led preparation of this RCIS with generous funding from the Stephen D. Bechtel, Jr. Foundation. DMCA is a public entity created in July 2006 through a Joint Powers Authority Agreement between the Antelope Valley Resource Conservation District and the Santa Monica Mountains Conservancy. DMCA has been established to identify, acquire, and manage open space lands within the boundaries of the two founding agencies for long-term conservation benefits. DMCA is one of the leading entities in Antelope Valley acquiring open space for conservation and on behalf of project proponents for mitigation.

DMCA collaborated with the other agencies and entities on the Steering Committee to prepare this RCIS consistent with AB 2087 and with the goals stated above.

#### 1.4.2.2 Steering Committee

The coordination and development of this Antelope Valley RCIS were guided by a Steering Committee. The Steering Committee, led by DMCA, was composed of representatives from DMCA, the Nature Conservancy, California Department of Transportation, California Energy Commission, U.S. Fish and Wildlife Service (USFWS), and Transition Habitat Conservancy. The Steering Committee met eight times throughout 2016 and 2017 to provide guidance on the development of this RCIS, including identification of the RCIS area and focal species; conservation goals, objectives, actions, and priorities; and implementation structure. The Steering Committee supported engagement with the Advisory Committee, other stakeholders, and the public (Appendix C, *Stakeholder Involvement and Public Outreach*). The Steering Committee also reviewed a complete administrative draft RCIS.

#### 1.4.2.3 Advisory Committee

The Advisory Committee comprised a broad group of stakeholders in Antelope Valley, including representatives from other nonprofit organizations including conservation, environmental, and community; federal and state agencies; city and county governments; and businesses. The Advisory Committee met in person and online throughout the development of this RCIS. The Advisory Committee provided important information concerning ecological resources in the region. It reviewed and commented on interim RCIS work products, including the RCIS area and focal species list. The Advisory Committee also reviewed a complete administrative draft RCIS.

#### 1.4.2.4 Technical Subcommittee

The Steering and Advisory Committees formed a Technical Subcommittee to analyze key technical and conservation planning issues and make recommendations. The Technical Subcommittee was composed of conservation specialists with local knowledge of the species, habitats, and natural communities throughout the RCIS area. The Technical Subcommittee met eight times via conference calls and online presentations during the preparation of the technical components of the RCIS.

### 1.4.3 Sponsoring State Agency

CFGC Section 1852(a) requires that, in order for CDFW to approve an RCIS, one or more state agencies must sponsor the RCIS by requesting approval of the strategy through a letter to CDFW indicating that the proposed RCIS would contribute to meeting state goals for conservation or public infrastructure or forest management. As the Antelope Valley RCIS's state agency sponsor, the Santa Monica Mountains Conservancy has requested approval of this RCIS through a state agency sponsor letter sent to the Director of CDFW, as required by CFGC 1852(a). The letter is included in Appendix D, *Letters of Support*

### 1.4.4 RCIS Area

The RCIS area for this Antelope Valley RCIS covers approximately 707,076 acres and is largely defined by the Los Angeles County portion of the DRECP plan area (California Energy Commission et al. 2014) (Figure 1-1). The southern boundary includes the full extent of the Petersen Ranch, an important protected area and mitigation bank in the RCIS area. Keeping the RCIS area largely within the DRECP plan area maintains consistency with the latest data and models from DRECP, many of which are used to inform this Antelope Valley RCIS. For the small portions of the RCIS area that extend beyond the DRECP boundary, data were augmented with best available existing data. The Antelope Valley within Los Angeles County represents a large portion of the jurisdiction of the DMCA, the RCIS applicant. The RCIS area is limited to Los Angeles County because the County's Significant Ecological Areas will form important cornerstones to the RCIS conservation priority areas.

### 1.4.5 Focal Species

Focal species are species whose conservation needs are addressed through the RCIS. Chapter 2, *Environmental Setting*, describes all focal species addressed in this Antelope Valley RCIS, along with the selection process. Conservation priorities, including land protection, enhancement, and restoration, are described in the context of their importance for contributing to the conservation and recovery of focal species and their habitats, as well as for other conservation elements in the RCIS area (Chapter 3, *Conservation Strategy*).

### 1.4.6 Strategy Term

After finding that the RCIS meets the requirements of CFGC Section 1852, CDFW may approve an RCIS for an initial period of up to 10 years. CDFW also has the option to extend the duration of an approved or amended RCIS for an additional period of up to 10 years after updating the RCIS with new scientific information and a new finding that the RCIS continues to meet the requirements of Section 1852. DMCA requests approval of this Antelope Valley RCIS for 10 years.

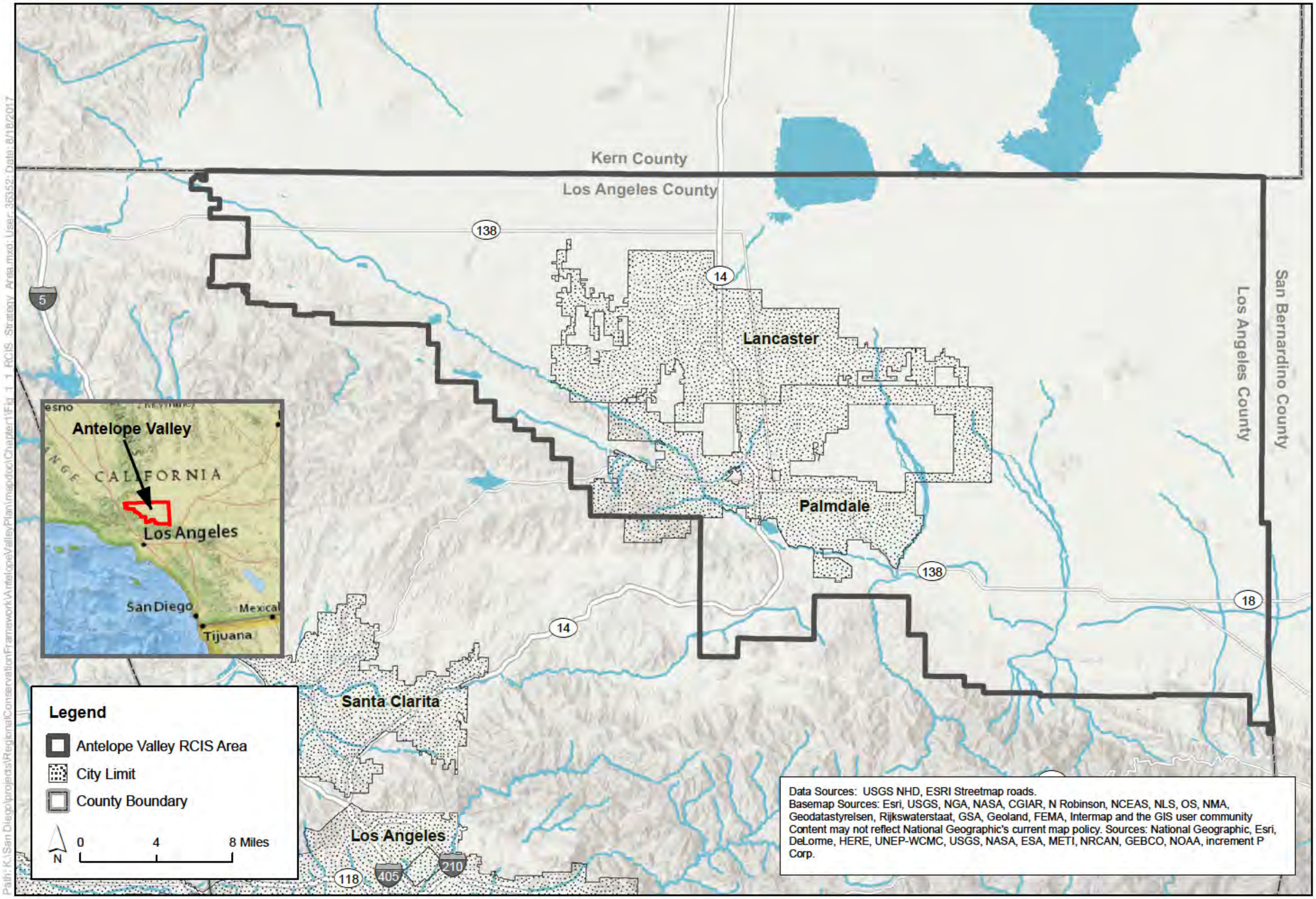


**Figure 1-1**
**Antelope Valley RCIS Area**

### 1.4.7 Requirements

To approve this RCIS, CDFW must find that it meets all of the requirements in the CFGC for an RCIS. To assist CDFW with these findings, Table 1-1 lists the requirements in the order they appear in the CFGC and their correlated sections in this RCIS.

**Exemption to September 2018 RCIS Guidelines:**

The Antelope Valley RCIS is exempt to the September 2018 RCIS Guidelines because it meets the conditions for exemption as stated below.

> All RCISs are subject to the September 2018 Guidelines, except for RCISs that were initiated prior to January 1, 2017 or filed a Notice of Intent (NOI) pursuant to Fish and Game Code Section 1854(c)(1) on or before September 13, 2018. RCISs that were initiated prior to January 1, 2017 or filed an NOI on or before September 13, 2018 are not subject to all of the September 2018 Guidelines sections but they are subject to requirements in several sections. Any RCIS subject to the June 2017 Guidelines must be submitted to CDFW for completeness review by March 29, 2019. In the event the RCIS is not submitted by that date, it will thereafter be subject to the September 2018 Guidelines.

**Table 1-1. California Fish and Game Code Requirements for an RCIS**

| California Fish and Game Code Section | Required Element | Relevant RCIS Section(s) |
|---|---|---|
| 1852(c) | The department may approve a regional conservation investment strategy pursuant to this chapter. A regional conservation investment strategy may be proposed by the department or any other public agency, and shall be developed in consultation with local agencies that have land use authority within the geographic area of the regional conservation investment strategy. The department may only approve a regional conservation investment strategy if one or more state agencies request approval of the regional conservation investment strategy through a letter sent to the director indicating that the proposed regional conservation investment strategy would contribute to meeting both of the following state goals:<br>(1) Conservation.<br>(2) Public infrastructure or forest management. | Section 1.4.3, *Sponsoring State Agency* |
| 1852(c)(2) | An explanation of the conservation purpose of and need for the strategy. | Section 1.2, *Purpose and Need* |
| 1852(c)(2) | The geographic area of the strategy and rationale for the selection of the area, together with a description of the surrounding ecoregions and any adjacent protected habitat areas or linkages that provide relevant context for the development of the strategy. | Section 1.4.4, *RCIS Area* |
| 1852(c)(3) | The focal species[2] included in, and their current known or estimated status within, the strategy. | Section 1.4.5, *Focal Species* |

[2] Focal species are species whose conservation needs are addressed through the RCIS (Section 1.4.5, *Focal Species*).

| California Fish and Game Code Section | Required Element | Relevant RCIS Section(s) |
|---|---|---|
| 1852(c)(4) | Important resource conservation elements within the RCIS area, including, but not limited to:<br>• Important ecological resources and processes.<br>• Natural communities.<br>• Habitat.<br>• Habitat connectivity.<br>• Existing protected areas.<br>• An explanation of the criteria and methods used to identify those important conservation elements. | Section 2.1, *Natural Environment* |
| 1852(c)(5) | A summary of historic, current, and projected future stressors and pressures in the RCIS area, including climate change vulnerability, on the focal species, habitat, and other natural resources, as identified in the best available scientific information, including, but not limited to, the State Wildlife Action Plan. | Section 2.3, *Pressures and Stressors on Focal Species and on other Conservation Elements* |
| 1852(c)(6) | Consideration of major water, transportation and transmission infrastructure facilities, urban development areas, and city, county, and city and county general plan designations that accounts for reasonably foreseeable development of major infrastructure facilities, including, but not limited to, renewable energy and housing in the RCIS area. | Sections 2.1.5.2, *Working Lands,* 2.2, *Built Environment,* and 2.2.3, *Major Infrastructure* |
| 1852(c)(7) | Provisions ensuring that the strategy will comply with all applicable state and local requirements and does not preempt the authority of local agencies to implement infrastructure and urban development in local general plans. | Section 1.4, *Overview* |
| 1852(c)(8) | Conservation goals and measurable objectives for the focal species and important conservation elements identified in the strategy that address or respond to the identified stressors and pressures on focal species. | Section 3.4*, Conservation Strategy for Focal Species and Conservation Elements* |
| 1852(c)(9) | Conservation actions, including a description of the general amounts and types of habitat that, if preserved or restored and permanently protected, could achieve the conservation goals and objectives, and a description of how the conservation actions and habitat enhancement actions were prioritized and selected in relation to the conservation goals and objectives. | Section 3.4*, Conservation Strategy for Focal Species and Conservation Elements* |
| 1852(c)(10) | Provisions ensuring that the strategy is consistent with and complements any administrative draft natural community conservation plan, approved natural community conservation plan, or federal habitat conservation plan that overlaps with the RCIS area. | Section 1.6, *Relevant Conservation Plans and Policies* |
| 1852(c)(11) | An explanation of whether and to what extent the strategy is consistent with any previously approved strategy or amended strategy, state or federal recovery plan, or other state or federal approved conservation strategy that overlaps with the RCIS area. | Section 1.6, *Relevant Conservation Plans and Policies* |

| California Fish and Game Code Section | Required Element | Relevant RCIS Section(s) |
|---|---|---|
| 1852(c)(12) | A summary of mitigation banks and conservation banks approved by the department or USFWS that are located within the RCIS area or whose service area overlaps with the RCIS area. | Section 2.2.4, *Protected Areas* |
| 1852(c)(13) | A description of how the strategy's conservation goals and objectives provide for adaptation opportunities against the effects of climate change for the strategy's focal species. | Sections 2.3*, Pressures and Stressors on Focal Species and other Conservation Elements,* and 3.2, *Identifying Areas of High Conservation Value* |
| 1852(c)(14) | Incorporation and reliance on, and citation of, the best available scientific information regarding the RCIS area and the surrounding ecoregion, including a brief description of gaps in relevant scientific information, and use of standard or prevalent vegetation classifications and standard ecoregional classifications for terrestrial and aquatic data to enable and promote consistency among regional conservation investment strategies throughout California. | Section 2.1, *Natural Environment* |
| 1852(d) | A regional conservation investment strategy shall compile input and summary priority data in a consistent format that could be uploaded for interactive use in an Internet Web portal and that would allow stakeholders to generate queries of regional conservation values within the RCIS area. | *Data Basin Web Portal: Antelope Valley RCIS* https://databasin.org/ |
| 1852(e) | In addition to considering the potential to advance the conservation of focal species, regional conservation investment strategies shall consider all of the following:<br>• The conservation benefits of preserving working lands for agricultural uses.<br>• Reasonably foreseeable development of infrastructure facilities.<br>• Reasonably foreseeable projects in the RCIS area, including, but not limited to, housing.<br>• Reasonably foreseeable development for the production of renewable energy.<br>• Draft natural community conservation plans within the area of the applicable regional conservation investment strategy. | Sections 2.1.5.2, *Working Lands*, 2.2, *Built Environment*, and 1.6, *Relevant Conservation Plans and Policies* |
| 1854(a) | The department may prepare or approve a regional conservation investment strategy, or approve an amended strategy, for an initial period of up to 10 years after finding that the strategy meets the requirements of Section 1852. | Section 1.4.6, *Strategy Term* |

| California Fish and Game Code Section | Required Element | Relevant RCIS Section(s) |
|---|---|---|
| 1854(c)(1) | A public agency shall publish notice of its intent to create a regional conservation investment strategy. This notice shall be filed with the Governor's Office of Planning and Research and the county clerk of each county in which the regional conservation investment strategy is found in part or in whole. If preparation of a regional conservation investment strategy was initiated before January 1, 2017, this notice shall not be required. | Section 1.5, *Stakeholder and Public Outreach and Involvement* |
| 1854(c)(3)(*A*) | A public agency proposing a strategy or amended strategy shall hold a public meeting to allow interested persons and entities to receive information about the draft regional conservation investment strategy or amended strategy early in the process of preparing it and to have an adequate opportunity to provide written and oral comments. | Section 1.5, *Stakeholder and Public Outreach and Involvement* |
| 1854(c)(3)(*B*) | In a draft regional conservation investment strategy or amended strategy submitted to the department for approval, the public agency shall include responses to written public comments submitted during the public comment period. | Section 1.5, *Stakeholder and Public Outreach and Involvement* |
| 1854(c)(3)(*D*) | If preparation of a regional conservation investment strategy was initiated before January 1, 2017, and a public meeting regarding the strategy was not held before January 1, 2017, the public meeting required under this section may be held after January 1, 2017, if it is held at least 30 days before the strategy is submitted to the department for approval. | Section 1.5, *Stakeholder and Public Outreach and Involvement* |
| 1854(c)(3)(*D*) | If preparation of a regional conservation investment strategy was initiated before January 1, 2017, and a public meeting regarding the strategy was not held before January 1, 2017, the public meeting required under this section may be held after January 1, 2017, if it is held at least 30 days before the strategy is submitted to the department for approval. | Section 1.5, *Stakeholder and Public Outreach and Involvement* |
| 1854(c)(4) | At least 30 days before holding a public meeting to distribute information about the development of a draft regional conservation investment strategy or amended strategy, a public agency proposing a strategy shall provide notice of a regional conservation investment strategy or amended strategy public meeting as follows:<br>(A) On the public agency's Internet Web site and any relevant LISTSERV.<br>(B) To each city, county, and city and county within or adjacent to the regional conservation investment RCIS area.<br>(C) To the implementing entity for each natural community conservation plan or federal regional habitat conservation plan that overlaps with the RCIS area.<br>(D) To each public agency, organization, or individual who has filed a written request for the notice, including | Section 1.5, *Stakeholder* and *Public Outreach and Involvement* |

| California Fish and Game Code Section | Required Element | Relevant RCIS Section(s) |
|---|---|---|
| | any agency, organization, or individual who has filed a written request to the department for notices of all regional conservation investment strategy public meetings. | |
| 1854(c)(5) | At least 60 days before submitting a final regional conservation investment strategy or amended strategy to the department for approval, the public agency proposing the investment strategy or amended strategy shall notify the board of supervisors and the city councils in each county within the geographical scope of the strategy and provide the board of supervisors and the city councils with an opportunity to submit written comments for a period of at least 30 days. | Section 1.5, *Stakeholder and Public Outreach and Involvement* |
| 1854(e) | The department shall require the use of consistent metrics that incorporate both the area and quality of habitat and other natural resources in relation to a regional conservation investment strategy's conservation objectives to measure the net change resulting from the implementation of conservation actions and habitat enhancement actions. | Section 3.3, *Gap Analysis for Focal Species,* Table 3-9, *Gap Analysis Results and Quantitative Conservation Priorities* |
| 1856(b) | For a conservation action or habitat enhancement action identified in a regional conservation investment strategy to be used to create mitigation credits pursuant to this section, the regional conservation investment strategy shall include, in addition to the requirements of Section 1852, all of the following:<br>(1) An adaptive management and monitoring strategy for conserved habitat and other conserved natural resources.<br>(2) A process for updating the scientific information used in the strategy, and for tracking the progress of, and evaluating the effectiveness of, conservation actions and habitat enhancement actions identified in the strategy, in offsetting identified threats to focal species and in achieving the strategy's biological goals and objectives, at least once every 10 years, until all mitigation credits are used.<br>(3) Identification of a public or private entity that will be responsible for the updates and evaluation required pursuant to paragraph (2). | Sections 3.6, *Monitoring and Adaptive Management Framework,* and 4.2.1.1, *Updating this RCIS with Best Available Science* |

RCIS = Regional Conservation Investment Strategy; USFWS = U.S. Fish and Wildlife Service

# 1.5 Stakeholder and Public Outreach and Involvement

Public outreach and involvement has been an important part of the process of developing this RCIS. The Steering Committee led the public outreach and involvement process to ensure that CFGC public meeting requirements were met and to engage potential users of this RCIS throughout the RCIS development process.

The requirements for public involvement prior to the approval of an RCIS, as described in CFGC 1854, are presented in Table 1-1 and summarized here, along with a description of how the Steering Committee met these requirements.

CFGC 1854(c)(1) requires a public agency to publish notice of its intent to create an RCIS. If preparation of the RCIS was initiated before January 1, 2017, however, this notice is not required. Because development of this Antelope Valley RCIS began in June 2016, a notice of intent to create an RCIS was not published.

CFGC 1854(c)(3)(A) requires that the public agency preparing an RCIS (in the case of this RCIS, DMCA) hold a public meeting to allow interested persons and entities to receive information about the RCIS early in the preparation process and to have adequate opportunity to provide written and oral comments. As required in CFGC 1854(c)(4), at least 30 days before holding the public meeting, the Steering Committee provided notice of the development of the draft Antelope Valley RCIS on DMCA's website to each city, county, and city and county within and adjacent to the RCIS area. The public meeting was also broadly noticed through DCMA's listserv, the County of Los Angeles, and by many of the Steering Committee participating organizations. No public agency, organization, or individual filed a written request for the notice, so no additional notices were sent.

Consistent with this requirement, the Steering Committee held a public meeting on March 7, 2017, at the Antelope Valley Transit Authority Offices, 42210 6th Street W., Lancaster, California. The meeting provided opportunity for interested parties to receive preliminary information about a non-regulatory planning effort underway to prepare an Antelope Valley RCIS and to provide comments. Interested persons were invited to provide written comments to the Steering Committee. The public meeting notice, agenda, PowerPoint presentation, and handouts provided at the public meeting are included in Appendix C, *Stakeholder Involvement and Public Outreach*.

CFGC 1854(c)(5) requires that, at least 60 days before submitting a final RCIS to CDFW for its review and approval, the RCIS applicant (i.e., DMCA) must notify the board of supervisors and the city councils in each county within the RCIS area and provide the board of supervisors and the city councils an opportunity to submit written comments for at least 30 days. DMCA will notify the Los Angeles County board of supervisors and the city councils in Palmdale and Lancaster consistent with this requirement.

CFGC 1854(c)(3)(B) requires that in the RCIS submitted to CDFW for approval, the public agency must include responses to written public comments submitted during the public comment period. Responses to written public comments are included in Appendix C.

In addition to the required public outreach measures described above and the stakeholder engagement described for the Steering Committee, Advisory Committee, and Technical Subcommittee in Section 1.4.2, *Development Team*, outreach and engagement efforts were conducted with the Association of Rural Town Councils. Refer to Appendix C for a summary of all stakeholder and public outreach and involvement efforts, including lists of participants.

# 1.6 Relevant Conservation Plans and Policies

The Program Guidelines require that an RCIS be consistent with any approved state or federal recovery plan, or other state or federal approved conservation strategy that overlaps with the RCIS area. In addition, an RCIS must be consistent with and complement any administrative draft NCCP, approved NCCP, or federal HCP. The RCIS must take into account and be consistent with the SWAP (California Department of Fish and Wildlife 2015). This section identifies NCCPs, HCPs, state or federal recovery plans, or other state or federal approved conservation strategies that overlap the RCIS area.

CFGC Section 1852 also requires that the RCIS consider major water, transportation, and transmission infrastructure facilities; urban development areas; and city, county, and city and county general plan designations that account for reasonably foreseeable development in the RCIS area. Relevant plans and policies in the RCIS area include local government general plans and major infrastructure development plans for transportation, water, and renewable energy; these are described in Section 2.2, *Built Environment*,

## 1.6.1 Natural Community Conservation Plans and Habitat Conservation Plans

There are no approved NCCPs in the RCIS area. The DRECP (a proposed HCP/NCCP) was released as a public draft in 2014 but there is no intention by its applicants to complete it. Instead, the Bureau of Land Management (BLM) completed a land use plan amendment in 2015 consistent with the DRECP. The conservation components of the DRECP were published in 2016 as the California Desert Biological Conservation Framework (described below). There is one approved HCP in the RCIS area, the *Statewide Electrified Fence Project HCP* (California Department of Corrections 1999). This HCP covers 29 state prison sites throughout California, one of which is found in the RCIS area, California State Prison—Los Angeles, in Lancaster.

## 1.6.2 Existing Recovery Plans and Other Conservation Plans

Several state or federal recovery plans overlap the RCIS area, and many state and local conservation plans address the RCIS area (Table 1-2 and Figure 1-2). Because much of the biological foundation components (e.g., focal species distribution models, land cover mapping) and conservation goals and objectives of this Antelope Valley RCIS are based on the California Desert Biological Conservation Framework and the SWAP, a more detailed description of these plans is included in the subsections below.

**Table 1-2. Existing Recovery and Other Conservation Plans**

| Plan Type | Plan Name | Responsible Entity and Year Published | Incorporation into RCIS |
|---|---|---|---|
| Multispecies Recovery Plans | Recovery Plan for Vernal Pools of Southern California | U.S. Fish and Wildlife Service 1998a | Focal species; critical habitat included in prioritization. |
| Single Species Recovery Plans | Revised Recovery Plan for the Mojave Population of the Desert Tortoise | U.S. Fish and Wildlife Service 2011 | Focal species; critical habitat included in prioritization. |
| | Draft Recovery Plan for Least Bell's Vireo | U.S. Fish and Wildlife Service 1998b | Focal species; critical habitat included in prioritization. |
| | Recovery Plan for the California Condor | U.S. Fish and Wildlife Service 1996 | Focal species; critical habitat included in prioritization. |
| State-Wide or Regional Conservation Assessments | California Desert Biological Conservation Framework | California Energy Commission et al. 2016 | The Conservation Framework (born out of the DRECP; see below in table) land cover dataset is used by this RCIS; as such, it is a component of the species habitat models and descriptions of natural communities and land cover types, and the basis for developing the conservation strategy. The RCIS goals, objectives, conservation priorities, and actions are designed to complement the Conservation Framework and are incorporated into this RCIS. |
| | Audubon Important Bird Areas | Audubon 2016 | Included in biological value area mapping and considered for focal species selection. |
| | State Wildlife Action Plan | California Department of Fish and Wildlife 2015 | Included in focal species selection process, land cover mapping, and identification of stressors and pressures to focal species and other conservation elements. |
| | Fire Resource and Assessment Program | CAL FIRE Fire Resource and Assessment Program 2015 | Land cover data incorporated. |
| | Riparian Bird Conservation Plan | Riparian Habitat Joint Venture 2004 | Focal species conservation goals and objectives. |
| Regional Conservation Strategies | DRECP Land Use Plan Amendment and Record of Decision | Bureau of Land Management 2016 | Included the development of the biological foundational elements of the California Deserts Biological Conservation Framework (see above in table). |
| | West Mojave Plan and Record of Decision[1] | Bureau of Land Management 2005a, 2006 | The RCIS goals, objectives, conservation priorities, and actions are designed to complement the plan and are incorporated into this RCIS. |

| Plan Type | Plan Name | Responsible Entity and Year Published | Incorporation into RCIS |
|---|---|---|---|
| Critical Habitat | Desert Tortoise, Mojave Population | U.S. Fish and Wildlife Service 1994 (50 CFR Part 17) | Focal species; critical habitat areas included in prioritization. |
| Wildlife Linkage Analyses | California Essential Habitat Connectivity Project | California Department of Fish and Wildlife 2010 | Linkages considered in prioritization. |
| | A Linkage Network for the California Deserts | Penrod et al. 2012 | Linkages considered in prioritization. |

[1] BLM's draft West Mojave Plan was published in 2005 jointly with the draft West Mojave HCP. Although many jurisdictions, including Kern County, participated in the development of BLM's West Mojave Plan, only San Bernardino County and the City of Barstow signed on to the draft West Mojave HCP. The HCP portion of the document was never completed by the local jurisdictions.
BLM = Bureau of Land Management; CAL FIRE = California Department of Forestry and Fire Protection; DRECP = Desert Renewable Energy Conservation Plan; HCP = habitat conservation plan; RCIS = Regional Conservation Investment Strategy

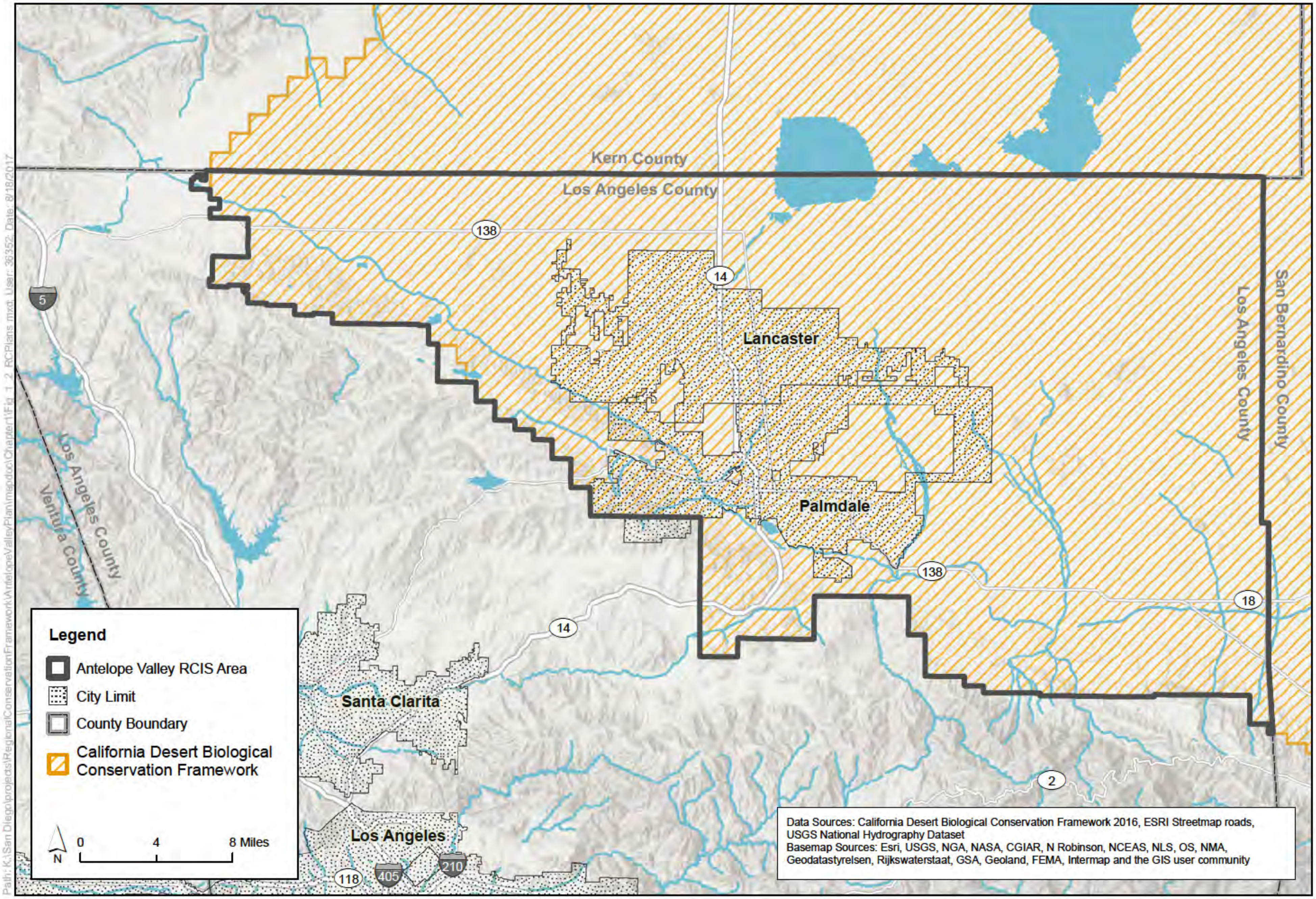


**Figure 1-2**
**California Desert Biological Conservation Framework Area**

### 1.6.2.1 California Desert Biological Conservation Framework

The California Desert Biological Conservation Framework, published in December 2016, was born out of the DRECP as a purely informational (i.e., non-regulatory) conservation planning document. The DRECP, a major component of California's renewable energy planning efforts, was intended to help provide effective protection and conservation of desert ecosystems while allowing for the appropriate development of renewable energy projects. The DRECP area included 22.5 million acres in the desert regions and adjacent lands of seven California counties—Imperial, Inyo, Kern, Los Angeles, Riverside, San Bernardino, and San Diego—including almost all of the RCIS area.

The DRECP process resulted in a BLM land use plan amendment, which was finalized in September of 2016. The amendment had minimal effect on the RCIS area because only a very small portion of the RCIS area is administered by BLM. However, the California Desert Biological Conservation Framework includes all of the conservation planning data and results developed for the DRECP, including biological goals and objectives for the landscape, natural communities, and 37 species covered under the plan. Elements developed for the DRECP, including species distribution models, natural community mapping, and biological goals and objectives, provide much of the broader biological context from which this Antelope Valley RCIS was developed.

Key elements of the biological conservation framework are the biological conservation focus, framework biological goals and objectives, and biological conservation actions. As envisioned by the interagency team that developed the framework, conservation strategies and decisions made by federal, state, and local planners would incorporate elements of the conservation strategy established in this framework. Using these elements, a framework-level analysis of conservation potential was conducted for landscape and ecological processes, natural communities, and focal species. The framework-level analysis demonstrated that conservation on both public lands and private lands is necessary for protecting and maintaining biodiversity in California.

Additionally, the biological conservation framework follows federal and state policy guidance provided by the national climate adaptation strategy, USFWS's Strategic Habitat Conservation approach, California Natural Resources Agency's 2009 California Climate Adaptation Strategy, and the implementation strategies identified in *Safeguarding California: Reducing Climate Risk* (National Fish Wildlife and Plants 2012; U.S. Geological Survey and U.S. Fish and Wildlife Service 2006; California Natural Resources Agency 2009, 2014). Among other actions, these plans call for increased monitoring across California's natural and working lands (e.g., agricultural fields) and for direct integration of a series of species-based vulnerability assessments into the landscape conservation planning process. Many of the vulnerability assessments identified in the California climate implementation plans are for desert species. The framework document describes biological conservation actions that can provide climate change adaptation and resiliency.

For counties, cities, and other entities on non-BLM lands in the California deserts, the framework provides a foundation from which land use plans, policies, and decisions can be developed, including this Antelope Valley RCIS. Furthermore, the framework is intended to support more specific and actionable planning.

### 1.6.2.2 State Wildlife Action Plan

California recently completed an update of its SWAP, which is a comprehensive plan for conserving fish and wildlife across the state (California Department of Fish and Wildlife 2015). For each region of California, the SWAP identifies a set of Species of Greatest Conservation Need; sets conservation targets for natural communities, fish, and wildlife; and outlines conservation strategy categories. The SWAP examines the health of wildlife and prescribes actions to conserve wildlife and vital habitat before they become rarer and more costly to protect. The plan also promotes wildlife conservation while furthering responsible development and addressing the needs of a growing human population. SWAP 2015 is a flexible, but scientifically grounded, plan. Employing an ecosystem approach to conserve and manage diverse habitats and species, SWAP 2015 provides a blueprint for actions necessary to address the highest priorities for conserving California's aquatic, marine, and terrestrial resources. Its implementation relies on making important and helpful conservation information more accessible to resource managers and the public, and on developing lasting partnerships with a broad array of governments, agencies, organizations, businesses, and citizens.

California's SWAP 2015 establishes a strategic vision of the integrated conservation efforts needed to sustain the globally important diversity of fish and wildlife resources found in the state. Although SWAP 2015 is not a specific work plan for CDFW or any other organization, it is meant to visualize, support, complement, and unite the plans of the multiple conservation and management entities within California. SWAP 2015 is an adaptive plan that will continually be updated, revised, and improved based on the input and deliberations of all those involved in wildlife conservation.

Three statewide goals to enhance California ecosystems have been identified for SWAP 2015. These overarching goals represent the desired ecological outcomes of SWAP 2015 implementation.

- **Goal 1. Abundance and Richness:** Maintain and increase ecosystem and native species distributions in California, while sustaining and enhancing species abundance and richness.
- **Goal 2. Enhance Ecosystem Conditions:** Maintain and improve ecological conditions vital for sustaining ecosystems in California.
- **Goal 3. Enhance Ecosystem Functions and Processes:** Maintain and improve ecosystem functions and processes vital for sustaining ecosystems in California.

Components of the SWAP described above, including its goal to help integrate conservation planning efforts, flexibility, and scientific foundation, are all congruent to the RCIS program. The SWAP, and specifically the Deserts Province-Specific Conservation Strategy, were relied upon in formulating the components of this RCIS, including the following.

- Species of Greatest Conservation Need considered for focal species in the RCIS (Section 2.1.4, *Focal Species*).
- Key Aquatic Habitats conservation element based on conservation targets identified in the SWAP for the Deserts Province (Section 2.1.5.4, *Key Aquatic Habitats*)
- The land cover data and natural community classifications are consistent with the classification used for the SWAP (Section 2.1.3, *Natural Communities and Land Cover*)
- Many pressures and stressors identified for the RCIS area are based on those identified in the Deserts Province-Specific Conservation Strategy of the SWAP (Section 2.3, *Pressures and Stressors on Focal Species and on other Conservation Elements*)

- Various conservation actions identified in this RCIS are consistent with conservation actions identified in the SWAP (Section 3.4, *Conservation Strategy for Focal Species and Conservation Elements*)

# 1.7 Document Organization

This RCIS and supporting information are presented in the chapters and appendices listed below.

- Chapter 1, *Introduction*, discusses the background, purpose of, and need for the RCIS, the planning process, strategy term, RCIS area, and relevant plans in the RCIS area.
- Chapter 2, *Environmental Setting*, provides an overview of the natural and built environment in the RCIS area, including land cover, protected lands, habitat linkages, and relevant plans and policies.
- Chapter 3, *Conservation Strategy*, discusses stressors and pressures to focal species and other resources, and outlines conservation goals, objectives, actions, and priorities.
- Chapter 4, *Implementation Strategy*, discusses the practical elements for how this RCIS will be implemented, including coordination with other resource agencies, and development of mitigation credit agreements.
- Chapter 5, *References*, is a bibliography of documents, data sources, and personal communications cited in this RCIS.
- Appendix A, *Glossary*
- Appendix B, *Regulatory Processes*
- Appendix C, *Stakeholder Involvement and Public Outreach*
- Appendix D, *Letters of Support*
- Appendix E, *Focal Species Assessment*
- Appendix F, *Focal Species Habitat Models*
- Appendix G, *Modeling Methodology*
- Appendix H, *Species Conservation Value Maps and Graphs*
- Appendix I, *Land Cover Conservation Values Maps and Graphs*

# Chapter 2
# Environmental Setting

This chapter presents an overview of the natural resources and built environment in the Regional Conservation Investment Strategy (RCIS) area to provide context for the voluntary conservation and enhancement actions (Chapter 3, *Conservation Strategy*). This overview consists of the best available information on existing land cover, other natural resources, existing and future infrastructure, and relevant plans and policies in the RCIS area.

This chapter describes the natural setting of the RCIS area for the following topics.

- Ecoregions
- Hydrology
- Natural communities and land cover
- Focal species
- Other conservation elements

Biological resources in the RCIS area that were directly considered in developing the RCIS, including focal species, natural communities, and other important conservation elements, are described further in Chapter 3, *Conservation Strategy*.

This chapter describes the built environment in the RCIS area for the following topics.

- Local government planning boundaries and plans
- Major infrastructure
- Protected areas

This chapter also describes the following pressures and stressors on focal species and on other important conservation elements.

- Airborne pollutants
- Annual and perennial non-timber crops
- Climate change
- Commercial and industrial areas
- Groundwater pumping
- Fire and fire suppression
- Housing and urban areas; roads and railroads
- Industrial and military effluents
- Invasive plants and animals
- Livestock, farming, and ranching
- Military activities

- Mining and quarrying
- Recreational activities
- Renewable energy
- Utility and service lines

# 2.1 Natural Environment

This section characterizes in the natural environment in the RCIS area.

## 2.1.1 Ecoregions

This section provides a description of the ecoregions that overlap and surround the RCIS area, as required by the *Regional Conservation Investment Strategies Program Guidelines* (Program Guidelines) (California Department of Fish and Wildlife 2017a). California Fish and Game Code (CFGC) 1852(c)(2) states that an RCIS shall include "a description of the surrounding ecoregions…that provide relevant context for the development of the strategy." Furthermore, CFGC 1852(c)(14) states that an RCIS shall include "incorporation and reliance on, and citation of, the best available scientific information regarding the strategy area and the surrounding ecoregion, including a brief description of gaps in relevant scientific information, and use of standard or prevalent vegetation classifications and standard ecoregional classifications for terrestrial and aquatic data to enable and promote consistency among regional conservation investment strategies throughout California."

Ecoregions are areas of general similarity based on major terrain features such as a desert, plateau, valley, mountain range, or a combination thereof. They provide a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregions can be effective units for setting regional conservation goals, as well as developing biological criteria and water quality standards.

Ecoregions are hierarchical and are identified based on patterns of biotic and abiotic phenomena, including geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. North America is divided into different ecological units from coarsest to finest (ecoregions [i.e., provinces], subregions [i.e., sections], landscapes, and land units). The RCIS area overlaps with two ecoregions, each of which contains one subregion that overlaps the RCIS area (Figure 2-1). The ecoregions and subregions that overlap the RCIS area are described in the following sections based on the descriptions provided by the U.S. Department of Agriculture (McNab et al. 2007).

### 2.1.1.1 American Semi-Desert and Desert Province

The American Semi-Desert and Desert Province overlaps with the majority of the RCIS area. This province includes the Mojave Desert (overlaps with RCIS area), Sonoran Desert, and Colorado Desert sections of the California desert. The American Semi-Desert and Desert Province is characterized by extensive plains with isolated low mountains and buttes. Vegetation is typical of desert environments and includes cacti, creosote brush, brittlebrush, and various species of saltbrush.

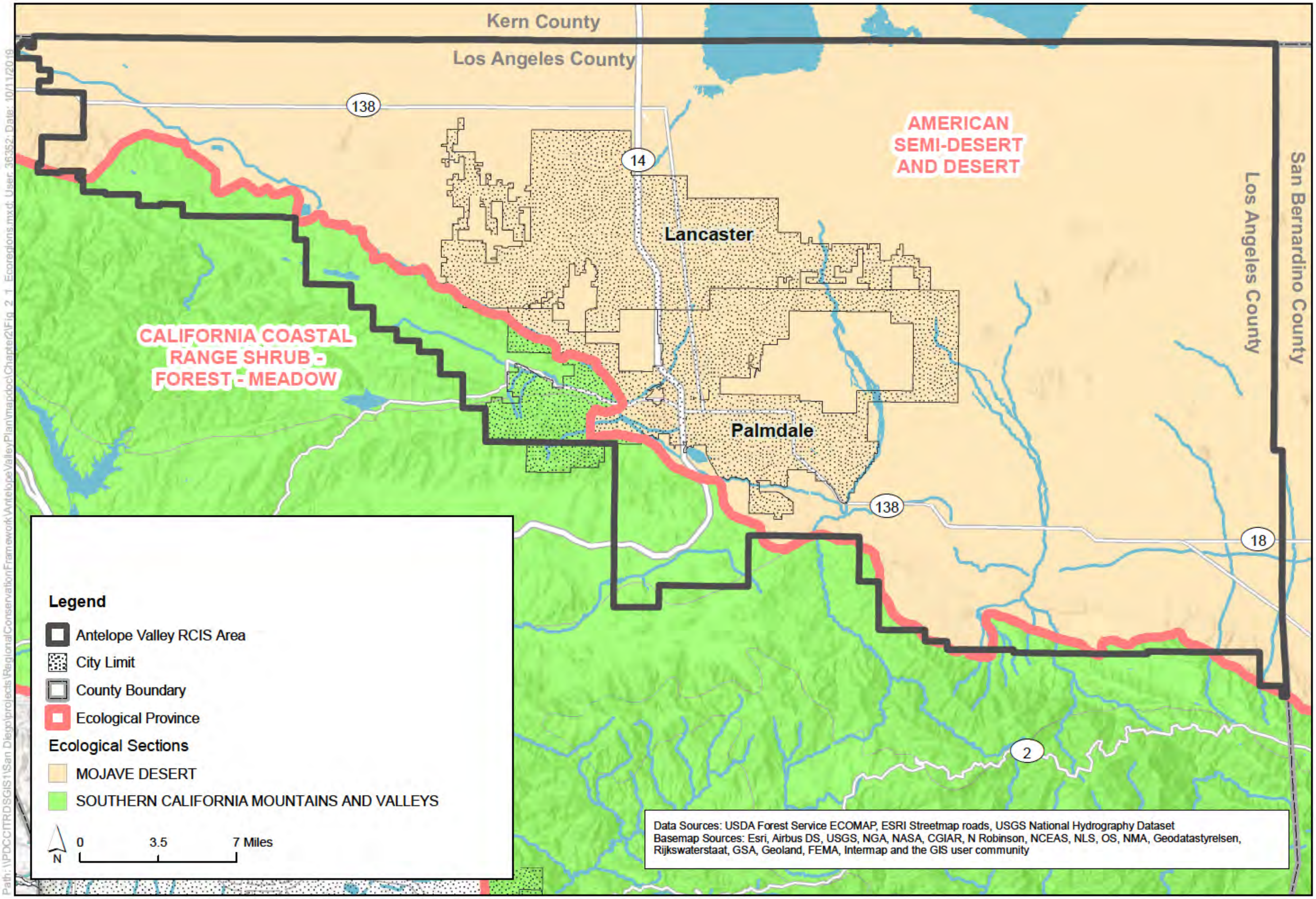


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**Figure 2-1**
**Ecoregions in the Vicinity of the RCIS Area**

### Mojave Desert Section

The Mojave Desert Section consists of desert plains and contains isolated mountains, plateaus, alluvial fans, playas, basins, and dunes. Elevation ranges from 300 feet below sea level to 11,000 feet above sea level. Predominant natural communities found within this province include creosote bush, blackbush, greasewood, and saltbush communities on basins, plains, and hills; Joshua tree communities on plains and hills; and Great Basin sagebrush, California juniper, and pinyon pine communities on mountains. Climate is characterized by desert conditions with minimal annual rainfall (3 to 10 inches) with temperatures ranging from 50 to 75 degrees Fahrenheit (°F).

## 2.1.1.2 California Coastal Range Open Woodland—Shrub—Coniferous Forest—Meadow

The California Coastal Range Open Woodland—Shrub—Coniferous Forest—Meadow Province overlaps with portions of the RCIS area along the area's western border. This province contains two sections, the Central California Coast Ranges and Southern California Mountain and Valleys (overlaps with RCIS area). Vegetation communities include chaparral, sclerophyll communities such as madrone and several species of oak, and sagebrush and grasslands in the valleys. Climate tends to be more temperate than in the eastern and northern portions of the RCIS area that overlaps with the American Semi-Desert and Desert Province.

### Southern California Mountains and Valleys Section

The Southern California Mountains and Valleys Section contains narrow ranges and broad fault blocks, alluviated lowlands, and dissected westward-sloping granitic uplands. This section is in both the Transverse and Peninsular Ranges geomorphic provinces and elevation ranges from 500 to 11,500 feet. Predominant natural communities include chamise, ceanothus, mixed chaparral, various scrub oaks, coast live oak, black oak, tucker oak, needlegrass, Jeffrey pine, canyon oak, and big cone Douglas-Fir series. Precipitation ranges from 10 to 40 inches annually with temperatures averaging between 45 and 64°F.

## 2.1.2 Hydrology

There are two main watersheds within the RCIS area (Figure 2-2): the Northern Mojave River watershed, which covers approximately 98 percent of the RCIS area, and the Ventura–San Gabriel Coastal watershed, which overlaps with small portions of the RCIS area along the western border. The Northern Mojave River watershed is the main watershed for most of the streams and rivers in the RCIS area. The Mojave River, which is outside of the RCIS area, runs approximately 100 miles from the northern slope of the San Bernardino Mountains at Summit Valley near Cajon Pass, north through Victorville, to the northeast through Barstow, then east through the Mojave Valley and Camp Cady to a closed basin sink near Baker. The Ventura–San Gabriel Coastal Basin overlaps with small areas of the RCIS area along the western border and delivers water to the Pacific Ocean.

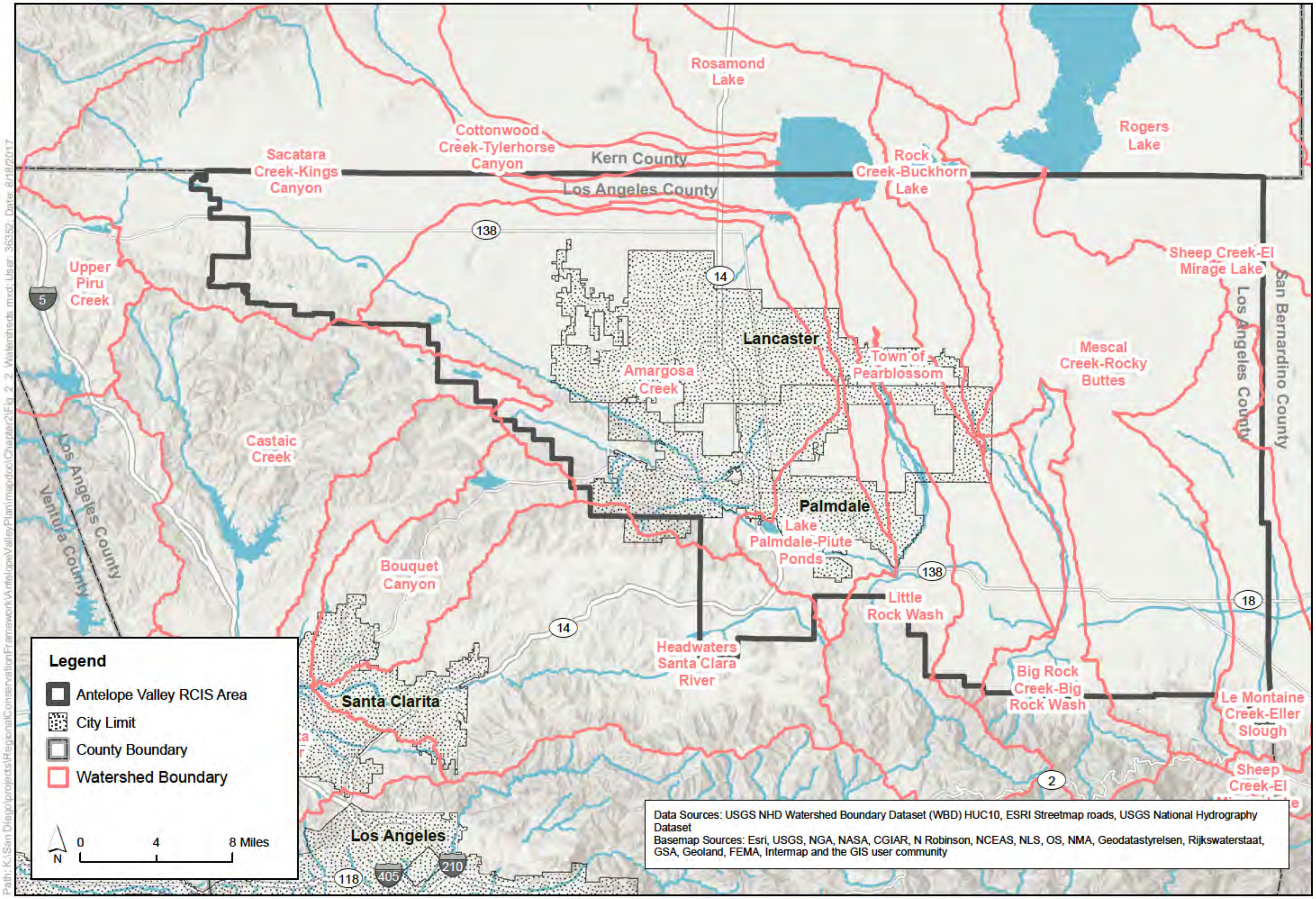


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**Figure 2-2**
**Major Watersheds and Groundwater Basins in the RCIS Area**

The RCIS area falls within the Antelope Valley Groundwater Basin, which is part of the 21.2 million-acre South Lahontan Hydrologic Region, composed of 76 groundwater basins/subbasins (California Department of Water Resources 2004). Antelope Valley Groundwater Basin underlies an extensive alluvial valley in the western Mojave Desert. The elevation of the valley floor ranges from 2,300 to 3,500 feet above sea level. The basin is bounded on the northwest by the Garlock fault zone at the base of the Tehachapi Mountains and on the southwest by the San Andreas fault zone at the base of the San Gabriel Mountains (California Department of Water Resources 2004). The basin is bounded on the east by ridges, buttes, and low hills that form a surface and groundwater drainage divide. It is bounded on the north by Fremont Valley Groundwater Basin at a groundwater divide approximated by a southeastward-trending line from the mouth of Oak Creek through Middle Butte to exposed bedrock near Gem Hill, and by the Rand Mountains farther east. Runoff in Big Rock and Little Rock Creeks from the San Gabriel Mountains and in Cottonwood Creek from the Tehachapi Mountains flows toward a closed basin at Rosamond Lake (California Department of Water Resources 2004). Average annual rainfall in the RCIS area ranges from 5 to 10 inches.

## 2.1.3 Natural Communities and Land Cover

All RCISs are required to identify "important resource conservation elements within the RCIS area, including, but not limited to, important ecological resources and processes, natural communities, habitat, habitat connectivity, and existing protected areas, and an explanation of the criteria, data, and methods used to identify those important conservation elements" (CFGC Section 1852(c)(4)). This Antelope Valley RCIS uses a detailed geographic information system (GIS) to characterize spatially the distribution of natural communities and habitat.

A *natural community* is defined as a group of organisms living together and linked together by their effects on one another and their responses to the environment they share (Sawyer et al. 2009). A *land cover* is the dominant character of the land surface discernible from aerial photographs or other remotely sensed imagery, as determined by vegetation, water, or human uses. Land cover types are the units most widely used in conservation planning to analyze a variety of landscape characteristics, including natural communities, wetlands and streams, species' habitat, ecosystem function, and biological diversity. Land cover is often a function of a variety of physical and biological factors such as plant and animal associations, soil type, topography, climate, and land uses.

The land cover data set is an important tool for developing the RCIS conservation strategy (Chapter 3, *Conservation Strategy*). Among its many uses, the land cover data were used to model focal species' habitat, identify gaps in conservation of habitat and other natural resources, set measurable conservation goals and objectives, and develop conservation actions to achieve the goals and objectives.

### 2.1.3.1 Natural Communities and Land Cover Data Sources

A composite natural community and land cover dataset for the RCIS area was created from the following layers, representing the best available information in the RCIS area in terms of mapping accuracy, resolution, and consistency within and outside the RCIS area.

- California Department of Fish and Wildlife (CDFW) VegCAMP ds735[1] for the majority of the West Mojave Ecoregional Subsection (subecoregion)
- U.S. Forest Service Calveg[2] product cross-walked by CDFW to the National Vegetation Classification Standard (NVCS) attributes for the area in the Antelope Valley study site southwest of the West Mojave subecoregion

## 2.1.3.2 Natural Communities and Land Cover in the RCIS Area

Natural communities are the broadest level of mapping of the natural landscape in this Antelope Valley RCIS and are mapped according to the *Division* level in the NVCS hierarchy. Land cover types are mapped based on the *Macrogroup* level of the NVCS. More detailed land cover mapping occurs at the *Group* level and *Alliance* level of the hierarchy, which are used for the mapping of unique, rare, or imperiled communities (Section 3.2, *Identifying Areas of High Conservation Value*).

Natural communities in the RCIS area are shown on Figure 2-3, and land cover types are shown on Figures 2-4**Error! Bookmark not defined.** through 2-8. Table 2-1 summarizes the RCIS area acreage by natural communities and land cover types. The natural community and land cover types and locations in the RCIS area are described in the sections that follow.

**Table 2-1. Extent of Natural Communities and Land Cover Types in the RCIS Area**

| Natural Community Land Cover | Acres in RCIS Area | Percentage of RCIS Area (%)[1] |
|---|---|---|
| **California Scrub** | **46,077** | **6.7** |
| California Chaparral | 16,145 | 2.4 |
| California Coastal Scrub | 29,932 | 4.4 |
| **California Grassland and Meadow** | **96,558** | **14.1** |
| California Annual and Perennial Grassland | 96,558 | 14.1 |
| **Semi-Desert Scrub and Grassland** | **225,216** | **32.9** |
| Madrean Warm Semi-Desert Wash Woodland/Scrub | 7,427 | 1.1 |
| Mojavean-Sonoran Desert Scrub | 217,789 | 31.9 |
| **Western North American Cool Semi-Desert Scrub and Grassland** | **65,916** | **9.6** |
| Cool Semi-Desert Wash and Disturbance Scrub | 43,049 | 6.3 |
| Inter-Mountain Dry Shrubland and Grassland | 8,381 | 1.2 |
| Western North America Tall Sage Shrubland and Steppe | 1,693 | 0.2 |
| Western North American Cool Semi-Desert Shrubland, Shrub-Steppe | 12,793 | 1.9 |
| **Vancouverian and Rocky Mountain Grassland and Shrubland** | **10,627** | **1.6** |
| Western Cordilleran Montane-Boreal Wet Meadow | 30 | <0.1 |
| Western North American Temperate Grassland and Meadow | 10,598 | 1.5 |
| **Western North America Interior Sclerophyllous Shrubland** | **6,311** | **0.9** |
| Warm Interior Chaparral | 6,202 | 0.9 |
| Lower Montane Chaparral | 109 | <0.1 |

[1] https://map.dfg.ca.gov/metadata/ds0735.html
[2] https://www.fs.usda.gov/detail/r5/landmanagement/resourcemanagement/?cid=stelprdb5347607

| Natural Community Land Cover | Acres in RCIS Area | Percentage of RCIS Area (%)[1] |
|---|---|---|
| **Madrean Forest and Woodland** | **36,758** | **5.4** |
| California Woodland and Forest | 36,646 | 5.4 |
| Californian-Vancouverian Montane and Foothill Forest | 113 | <0.1 |
| **North American Intermountain Basins Scrub Woodland** | **1,968** | **0.3** |
| Intermountain Basins Pinyon-Juniper Woodland | 1,968 | 0.3 |
| **Western North America Warm Temperate Flooded and Swamp Forest** | **1,525** | **0.2** |
| Southwestern North American Riparian, Flooded and Swamp Forest | 1,525 | 0.2 |
| **Western North American Freshwater Marsh** | **56** | **<0.1** |
| Western North America Vernal Pool | <1 | <0.1 |
| Western North America Wet Meadow and Low Shrub Carr | 15 | <0.1 |
| Western North American Freshwater Marsh | 41 | <0.1 |
| **Western North American Interior Alkali-Saline Wetland** | **64,045** | **9.4** |
| Cool Semi-Desert Alkali-Saline Wetlands | 45,086 | 6.6 |
| Warm Semi-Desert/Mediterranean Alkali-Saline Wetland | 18,959 | 2.8 |
| **North American Mediterranean Rock Outcrop, Scree, and Talus Nonvascular and Sparse Vascular Vegetation** | **1,030** | **0.2** |
| California Cliff, Scree, and Other Rock Vegetation | 1,030 | 0.2 |
| **North American Warm Semi-Desert Cliff, Scree, and Rock Vegetation** | **5,892** | **0.9** |
| North American Warm Semi-Desert Cliff, Scree, and Other Rock Vegetation | 5,892 | 0.9 |
| **Agriculture** | **36,716** | **5.4** |
| Deciduous Orchard, Vineyard | 1,796 | 0.3 |
| Irrigated Row and Field Crops | 34,920 | 5.1 |
| **Urban and Developed** | **80,854** | **11.8** |
| Urban and Developed | 80,854 | 11.8 |
| **Water** | **4,183** | **0.6** |
| Lacustrine | 4,183 | 0.6 |

Sources: California Energy Commission et al. 2014; VegCAMP ds735; Calveg
[1] Percentages may not add exactly due to rounding methods.

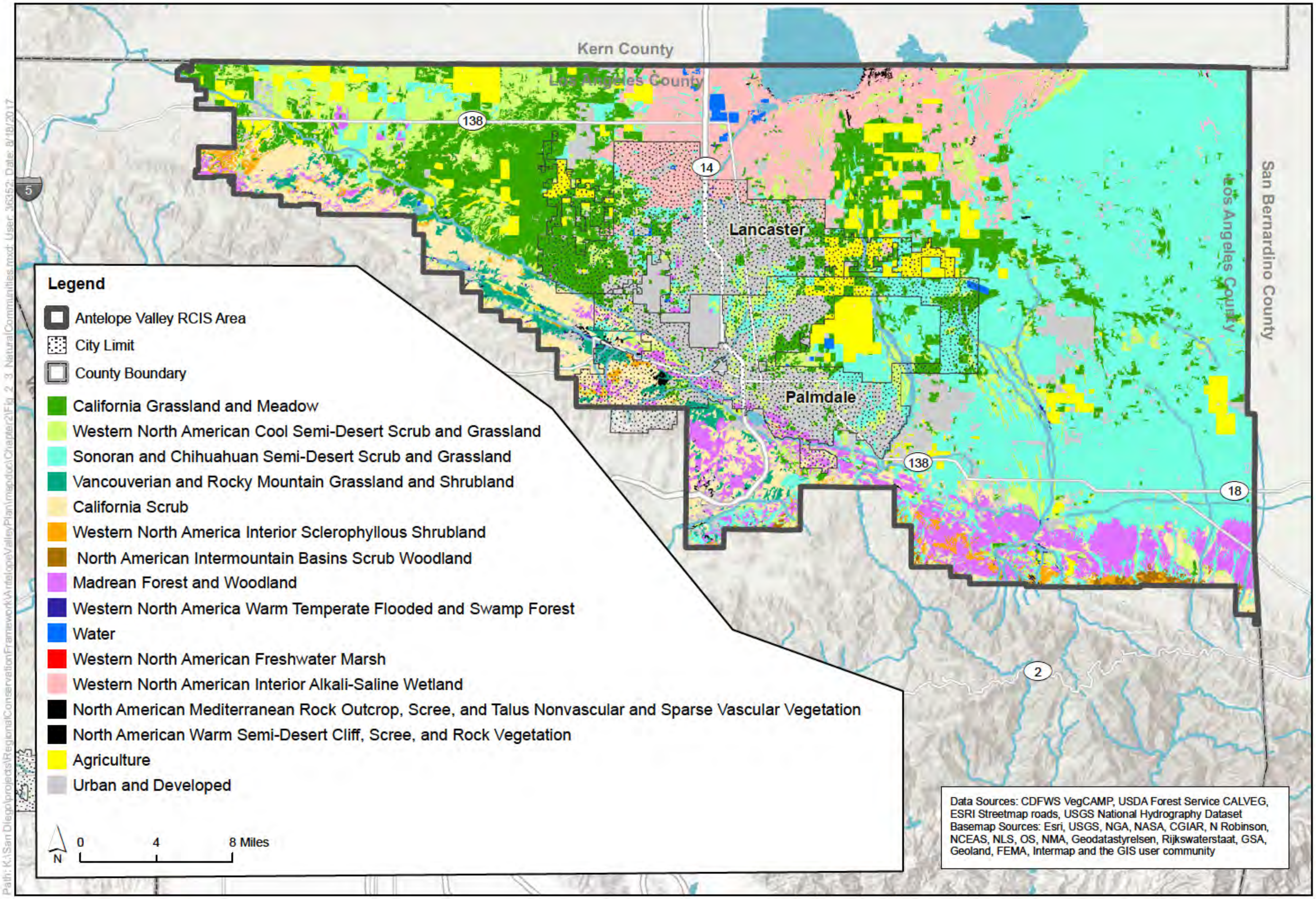


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**Figure 2-3**
**Natural Communities of the Antelope Valley RCIS Area**

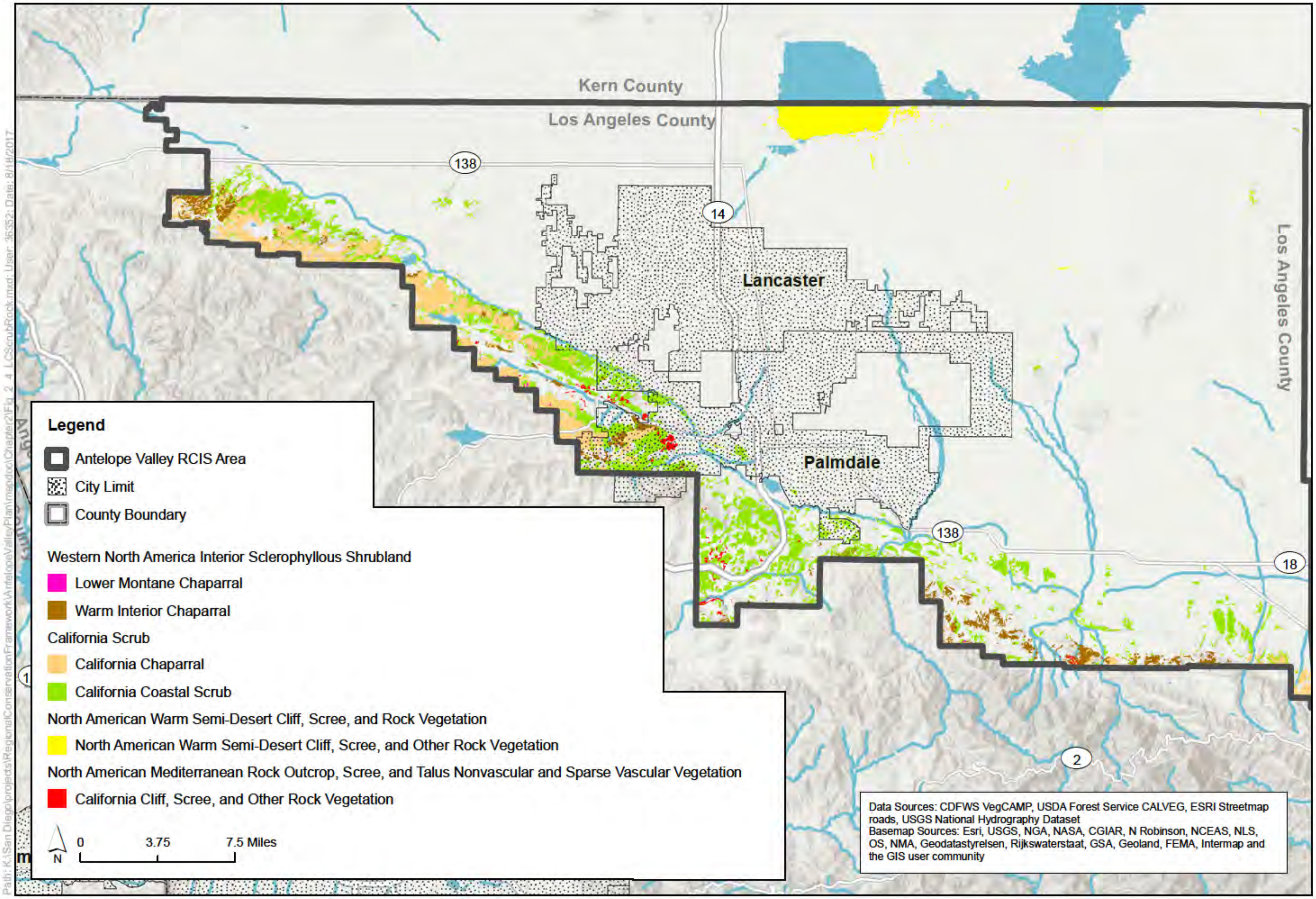


**Figure 2-4**
**Scrub and Rock Outcrop Land Cover in the Antelope Valley RCIS Area**

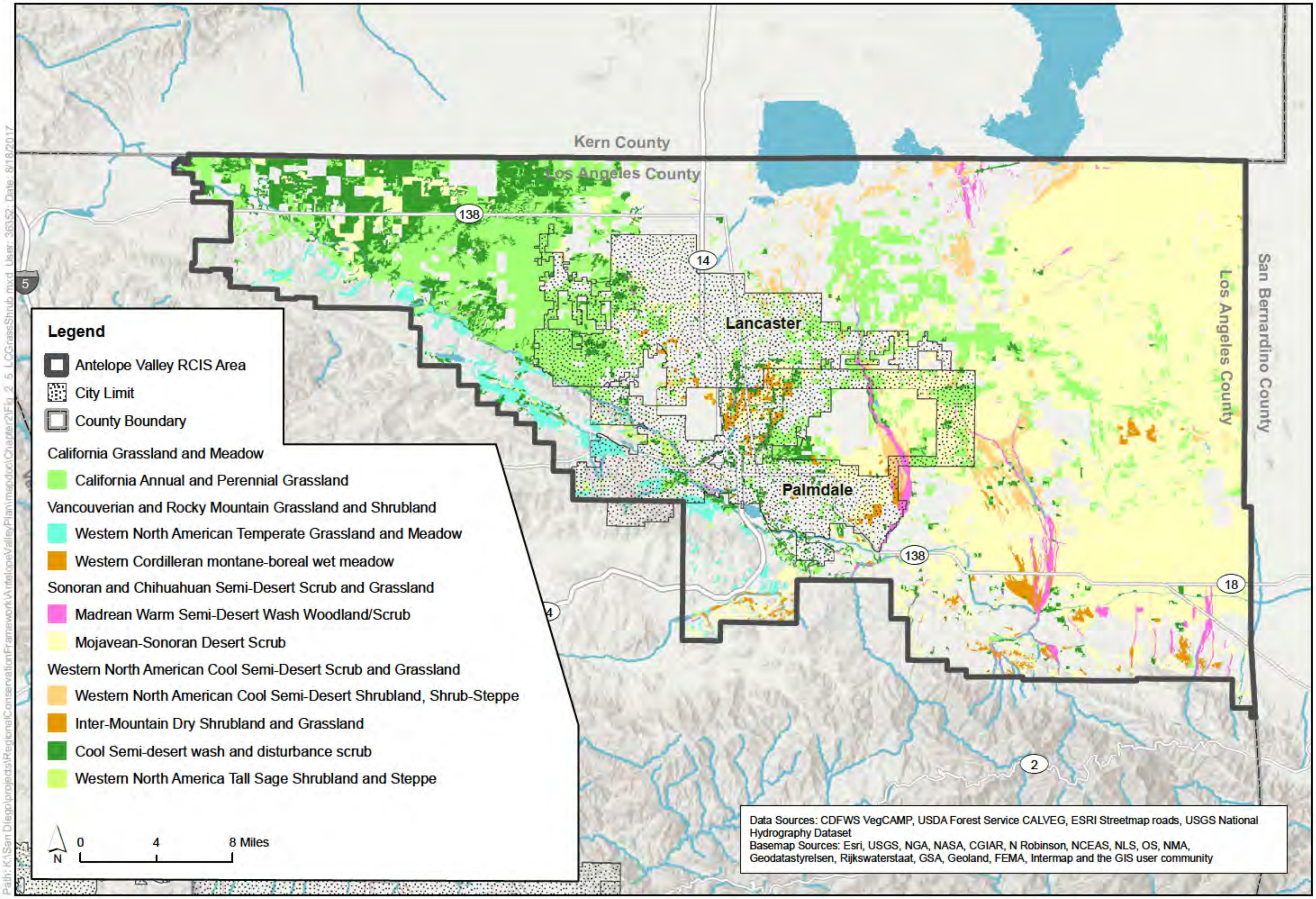


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**Figure 2-5**
**Grassland and Shrubland Land Cover in the Antelope Valley RCIS Area**

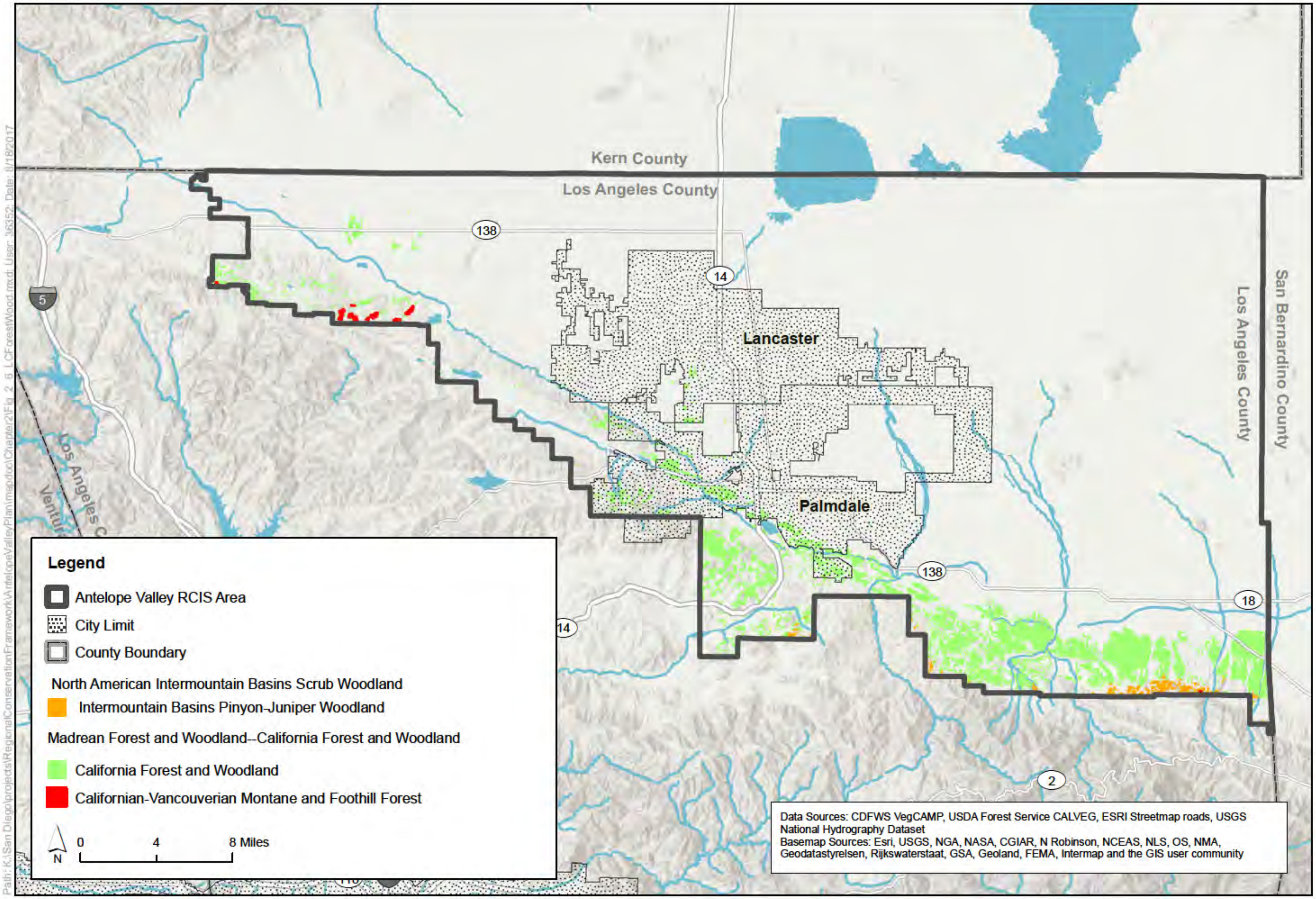


**Figure 2-6**
**Forest and Woodland Land Cover in the Antelope Valley RCIS Area**

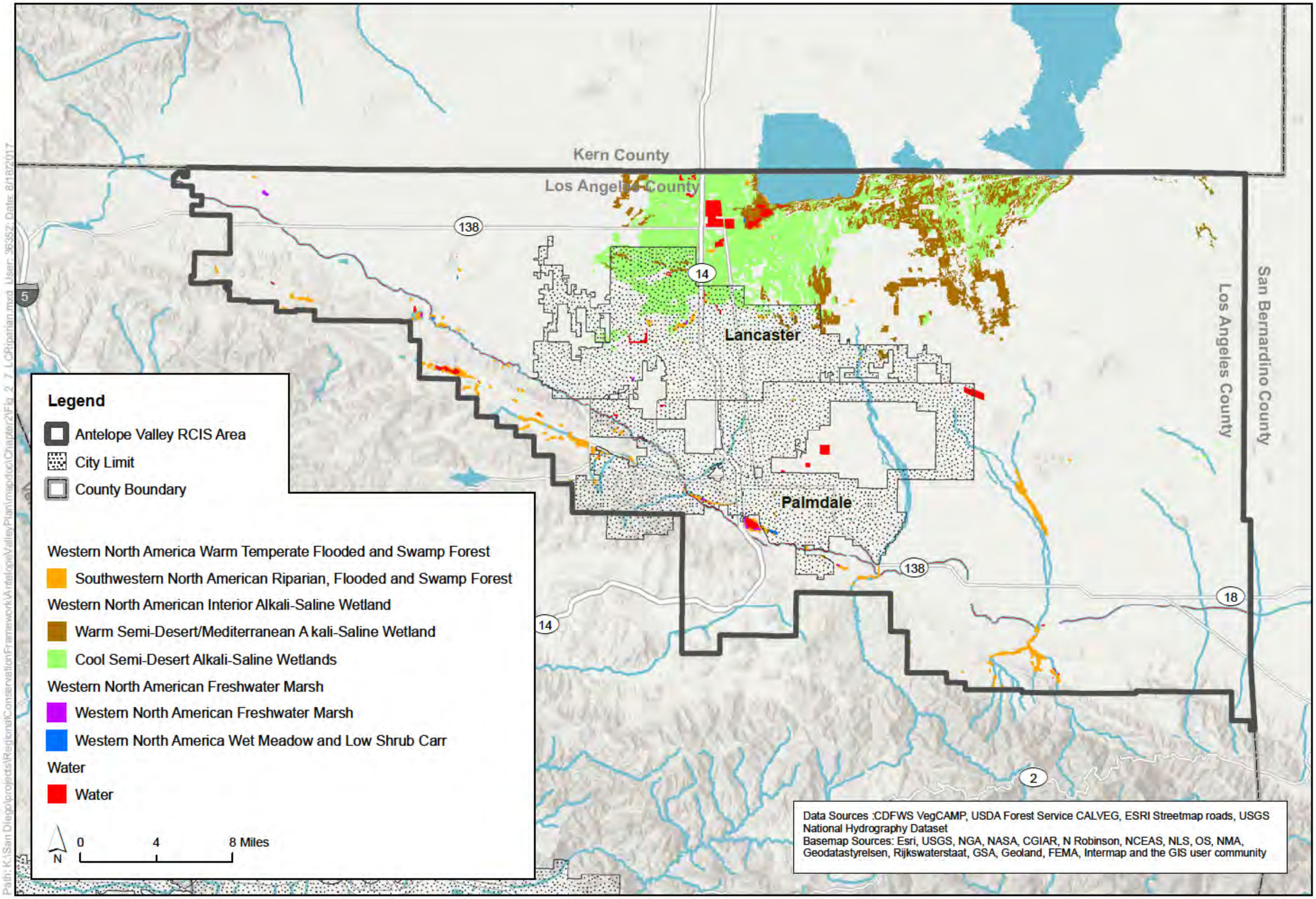


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**Figure 2-7**
**Riparian and Wetland Land Cover in the Antelope Valley RCIS Area**

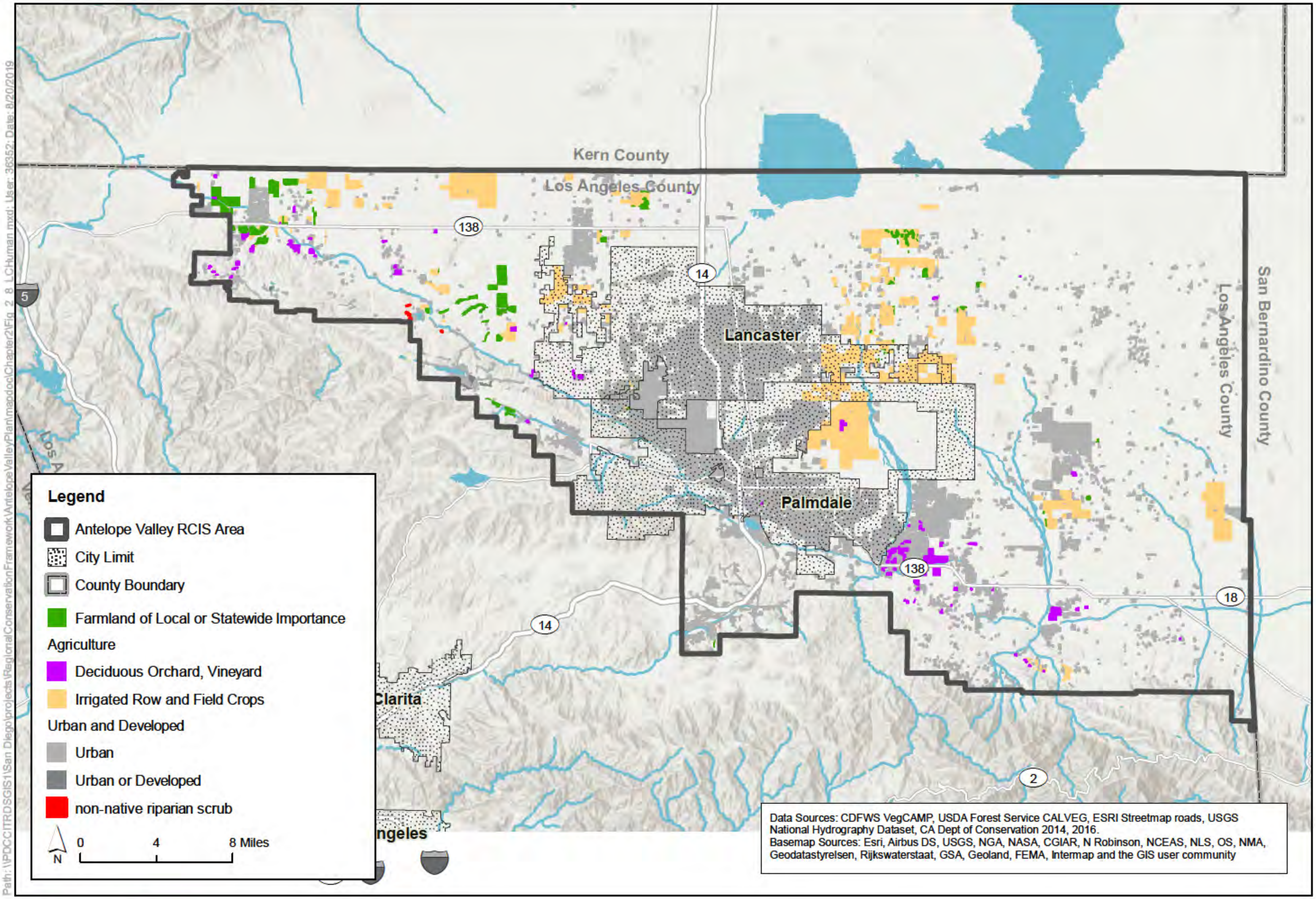


**Figure 2-8**
**Human Modified Land Cover in the Antelope Valley RCIS Area**

## California Scrub

The Californian scrub natural community occurs in the warm-temperate Californian Floristic Province,[3] from southwestern Oregon through California, west of the Sierra-Cascades divide and south into northwestern Baja California, Mexico.

This natural community is composed of two distinct vegetation communities: California chaparral and coastal scrub land cover types. Chaparral occurs on rocky, porous, nutrient-deficient soils on steep slopes up to 2,000 meters in elevation (Keeley 2000). These communities are dominated by densely packed and nearly impenetrable drought-adapted evergreen woody shrubs with small, thick, leathery sclerophyllous leaves (Hanes 1988; Keeley 2000). In comparison, the coastal scrub cover types generally consist of low "soft" shrubs in open to dense shrublands, interspersed with grassy openings or little to no herbaceous layer.

California scrub is classified into two land cover types and is mostly found along the western border of the RCIS area.

- California chaparral
- Coastal scrub

### California Chaparral

The California chaparral land cover type occurs along the coast and into the western foothills of the Sierra Nevada. It is typically found on arid, south-facing slopes and ridges, and occasionally on mesic sites, such as north-facing slopes, concavities, or toe slopes, with well-drained soils and mafic soils. The more frost-tolerant species are found at higher, cooler, and generally more mesic sites up to approximately 6,000 feet. Chaparral is naturally displaced by woodlands on very mesic slopes and by sage scrub on xeric slopes (Keeley and Davis 2007). These shrublands include extensive areas on coarse-grained soils with annual precipitation up to 75 centimeters (winter rain and only intermittent snow).

The California chaparral land cover type includes Californian mesic chaparral, Californian xeric chaparral, Californian premontane chaparral, and western Mojave and Sonoran borderland chaparral, with Californian xeric chaparral being the most common. Californian mesic chaparral occurs on sites with mesic conditions, such as north-facing slopes, concavities, and toe slopes with well-drained soils. It is found throughout Mediterranean California, but is primarily inland from the coastal fog belt. Californian mesic chaparral occurs up to 6,000 feet in Southern California. Dominant plant species include a variety of mixed or single-species, evergreen, sclerophyllous shrubs that resprout following fire. Dominant species include mostly evergreen, drought-deciduous plants, but also some deciduous species.

Californian chaparral consists of a mixture of obligate seeders, facultative seeders, and resprouters that form sclerophyll shrublands dominated by one or more of the following species: chamise (*Adenostoma fasciculatum*), bigberry manzanita (*Arctostaphylos glauca*), hoaryleaf ceanothus (*Ceanothus crassifolius*), or flannelbush (*Fremontodendron* spp.). Drought-deciduous black sage (*Salvia mellifera*) may be codominant.

[3] The California Floristic Province is a world biodiversity hotspot as defined by Conservation International, due to an unusually high concentration of endemic plants. It is one of only five areas with a Mediterranean-type climate in the world, all of which are on the biodiversity hotspot list, with hot, dry summers and cool, wet winters (Critical Ecosystem Partnership Fund 2017).

California chaparral occupies 16,145 acres (2.4 percent) of the RCIS area.

### California Coastal Scrub

The California coastal scrub land cover type consists of a diverse mix of drought-deciduous shrubs and characteristic obligate-seeding or resprouting evergreen shrubs occurring in coastal and foothill communities of southwestern Oregon, along the California coast and inner foothills, and south into Baja Norte, Mexico. California coastal scrub generally occurs where the cooling influence of the Pacific Ocean moderates summer drought. Landforms include coastal terraces, low to middle slopes, valley bottoms, coastal bluffs, and rock outcrops. Southern coastal scrub occurs below 3,300 feet and extends inland from the maritime zone in hotter, drier conditions than northern (less fog-drenched) shrublands (e.g., areas with 10 to 60 centimeters of annual precipitation). The more central and northern scrub extends inland in some areas to over 4,900 feet. Some of the inland distribution follows the corridors of marine influences of coastal fog or cool marine air where it is pushed inland by prevailing winds and in areas with steep slopes and disturbance. Soils vary from coarse gravels to clays but typically only support plant-available moisture with winter and spring rains.

California coastal scrub occupies 29,932 acres (4.4 percent) of the RCIS area.

## Californian Grassland and Meadow

The grassland and meadow natural community consists of herbaceous vegetation dominated by grasses and forbs. Grasslands are the dominant land cover type outside of urban areas in the RCIS area and are found in upland topographic locations, generally irrespective of landscape position, slope, and aspect. Areas devoid of vegetation but located in grasslands are also included in this natural community as individual land cover types.

Grassland is classified into one land cover type and is found in the northwestern portions and east of Lancaster in the RCIS area.

- California annual and perennial grassland

### California Annual and Perennial Grassland

The California annual and perennial grassland land cover type includes all annual forb/grass vegetation, native and nonnative, as well as native perennial grasslands growing within the California Mediterranean climate. Stands of this land cover type include everything from wildflower fields in the San Joaquin Valley and adjacent South and Central Coast Ranges to poppy fields of the western Mojave Desert, needlegrass grasslands of the foothills, valleys, and coastal ranges, and the largely nonnative annual grasslands and weed patches in the dry, warm summer regions of California. The dominant grasses generally consist of introduced annual grasses, including barbed goat grass (*Aegilops triuncialis*), foxtail chess (*Bromus madritensis*), harding grass (*Phalaris aquatica*), hare barley (*Hordeum murinum* ssp. *leporinum*), nit grass (*Gastridium phleoides*), oats (*Avena barbata* and *A. fatua*), rattail sixweeks grass (*Festuca myuros*), ripgut grass (*Bromus diandrus*), rye grass (*Festuca perennis*), silver hair grass (*Aira caryophyllea*), small fescus (*Festuca microstachys*), soft chess (*Bromus hordeaceus*), and water beard grass (*Polypogon viridis*). The associated herbaceous cover includes native and nonnative forbs.

California annual grassland occupies 96,558 acres (14.1 percent) of the RCIS area.

## Sonoran and Chihuahuan Semi-Desert Scrub and Grassland

The Sonoran and Chihuahuan semi-desert scrub and grassland natural community is characterized by a sparse to moderately dense layer (1 to 50 percent cover) of xeromorphic, evergreen and drought-deciduous, microphyllous and broad-leaved shrubs and/or succulent species, especially cacti and rosette stem succulents and sarcocaulescent trees and shrubs. The semi-desert scrub and grassland natural community includes two land cover types and is the predominant land cover type covering most of the eastern RCIS area.

- Madrean warm semi-desert wash woodland/scrub
- Mojavean-Sonoran desert scrub

### Madrean Warm Semi-Desert Wash Woodland/Scrub

The Madrean warm semi-desert wash woodland/scrub land cover type consists of fluvial-driven shrublands and herbaceous communities that line washes in the warm deserts of the western United States. The land cover may be dominated by *Chilopsis linearis*, *Fallugia paradoxa*, *Prunus fasciculata*, or other shrub species. This land cover type is restricted to intermittently flooded washes or arroyos that dissect bajadas, mesas, plains, and basin floors throughout the warm deserts. A woody layer is usually present and is typically scattered clumps to very open and may be dominated by shrubs and small trees. Although often dry, the intermittent fluvial processes are characteristic of this land cover type, which are often associated with rapid sheet and gully flow. The vegetation of desert washes is quite variable in species composition and structure, ranging from sparse and patchy to moderately dense, and typically occurs along the banks, but may occur in the channel.

Madrean warm semi-desert wash/woodland scrub occupies 7,427 acres (1.1 percent) of the RCIS area.

### Mojavean-Sonoran Desert Scrub

The Mojavean–Sonoran desert scrub land cover type, which composes the majority of the scrub communities in the RCIS area, consists of two groups: lower bajada and fan Mojavean–Sonoran desert scrub and the less common Arizonan upland Sonoran desert scrub. Lower bajada and fan Mojavean–Sonoran desert scrub occurs on lower slopes, fans, and small sheet-flow areas and not on well-defined washes or arroyos with defined banks and channels. This natural community is dominated or co-dominated by the following small to moderately sized shrubs (or perennial grasses): ragweed (*Ambrosia* spp.), brittlebush (*Encelia* spp.), creosote bush (*Larrea tridentata*), mountain yucca (*Hesperoyucca whipplei*), buckwheats (*Eriogonum* spp.), and barrel cactus (*Ferocactus* spp.). Where Mexican bladdersage, hopsage, or Mormon's tea are present, they have equal or lower cover. Areas where lower bajada and fan Mojavean-Sonoran desert scrub occurs may experience short frosts during winter, but typically do not experience persistent freezes or snow accumulation. Lower bajada and fan Mojavean-Sonoran desert scrub is found throughout most of the RCIS area except for the mountainous regions along the western border of the RCIS area.

Mojavean-Sonoran desert scrub occupies 217,789 acres (30.8 percent) of the RCIS area.

## Western North American Cool Semi-Desert Scrub and Grassland

The western North American cool semi-desert scrub and grassland natural community includes all upland shrub and grassland vegetation within the Western North American Cool Semi-Desert Region, from south-central Alberta through the Great Basin and western margins of the Great Plains to New Mexico, westward to dry-interior southern British Columbia and south through eastern Oregon and interior California, into the mountains of northwestern Baja California, Mexico. It includes extensive shrublands dominated by *Artemisia tridentata*, ranging from middle to upper slopes and deep to shallow soils, and extensive *Atriplex* shrublands.

This natural community includes four land cover types within the RCIS area. It is predominantly found mixed in with California grasslands and meadows in the northwestern portion of the RCIS area and in scattered patches throughout.

- Cool semi-desert wash and disturbance scrub
- Inter-mountain dry shrubland and grassland
- Western North America tall sage shrubland and steppe
- Western North American cool semi-desert shrubland, shrub-steppe

### Cool Semi-Desert Wash and Disturbance Scrub

The cool semi-desert wash and disturbance scrub land cover is most common in the mountains of the Mojave Desert in the RCIS area. Stands form when fire or other clearing and disturbance remove stands of *Artemisia* (in the big sagebrush scrub) or other shrubs.

Cool semi-desert wash and disturbance scrub occupies 43,049 acres (6.3 percent) of the RCIS area.

### Inter-Mountain Dry Shrubland and Grassland

The inter-mountain dry shrubland and grassland land cover type occurs in the cooler mountains of the Mojave Desert. It is composed of shrublands with cool desert affinities but segregated from the short and tall species of sagebrush (*Artemisia* spp.). Most of the vegetation in this land cover type occurs well beyond the eastern borders of California. Perennial desert grasslands are also part of this land cover type and increase with short fire intervals.

Inter-mountain dry shrubland and grassland occupies 8,381 acres (1.2 percent) of the RCIS area.

### Western North American Tall Sage Shrubland and Steppe

The western North American tall sage shrubland and steppe land cover type is emblematic of the valleys and lower slopes of the Great Basin Desert and the higher mountains of the Mojave Desert. This land cover type includes the big sagebrush shrubland and shrub-steppe that is a matrix and large-patch type throughout much of the intermountain western United States and is dominated by Great Basin sagebrush (*Artemisia tridentata*) and bitterbrush (*Purshia tridentata*).

Western North American tall sage shrubland and steppe occupies 1,693 acres (0.2 percent) of the RCIS area.

#### Western North American Cool Semi-Desert Shrubland, Shrub-Steppe

The western North American cool semi-desert shrubland, shrub-steppe land cover type includes shrubby cool desert saltbush species that often form distinct bands above closed basins and below extensive sagebrush belts in the Great Basin Desert. This land cover type contains those saltbush scrubs that typically do not grow in strongly saline or alkaline soils but do tolerate higher pH (alkalinity) and often finer soil texture than *Artemisia tridentata* and related taxa of sagebrush.

Western North American cool semi-desert shrubland, shrub steppe occupies 12,793 acres (1.9 percent) of the RCIS area.

### Vancouverian and Rocky Mountain Grassland and Shrubland

The Vancouverian and Rocky Mountain grassland and shrubland natural community is widespread in the Rocky Mountains cordillera from New Mexico and Colorado north into Canada, and west to high plateaus and mountains in the Colorado Plateau, higher mountain ranges of Nevada, and the Sierra Nevada into the eastern Cascades. It also occurs in the "island ranges" of central Montana. Vegetation is composed of an open to dense perennial graminoid layer that is generally less than 3 feet tall. Characteristic grassland species include *Danthonia parryi*, *Danthonia intermedia*, *Festuca arizonica*, *Festuca thurberi*, and *Muhlenbergia montana* in montane and subalpine grasslands. Associated graminoid species include *Blepharoneuron tricholepis*, *Bouteloua gracilis*, *Festuca idahoensis*, *Hesperostipa comata*, *Muhlenbergia filiculmis*, and *Pseudoroegneria spica*.

This natural community includes two land cover types in the RCIS area, primarily along the western border of the RCIS area in the foothills of the San Gabriel Mountains.

- Western cordilleran montane-boreal wet meadow
- Western North American temperate grassland and meadow

#### Western Cordilleran Montane-Boreal Wet Meadow

The western cordilleran montane-boreal wet meadow land cover type is found in montane and subalpine elevations, occasionally reaching into the lower edges of the alpine elevations at 3,000 to 10,000 feet. This land cover type contains montane meadow grasses, graminoids, and forbs and shrublands associated with meadows, riparian terraces, and seeps in the higher mountains of the state from the Peninsular and Transverse Ranges through the Sierra-Cascade Ranges and including the higher mountains of the Modoc Plateau, the Klamath Mountains, and the high Inner North Coast Ranges. The vegetation tends to make small stands based on moisture availability and on tolerance of disturbance. This concept joins both low riparian shrublands and associated wet meadows based on their overlap in ecologies and floristic composition. Wet meadows can be tightly associated with snowmelt and typically are not subjected to high-velocity disturbance, but they can be flooded by slow-moving waters. Soils are mostly mineral and show typical hydric soil characteristics such as low chroma and redoximorphic features; some areas may have high organic content as inclusions or pockets. Vegetation of this group can manifest as a mosaic of several plant associations, or be a monotypic stand of a single association dominated by graminoids or forbs.

Western cordilleran montane-boreal wet meadow occupies 30 acres (less than 0.1 percent) of the RCIS area.

### Western North American Temperate Grassland and Meadow

The western North American temperate grassland and meadow land cover type includes montane and subalpine mesic meadows and drier grasslands in the high plateaus and ranges. This land cover type is dominated by grasses, which are typically not restricted to moisture conditions that are higher than the surrounding landscape (not seeps, riparian areas, or wet meadows). The grasslands occur on flat to rolling plains, in intermontane parks, and on dry side slopes, especially with south and west aspects. They can also occur on gentle slopes with ample early-season seepage. Mesic meadow stands occur in swales that lose their snow cover relatively late in the season. Many occurrences are small patches and are often found in mosaics with woodlands, more dense shrublands, or just below alpine communities. These upland communities occur on gentle to moderate-gradient slopes and in relatively moist habitats. At montane elevations, this macrogroup occurs within Pinus-Pseudotsuga or mixed conifer-dominated forests. At subalpine and low alpine elevations, these meadows are found below the tree line, usually within Abies lasiocarpa–Picea-dominated forests, or they extend into the low alpine.

Western North American temperate grassland and meadow occupies 10,517 acres (1.5 percent) of the RCIS area.

## Western North American Interior Sclerophyllous Shrubland

The western North American Interior sclerophyllous shrubland natural community occurs between low-elevation desert landscapes and higher subalpine woodlands of the western United States and northern Mexico. The moderate to dense evergreen shrub layer is dominated by sclerophyllous shrubs, especially *Ceanothus greggii*, *Quercus john-tuckeri*, and *Quercus turbinella*. Scattered pinyon and juniper trees may be present; however, in the western Mojave Desert, *Juniperus californica* sometimes forms an open, shrubby tree layer with the evergreen oaks and other shrubs, and can even be the sole dominant (as in the upper Santa Clara River area). Stands occur predominantly across central Arizona (Mogollon Rim) and western New Mexico, south into mountains in the northwestern Chihuahuan region and Madrean Occidentale in northern Mexico, and north into extreme southwestern Utah and southern Nevada. It also occurs in mountains in the Sonora and western Mojave Deserts, and extends from northeast Kern County, California south into Baja Norte, Mexico. Stands are found on foothills, xeric mountain slopes, and canyons in hotter and drier habitats and often dominate along the mid-elevation transition zone between desert scrub and montane woodlands.

This natural community is found in small patches near the northwestern border of the RCIS area. It contains the following land cover types.

- Warm interior chaparral
- Lower montane chaparral

### Warm Interior Chaparral

The warm interior chaparral land cover type includes all the interior chaparral in the southwestern United States. It is composed of a diverse list of evergreen shrubs such as *Arctostaphylos patula*, *Ceanothus greggii*, *Garrya elliptica*, *Quercus john-tuckeri*, and *Quercus turbinella*, which dominate large areas on foothills, xeric mountain slopes, and canyons. These chaparral stands occur in the rain shadow of the mountains including the inland sides of the inner South Coast, the southern Sierra Nevada, Tehachapi, Transverse, and Peninsular Ranges. Compared to California chaparral, the stands are less dense, contain a mix of other non-chaparral shrubs with desert affinities, and tend to have less frequent and less intense fires.

Warm interior chaparral occupies 6,202 acres (0.9 percent) of the RCIS area.

#### Lower Montane Chaparral

The lower montane chaparral land cover type is found on foothills, xeric mountain slopes, and canyons in hotter and drier habitats. It often dominates along the mid-elevation transition zone between desert scrub and montane woodlands (oak, pine-oak, and ponderosa pine). Sites are variable but often steep and rocky. Sometimes this group occurs in thickets along upper canyon watercourses and northerly upland slopes in the pinyon-juniper woodland zone.

Lower montane chaparral occupies 109 acres (less than 0.1 percent) of the RCIS area.

### Madrean Forest and Woodland

The Madrean forest and woodland natural community is composed of forests, woodlands, and savannas characterized by various species of conifers and deciduous and evergreen broad-leaved trees. These species are usually oaks, junipers, and/or pines that have a Madrean and/or Balconian distribution, in semi-arid to sub-humid, warm-temperate settings in montane areas of southern New Mexico, southeastern Arizona, western Texas, or northern and central Mexico, and in lowland settings in central Texas.

This natural community contains two land cover types along the southwestern border of the RCIS area.

- California woodland and forest
- Californian-Vancouverian montane and foothill forest

#### California Woodland and Forest

The California woodland and forest land cover type includes all Mediterranean climate woodlands and forests in California from sea level to the point where snow and frost with high winter precipitation enable cool-temperate species of trees to dominate the overstory layer. This land cover type ranges throughout the state west of the deserts and below the higher mountains where snow is the main form of precipitation. This land cover type is limited to the higher elevations in the RCIS area.

California woodland and forest occupies 36,646 acres (5.4 percent) of the RCIS area.

#### Californian-Vancouverian Montane and Foothill Forest

The California-Vancouverian montane and foothill forest land cover type is representative of the cool-temperate forests in the Pacific states from the Puget Sound area south into the higher mountains of Southern California and adjacent Baja California, Mexico. In California, these range inland from the immediate coast. This land cover type experiences warm, relatively dry summers and cool rainy to cool snowy winters.

California-Vancouverian montane and foothill forest occupies 113 acres (less than 0.1 percent) of the RCIS area.

## North American Intermountain Basins Scrub Woodland

The North American intermountain basins scrub woodland natural community includes pinyon pine- and juniper-dominated woodlands, scrub, and savannas that generally occur just above semi-desert shrublands and grasslands or shortgrass prairies and below montane forest vegetation throughout the semi-arid Intermountain West and western Great Plains of North America.

This natural community contains one land cover type found in the RCIS area. This natural community is found in small patches along the southern boundary of the RCIS area in the foothills of the San Gabriel Mountains.

- Intermountain basins pinyon-juniper woodland

### Intermountain Basins Pinyon-Juniper Woodland

The intermountain basins pinyon-juniper woodland land cover type includes all mixed and pure pinyon and juniper stands in transmontane California. These are largely found in the mountains of the Mojave Desert and of the Modoc Plateau and Great Basin. They also occur on the eastern slopes of the Sierra Nevada and the Peninsular Ranges and the northern slopes of the Transverse Ranges. The herbaceous layer may be sparse to dense depending on overstory density, substrate, landscape position, and disturbance history, with the densest graminoid layer in open tree savanna. Common graminoid associates include *Stipa comata*, *Festuca idahoensis*, *Elymus cinereus*, *Leymus salinus*, *Pseudoroegneria spicata*, *Poa fendleriana*, and *Poa secunda*. Forb species may be diverse but typically have low canopy cover values. Pinyon and juniper stands in the RCIS area occur between 3,000 to 4,000 feet on warm, dry sites of foothills and toe slopes.

Intermountain basins pinyon-juniper woodland occupies 1,968 acres (0.3 percent) of the RCIS area.

## Western North America Warm Temperate Flooded and Swamp Forest

The western North American warm temperate flooded and swamp forest natural community is dominated by broad-leaved deciduous trees (cottonwoods, sycamores, and hackberries) and palms that occur along perennial and intermittent rivers, springs, and oases of the California Central Valley, deserts of the southwestern United States, and the Tamaulipan region of south Texas and adjacent Mexico.

This natural community contains one land cover type that occurs in the RCIS area. This natural community is found in small patches of riparian areas east of Lancaster.

- Southwestern North American riparian, flooded and swamp forest

### Southwestern North American Riparian, Flooded and Swamp Forest

The southwestern North American riparian, flooded and swamp forest land cover type consists of low-elevation riparian areas throughout the southwestern United States that are dominated by nonnative invasive woody species. These are warm desert riparian forests and thickets with a range of the main indicator trees and shrubs. Most stands occur below 4,000 feet and are replaced by the cool-temperate version of riparian forest in the mountains and on the north coast. Abundant species include *Elaeagnus angustifolia*, *Tamarix chinensis*, *Tamarix parviflora*, and *Tamarix ramosissima. Schinus molle*, *Schinus terebinthifolius*, or *Myoporum laetum* may be present to abundant, but these latter species are not restricted to riparian settings. Sites are typically streambanks and benches, floodplains, and canyons with permanent, intermittent, or temporary water flows.

Southwestern North American riparian, flooded and swamp forest occupies 1,525 acres (0.2 percent) of the RCIS area.

## Western North American Freshwater Marsh

The western North American freshwater marsh natural community includes herbaceous marshes and riparian shrublands found throughout canyons and desert valleys of the warm desert regions of the southwestern United States and adjacent Mexico. These desert freshwater marshes consist of low-elevation (lower than 3,500 feet) wetlands where dominant scrub species are *Prosopis glandulosa* and *Prosopis velutina*, and other shrubs include *Baccharis salicifolia*, *Pluchea sericea*, *Salix lasiolepis*, and *Salix exigua*. Woody vegetation is relatively dense, especially when compared to drier washes. These wetlands occur along perennial and intermittent streams, lake or playa edges, and alkaline seeps and springs. Vegetation, especially the mesquites, tap into groundwater below the streambed when surface flows stop. Vegetation depends on annual rise in the water table or annual or periodic flooding and associated sediment scour or annual rise in the water table for growth and reproduction.

This natural community is found in small patches along the northwestern border of the RCIS area. It contains the following land cover types.

- Western North America vernal pool
- Western North America wet meadow and low shrub carr
- Western North American freshwater marsh

### Western North America Vernal Pool

The vernal pool land cover type is widespread in 17 regions in the state, ranging from the Mediterranean climate pools of the south coast through the Central Valley up to the cool temperate Modoc Plateau and Sierra Valley areas of the northeastern part of the state. In the RCIS area, vernal pools form in closed depressions where subsoils consist of nearly impermeable clay that leads to seasonally perched water table. Most pools are small; depth and duration are more important factors in defining vernal pools than size/area. Vernal pools in Southern California generally fill once in the wet season (winter) and are completely dry in the late spring and summer months. It is common for them to experience prolonged periods of desiccation during droughts. Vegetation varies seasonally and yearly due to fluctuating and unpredictable water levels. This fluctuation of inundations and drought/desiccation creates unique environments that support species that are either able to tolerate a wide range of conditions or species able to grow and reproduce in the short time the pool exhibits a favorable condition. Because of this, vernal pools support many specialized and even endemic species. Due to their ephemeral nature, vernal pools are an especially difficult land cover type to accurately map and, as such, their mapped area is probably underestimated.

Western North America vernal pool occupies less than 1 acre (less than 0.1 percent) of the RCIS area.

### Western North America Wet Meadow and Low Shrub Carr

The western North American wet meadow and low shrub carr land cover type is typical of low-lying sites in the mountains and in some lower-elevation valleys and depressions. Saturated soil or standing water through the growing season are key characteristics. Long-persisting standing water tends to convert sites to freshwater marsh. Many wet meadow vegetation types occur in the mountainous areas of the state where cool, snowy winters and short growing seasons prevail. However, there is a warmer winter lower elevation analog and one with invasive exotic species. This land cover type is widespread throughout California wherever freshwater meadows and seeps occur.

Western North America wet meadow and low shrub carr occupies 15 acres (less than 0.1 percent) of the RCIS area.

#### Western North American Freshwater Marsh

The western North America freshwater marsh land cover type is characterized by fresh water throughout all or most of the growing season. Vegetation is widespread and tends to be tall, emergent forms at lower elevations, but when water depth is more than 3.2 feet, most vegetation is either anchored or floating hydrophytes (e.g., water lilies, duckweed, pondweed). Fresh water occurs along perennial and intermittent streams, lake or playa edges, and alkaline seeps and springs. Vegetation, especially the mesquites, taps into groundwater below the streambed when surface flows stop. Vegetation depends on annual rise in the water table or annual or periodic flooding and associated sediment scour or annual rise in the water table for growth and reproduction. This macrogroup occurs in the warm desert regions of the southwestern United States and adjacent Mexico.

Western North American freshwater marsh occupies 41 acres (less than 0.1 percent) of the RCIS area.

### Western North American Interior Alkali-Saline Wetland

The western North American interior alkali-saline wetland natural community consists of alkaline and saline wetlands with salt-tolerant plant growth where dominant and characteristic plant species include *Atriplex* spp., *Distichlis spicata*, *Salicornia* spp., *Sarcobatus vermiculatus*, *Sesuvium verrucosum*, *Sporobolus airoides*, and *Suaeda nigra*. These are located in playas, washes, mudflats, and depressional wetlands where evaporation far exceeds precipitation and/or where bedrock and soil properties contribute to alkaline and saline conditions. Sites are found throughout the western United States.

This natural community contains two land cover types found in the RCIS area, primarily north of Lancaster.

- Cool semi-desert alkali-saline wetlands
- Warm semi-desert/Mediterranean alkali-saline wetland

#### Cool Semi-Desert Alkali-Saline Wetlands

The cool semi-desert alkali-saline wetland land cover type typically has saline/alkaline soils, a shallow water table, and flood or high water table intermittently, seasonally to semi-permanently. Sites may remain dry for most growing seasons or remain wet due to poor drainage. The water table generally remains high enough to maintain vegetation, despite salt accumulations. Some stands occur on floodplains, along the margins of perennial lakes, and in alkaline closed basins, with extremely low-gradient shorelines, and slopes with alkaline springs.

Cool semi-desert alkali-saline wetlands occupy 45,086 acres (6.4 percent) of the RCIS area.

#### Warm Semi-Desert/Mediterranean Alkali-Saline Wetland

The warm semi-desert/Mediterranean alkali-saline wetland land cover type includes herbaceous and shrubby perennial vegetation associated with saline or alkaline wetlands in the desert or along the upper edges of coastal salt marshes. The overlap between salty desert basins and coastal "high" salt marsh becomes more pronounced to the south in regions where precipitation is only 10 inches per year and solar insulation and evaporation concentrate surface salts to similar levels found on or at the edges of many desert playas. Seeps of fresh or brackish water in either setting account for denser herbaceous growth indicative of one group of alliances in this land cover type, while the evaporative flat pannes and playas of the coast and the desert are the home of phreatophitic shrubby indicators.

Warm semi-desert/Mediterranean alkali-saline wetland occupies 18,959 acres (2.8 percent) of the RCIS area.

### North American Mediterranean Rock Outcrop, Scree, and Talus Nonvascular and Sparse Vascular Vegetation

The North American Mediterranean rock outcrop, scree, and talus nonvascular and sparse vascular vegetation natural community supports vegetation in rocky or rocklike habitats (such as cliffs, talus, scree, pavement, cobbles, lava, boulder fields, or badlands) at low elevations at mid-latitudes. It is characterized by nonvascular plant growth forms that have structural adaptations for living on stable rock surfaces or in unstable rocky substrates. A sparse cover of vascular mesomorphic growth forms, including needle-leaved and cold-deciduous broad-leaved woody plants, may be present.

This natural community is found in a few small patches along the eastern border of the RCIS area in the foothills of the San Gabriel Mountains. The natural community contains the following land cover type.

- California cliff, scree, and other rock vegetation

#### California Cliff, Scree, and Other Rock Vegetation

The California cliff, scree, and other rock vegetation land cover type has vegetation cover that generally covers less than 2 percent of cliffs and outcrops west of the deserts and inland from the immediate coast, south of Central California. Rock surfaces or rapidly eroding, unstable slopes are characteristic. Stands do not include alpine or subalpine sparse, rocky vegetation, or the sparsely vegetated portions of the warm and cold deserts. This land cover type consists of barren and sparsely vegetated substrates from a variety of landscapes across the southwestern United States and northern Mexico in the Chihuahuan, Sonoran, and Mojave Deserts, extending south along coastal areas around the Gulf of California. Vegetation is variable depending on environmental factors of the sites, which range from sea level to subalpine elevations. Lower-elevation sites often have herbaceous or shrub species present, whereas foothill, montane, and subalpine sites may also include trees. Most of the species also occur in non-sparse vegetation groups.

California cliff, scree, and other rock vegetation species occupy 1,030 acres (0.2 percent) of the RCIS area.

## North American Warm Semi-Desert Cliff, Scree, and Rock Vegetation

The North American warm semi-desert cliff, scree, and rock vegetation natural community is characterized by the vegetation of rocky or rocklike habitats, including outcrops, cliffs, talus, or scree, in low- to mid-elevation, temperate and boreal climatic areas of western North America. Cryptogam vegetation tends to dominate, with vascular plants species of low cover.

This natural community is found in a few small patches along the eastern border of the RCIS area in the foothills of the San Gabriel Mountains. It contains one land cover type in the RCIS area.

- North American warm semi-desert cliff, scree, and other rock vegetation

### North American Warm Semi-Desert Cliff, Scree, and Other Rock Vegetation

The North American warm semi-desert cliff, scree, and other rock vegetation land cover type is characteristic of the desert dunes and contains both annual and perennial species with special strategies to deal with the shifting sands and the dry and unpredictable climate. Vegetation cover is variable depending on unpredictable rainfall patterns. This land cover type consists of near-barren and sparsely vegetated landscapes on a variety of substrates across the southwestern United States and northern Mexico, including Baja California. It is divided into two main groups: pavement, badlands, and outcrops or southwestern North American dunes and sand sheets. Vegetation is variable depending on environmental factors of the sites, which range from sites below sea level to those at foothill and lower montane elevations. Lower-elevation sites often have herbaceous or shrub species present, whereas foothill and lower montane sites may include scattered trees. Most of the tree species also occur in non-sparse vegetation groups.

North American warm semi-desert cliff, scree, and other rock vegetation species occupy 5,892 acres (0.9 percent) in the RCIS area.

## Agriculture

The agriculture natural community consists of deciduous orchards, vineyards, and irrigated row and field crops that require soil tillage. Agriculture in Antelope Valley is on a much smaller scale than in surrounding areas. Crops include alfalfa, dry onions, carrots, potatoes, peaches, grapes, and nectarines.

This natural community consists of two land cover types in the RCIS area, mostly to the east of the cities of Palmdale and Lancaster.

- Deciduous orchard, vineyard
- Irrigated row and field crops

### Deciduous Orchard, Vineyard

The deciduous orchard, vineyard land cover type is those areas planted in fruit-bearing trees or vineyards. Orchards are usually evergreen or deciduous small trees producing fruit or nut crops, such as peaches and nectarines, usually planted in rows with or without irrigation channels. Orchard is distinguished because of its tree cover, canopy characteristics, and distinctive production rows.

The vineyards are characterized by row production and open canopy. Vines or shrubs, such as vineyards devoted to grapes and shrubby nut or fruit crops, may dominate the woody component on agricultural or horticultural lands.

Deciduous orchard, vineyard occupies 1,796 acres (0.3 percent) of the RCIS area.

#### Irrigated Row and Field Crops

The irrigated row and field crops land cover type consists of tilled land not supporting orchard or vineyard, and includes hay and pasture. Edible or useful herbaceous products, such as cereals or vegetables for stock or human use, are usually harvested in irrigated or dry rows. Agricultural crop fields are occasionally planted to provide animal forage and to improve nitrogen levels, as with legumes such as alfalfa or sweet clovers. This land cover type includes ruderal and barren areas that have been left fallow for several growing seasons. Ruderal sites may be dominated by weedy forbs such as black mustard or thistles.

Irrigated row and field crops occupy 34,920 acres (5.1 percent) of the RCIS area.

### Urban and Developed

The urban and developed land cover consists of areas where native vegetation has been replaced with residential, commercial, or industrial lands; transportation infrastructure; or other structures, paved and impermeable surfaces, horticultural plantings, turf, and lawn. Vegetation found in the urban and developed land cover type is typically cultivated vegetation associated with landscaped residences, nonnative planted street trees (e.g., elm, ash, liquidambar, pine, palm), and parklands.

This land cover in the RCIS area consists of three land cover types in the RCIS area, primarily in the large urban centers of Lancaster and Palmdale.

#### Urban or Developed

The urban land cover type comprises areas dominated by low- to high-intensity residential, commercial, industrial, transportation, open space, or recreational uses, or other developed land use elements such as highways, city parks, golf courses, and cemeteries. Vegetation found in the urban land cover type is similar to that of the rural residential land cover type, except that these areas are more expansive and include large areas of turf and lawn.

Urban or developed land occupies 80,854 acres (11.8 percent) in the RCIS area, primarily in the cities of Lancaster and Palmdale. These areas also include rural development in the western Mojave Desert.

### Water

The water natural community includes open water and aquatic habitats subject to seasonal or perennial flooding or ponding. This natural community may have hydrophytic herbaceous vegetation.

The water natural community includes one land cover type in the RCIS area.

- Lacustrine

#### Lacustrine

The lacustrine land cover type consists of lakes or lake-like areas and occurs along the California Aqueduct in the southern portion of the western Mojave Desert. This land cover type includes large, open reservoirs managed for water storage, water supply, flood protection, or recreational uses.

Plants associated with reservoirs include those plants common to deep water systems. Algae are the predominant photosynthetic organisms found in the open waters of reservoirs. Depending on reservoir temperature, water level, and other environmental conditions, algal blooms may occur, resulting in thick algal mats on the surface of the reservoir. Where reservoir edges are shallow, plant species similar to those found in ponds may be present. If a reservoir has steeper edges, water depth and fluctuations in reservoir height may prevent the establishment of vegetation. Upland and riparian trees that were not removed during the construction of the reservoir, or that were planted afterward, may be present around the perimeter of the reservoir.

Lacustrine areas occupy 4,183 acres (0.6 percent) of the RCIS area.

## 2.1.4 Focal Species

*Focal species* are species whose conservation needs are addressed through this Antelope Valley RCIS. The conservation actions, including land protection, enhancement, and restoration (Chapter 3, *Conservation Strategy*), are described in the context of the conservation needs for focal species. Therefore, selecting the species that are addressed in this RCIS was one of the first and most important decisions.

## 2.1.4.1 Selection Process

This section discusses the screening criteria used to select focal species for this Antelope Valley RCIS and the application of those criteria to develop the focal species list. The section also discusses factors to consider when prioritizing species and developing a manageable focal species list to help ensure a cost-effective RCIS process.

The focal species list was developed using a three-step process.

- Step 1. Identify potential focal species.
- Step 2. Apply screening criteria.
- Step 3. Prioritize and finalize focal species list.

### Step 1. Identify Potential Focal Species

The first step in the selection process was to compile a comprehensive list of declining and vulnerable species that occur or may occur in the RCIS area. This list was compiled by reviewing a variety of publicly available sources. The initial list included those taxa identified as species of greatest conservation need in the California State Wildlife Action Plan (SWAP) (California Department of Fish and Wildlife 2015) and species that have documented occurrences in the California Natural Diversity Database (CNDDB) (California Department of Fish and Wildlife 2017b).

The following sources were also considered in developing the focal species list.

- Species proposed for coverage in the *Draft Desert Renewable Energy Conservation Plan and Environmental Impact Report/Environmental Impact Statement* (DRECP) (California Energy Commission et al. 2014)
- Species proposed for coverage by the proposed Apple Valley Multiple Species Habitat Conservation Plan (Apple Valley 2017)

- California Native Plant Society *Inventory of Rare and Endangered Vascular of California* (California Native Plant Society 2017a)
- CDFW lists of special animals (California Department of Fish and Wildlife 2017b)
- U.S. Fish and Wildlife Service (USFWS) federally listed endangered and threatened species for the RCIS area
- Personal communication with local species experts, including wildlife agency staff and representatives of local environmental groups

Potential focal species may also include species that are not necessarily declining or vulnerable species, but that inform the conservation strategy in ways that declining species cannot. These species, called *planning species*, may include area-dependent species, umbrella species, indicator species, and keystone species. Each category of planning species is defined below.

- **Area-dependent species.** The species requires large, contiguous blocks of habitat and may therefore inform the placement of protected areas on the landscape for wildlife connectivity and other landscape-scale processes.
- **Umbrella species.** Conservation of an umbrella species would indirectly conserve multiple other species dependent on the same ecological conditions.
- **Indicator species.** The species' abundance in a given area is believed to indicate certain environmental or ecological conditions or suitable conditions for a group of other species. This may include species that are particularly sensitive to climate change.
- **Keystone species.** The species' impacts on the community or ecosystem are much larger than would be expected from the species' abundance.

### Step 2. Apply Screening Criteria

Once the potential focal species were identified, the following criteria were applied to each of the species. To be considered a focal species, the species should meet all three criteria.

- **Status.** The species is listed by state or federal resource agencies as threatened or endangered, or is a candidate for such listing; is reasonably expected to be considered for listing in the future; or is considered highly vulnerable or at risk by a recognized leading organization such as the California Native Plant Society. If the species does not meet the status criteria, then it has conservation value as a planning species (e.g., area-dependent, umbrella, indicator, or keystone species).
- **Occurrence.** The species is known or likely to occur in the RCIS area. Occurrence data should be based on credible evidence. Some potential focal species may not be present in the RCIS area at the time the RCIS is developed but could be reasonably expected to expand their range into the RCIS area within 10 years.[4]
- **Data.** Drawing on best available science and emerging data, sufficient data on the species' life history, habitat requirements, and occurrence within the RCIS area are available to propose viable conservation actions.

[4] CDFW approval of each RCIS is valid for 10 years. After 10 years, RCISs can be updated and approved again to extend their authorization for another 10 years. If species of interest are not expected to occur in an RCIS area for more than 10 years, they should be added as focal species in future RCIS updates.

## Step 3. Prioritize and Finalize Focal Species List

The final step in the focal species selection process is prioritization. The species were prioritized for inclusion on the focal species list based on the following factors.

- **Status.** Species that are state or federally listed or candidates for listing are prioritized over declining or vulnerable species that are not listed or candidate species. Non-listed species are prioritized based on their likelihood of being listed in the near future. This criterion assumes that listed species are at a higher risk of extinction than other species and therefore are in greater need of conservation.
- **Importance of RCIS area to the species.** Species are prioritized as focal species based on the importance of the RCIS area to the species. For example, a species with a range that is wholly or mostly included in the RCIS area is prioritized over a species for which the RCIS area is only a small fraction of its range. Species with designated critical habitat or core recovery areas within the RCIS area are also prioritized as focal species.
- **Alignment with other regional conservation goals.** Focal species are prioritized if their conservation aligns with conservation goals outlined in other regional or statewide strategies (e.g., SWAP, local habitat conservation plans, or natural community conservation plans).

The resulting focal species of this Antelope Valley RCIS are noted in Table 2-2.

### Table 2-2. Antelope Valley RCIS Focal Species

| | | Status[a] | | |
|---|---|---|---|---|
| **Common Name** | **Scientific Name** | **Federal** | **State** | **Global** |
| **Plants** | | | | |
| Alkali mariposa-lily | *Calochortus striatus* | – | 1B.2 | G2 |
| California juniper | *Juniperus californica* | – | – | G5 |
| Joshua tree | *Yucca brevifolia* | – | – | G4G5 |
| Spreading navarretia | *Navarretia fossalis* | T | – | G2 |
| Short-joint beavertail | *Opuntia basilaris* var. *brachyclada* | – | – | G5 |
| **Reptiles** | | | | |
| Coast horned lizard | *Phrynosoma blainvillii* | – | SSC | G3G4 |
| Desert horned lizard | *Phrynosoma platyrhinos calidiarum* | – | – | – |
| Agassiz's desert tortoise | *Gopherus agassizii* | T | T | G4 |
| Western pond turtle | *Actinemys marmorata* | UR | – | G3G4 |
| **Birds** | | | | |
| Burrowing owl | *Athene cunicularia hypogea* | – | SSC | G4 |
| California condor | *Gymnogyps californianus* | E | E, FP | G1 |
| Golden eagle | *Aquila chrysaetos* | FP | FP | G5 |
| Le Conte's thrasher | *Toxostoma lecontei* | – | SSC | G3 |
| Least Bell's vireo | *Vireo bellii pusillus* | E | E | G5T2 |
| Loggerhead shrike | *Lanius ludovicianus* | – | SSC | SSC |
| Long-billed curlew | *Numenius americanus* | – | – | G5 |
| Mountain plover | *Charadrius montanus* | – | SSC | G2 |
| Northern harrier | *Circus cyaneus* | – | SSC | G5 |

| Common Name | Scientific Name | Status[a] Federal | State | Global |
|---|---|---|---|---|
| Prairie falcon | *Falco mexicanus* | – | – | G5 |
| Swainson's hawk | *Buteo swainsoni* | – | T | G5 |
| Tricolored blackbird | *Agelaius tricolor* | – | T | G2G3 |
| Willow flycatcher | *Empidonax traillii* | – | E | G5 |
| **Mammals** | | | | |
| American badger | *Taxidea taxus* | – | SSC | G5 |
| Desert kit fox | *Vulpes macrotis arsipus* | – | | G4 |
| Mohave ground squirrel | *Spermophilus [Xerospermophilus] mohavensis* | – | T | G2G3 |
| Mountain lion | *Felis concolor* | – | – | – |
| Tehachapi pocket mouse | *Perognathus alticolus inexpectatus* | – | SSC | G1G2T1T2 |

[a] Status

**Federal**

E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
C = listed as a candidate species, which is a species for which the U.S. Fish and Wildlife Service has on file sufficient information to warrant a listing.
– = no listing.

**State (California Department of Fish and Wildlife January 2017, Special Animals List; available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406)**

E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
SSC = listed as a California species of special concern by the California Department of Fish and Wildlife
FP = listed as a fully protected by the California Department of Fish and Wildlife
SC = listed as a candidate species, which is a species for which the California Department of Fish and Wildlife has on file sufficient information to warrant a listing.
– = no listing.

**Global Conservation Status (NatureServe 2015; available at http://explorer.natureserve.org/granks.htm)**

G1 = critically imperiled: high risk of extinction due to extreme rarity (often 5 or fewer populations)
G2 = imperiled: high risk of extinction due to very restricted range, very few populations (often 20 or fewer populations)
G3 = vulnerable: moderate risk of extinction due to restricted range and very few populations (often 80 or fewer populations)
G4 = apparently secure: uncommon but not rare
G5 = secure: common, widespread, and abundant
G#G# = range rank: numeric range rank (e.g., G2G3) is used to indicate the range of uncertainty in the status of a species or community.
Q = questionable taxonomy: taxonomic distinctiveness of this entity at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid.
T# = infraspecific taxon: the status of infraspecific taxa (subspecies or varieties) is indicated by a "T-rank" following the species' global rank.

Rules for assigning T-ranks follow the same principles outlined for global conservation. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1.

**California Rare Plant Rank (California Native Plant Society 2017); available at http://www.cnps.org/cnps/rareplants/ranking.php)**

1B = plants rare, threatened, or endangered in California and elsewhere.
0.1 = seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
0.2 = moderately threatened in California (20 to 80% of occurrences threatened/moderate degree of immediacy of threat)

### 2.1.4.2 Species Occurrence Data

Species occurrence data are important in understanding the distribution of species in the RCIS area. The occurrence data were derived from several sources. The use of data from multiple sources collected at different times, spatial scales, and for different purposes can result in an unsystematic and spatially biased occurrence data set. Sampling effort is, as expected, not equal across the RCIS area and is generally higher where access is easier. Therefore, these data do not represent a comprehensive survey for the entire RCIS area. Regardless, the data do provide important locations where sensitive species have been found and are known to occur.

The polygon version of the CNDDB (California Department of Fish and Wildlife 2017b) provided the majority of occurrence data. It was augmented by point occurrence data, validated by species experts, from USFWS, eBird, and HerpMapper (Table 2-3).

**Table 2-3. Species Occurrence Data**

| Data Layer | Data Description |
|---|---|
| Audubon and Cornell Lab of Ornithology eBird Database | Documented and reported bird species occurrences. (August 2016)<br>Source: Audubon and Cornell Lab of Ornithology 2017. |
| HerpMapper Data | Common and rare or sensitive herpetological species documented by experts and HerpMapper partners. (September 2016)<br>Source: HerpMapper 2016 |
| CDFW and CNDDB polygon occurrence data | Documented and reported occurrences of sensitive and special-status animal species within the study area. These data are also available to view with the Biogeographic Information and Observation System. (January 2017)<br>Source: California Department of Fish and Wildlife 2017c |
| USFWS Carlsbad species occurrence data | Known occurrence and point data of sensitive species tracked and identified by the USFWS Carlsbad office.<br>Source: U.S. Fish and Wildlife Service 2017 |

CDFW = California Department of Fish and Wildlife; CNDDB = California Natural Diversity Database; USFWS = U.S. Fish and Wildlife Service

### 2.1.4.3 Species Habitat Distribution Modeling

Species habitat distribution models can be used to evaluate species distributions and conservation options at a landscape scale when it is not feasible to conduct comprehensive species surveys. Species habitat distribution models tend to be conservative (i.e., to over-predict habitat), and the results generally include areas beyond the actual distribution of species. Furthermore, not all of the predicted suitable habitat is expected to be occupied by a given species at any one time because population dynamics of species affect their local distribution over space and time. In addition, small-scale habitat features not mapped in the GIS database can affect the ability to predict the actual suitability of habitat.

While it is important to be aware of these limitations, species modeling can provide an objective, transparent, and repeatable means of assessing species habitat distribution where the species or suitable habitat distribution are not well known. Species habitat distribution modeling improves the RCIS planning process in the following ways.

- Extrapolates habitat distribution across areas lacking adequate data from field surveys

- Transcends the limitations of the "snapshot in time" effect that survey data represent
- Synthesizes and analyzes multiple data sources across the entire RCIS area
- Supports the identification and ranking of biological values between areas

Two types of models are typically used in conservation planning applications: expert-based models and statistically based models. Expert-based models identify species-specific habitat distribution based on scientific literature and expert opinion related to the physical and biological habitat parameters associated with species occurrence. Expert-based models are appropriate where species occurrence data are not sufficient to conduct more rigorous statistical modeling, where species occurrence data are strongly biased spatially across a plan area, or during the initial exploratory analyses of environmental factors associated with species occurrence. Statistically based models identify potentially suitable habitat and may even predict the likelihood of species occurrence based on correlations between presence/absence data and physical and biological habitat parameters. A combination of expert-based models and statistically based models are used in this Antelope Valley RCIS to identify areas of higher probability for species presence or, in other words, high probability of suitable conditions for a species in the RCIS area.

The sources of existing species distribution models for focal species are listed in Table G-1 (Appendix G, *Modeling Methodology*, describes species modeling methods).

As described below and summarized in Table 2-4:

- Seventeen focal species models were created using statistical methods that were further refined to depict where each species is most likely to occur on the landscape.
- Five focal species models were created as expert models.
- Two focal species were field mapped directly in the land cover mapping.
- Two focal species (western pond turtle and spreading navarretia) lacked enough occurrence data to create species distribution models; therefore, evaluation of the species in the RCIS is based on occurrence data only.

Most of the statistical models were originally created by the University of California, Santa Barbara and were included in the DRECP. Conservation Biology Institute created new species distribution models for four of the focal species: desert kit fox, desert horned lizard, long-billed curlew, and Swainson's hawk. For these, MaxEnt (Version 3.3.3k; Phillips et al. 2006) was used to estimate the relative habitat suitability for a species as a function of environmental predictor variables and observation records at 270-meter resolution. See Appendix G, *Modeling Methodology*, for more details. All models were masked using the updated land use/land cover dataset to remove areas clearly not habitat, such as playas, urban, and major disturbed areas (e.g., large mines).

**Table 2-4. Species Distribution Model Types for 24 Focal Species**

| Statistical Model | Expert Model | Mapped Distribution | Occurrence Data Only |
|---|---|---|---|
| American badger | Short-joint beavertail* | California juniper | Spreading navarretia |
| Alkali mariposa-lily | Golden eagle | Joshua tree | Western pond turtle |
| Burrowing owl | Mountain plover | | |
| Coast horned lizard | Swainson's hawk* | | |
| Desert horned lizard* | Mountain lion | | |
| Desert kit fox* | California condor | | |
| Agassiz's desert tortoise | | | |
| Least Bell's vireo | | | |
| Long-billed curlew* | | | |
| Le Conte's thrasher | | | |
| Loggerhead shrike | | | |
| Mohave ground squirrel | | | |
| Northern harrier | | | |
| Prairie falcon | | | |
| Willow flycatcher | | | |
| Tehachapi pocket mouse | | | |
| Tricolored blackbird | | | |

* New species distribution model created by Conservation Biology Institute

We created an additional dataset called *species focal areas* to emphasize modeled species habitat that overlaps with known occupied habitat. Because species distribution models tend to over-predict habitat, species focal area maps provide greater certainty that the initial identification of potential priority conservation areas will include occupied habitat. Species focal areas were created for all species that used a statistical model and for three of the five species that used an expert model (i.e., those species for which sufficient point data were available). Species focal areas were created by buffering known point occurrences (since 2000) by distances that estimated the species' primary activity areas (Table 2-5). In some cases, foraging distance was used to set the buffer distance; in other cases, home ranges were applied. The buffered points were then clipped by their most refined distribution models.

**Table 2-5. Methods for Species Focal Areas: Buffer Distances Applied to Known Point Occurrences for Focal Species for which Sufficient Point Occurrence Data Were Available**

| Model | Buffer Distance | Supporting Citation |
|---|---|---|
| **Statistical Models** | | |
| American badger | 1.5 kilometers | Lindzey 1978 |
| Alkali mariposa-lily | 500 meters | Expert judgment |
| Burrowing owl | 3 kilometers | Gervais et al. 2003 |
| Coast horned lizard | 50 meters | Whitford and Bryant 1979 |
| Desert horned lizard | 50 meters | Whitford and Bryant 1979 |
| Desert kit fox | 3 kilometers | Grinnell 1937 |
| Agassiz's desert tortoise | 2 kilometers | Nussear et al. 2012 |
| Least Bell's vireo | 100 meters | Hensley 1950 |
| Long-billed curlew | 1 kilometers | Fitzner 1978 |
| Le Conte's thrasher | 3 kilometers | Sheppard 1996 |
| Loggerhead shrike | 4 kilometers | Collister and DeSmet 1997 |
| Mohave ground squirrel | 3 kilometers | Harris and Leitner 2005 |
| Northern harrier | 4 kilometers | Martin 1987 |
| Prairie falcon | 8 kilometers | Harmata et al. 1978 |
| Willow flycatcher | 1 kilometers | U.S. Fish and Wildlife Service 2002 |
| Tehachapi pocket mouse | 150 meters | Dudek and ICF International 2012 |
| Tricolored blackbird | 5 kilometers | Beedy and Hamilton 1997a |
| **Expert Models** | | |
| Golden eagle | 3 kilometers | Suter and Jones 1981 |
| Mountain plover | 1 kilometers | Knopf and Rupert 1996 |
| Swainson's hawk | 5 kilometers | Estep 1989 |

In summary, for each of the 17 species mapped using statistical methods, three datasets were created.

- The original DRECP or a new species distribution model
- A version of the species distribution model showing only high probability of occurrence (see Appendix G)
- Species focal areas, as described above

For the three species that used an expert model for which point location data were available, two datasets were created.

- The expert model
- Species focal areas

In addition to helping understand the potential distribution of each focal species in the RCIS area, the modeled or mapped species distributions were also used in mapping the biological values in the RCIS area (Section 3.2.1.1, *Focal Species Habitat Groups*), and displaying the high conservation value areas for each species (Section 3.2.3, *Mapping Conservation Value*).

## 2.1.4.4 Model Uses and Limitations

The precision of the habitat distribution models is limited by several factors, including minimum mapping units of the underlying land cover datasets. Areas of suitable habitat smaller than the mapping thresholds were not mapped and were therefore not incorporated into the models. This constraint limited the degree of resolution of some habitat features potentially important to some species. This presented challenges for focal plant species, which are often associated with unmapped microhabitats such as swales, ditches, or rock outcrops smaller than the minimum mapping unit.

The habitat distribution models are intended to be used only for planning purposes at the scale of the RCIS area. The use of these models by project applicants is voluntary. The models impose no regulatory requirements. If used for site planning, the models should only be used as a guide. All species' habitat and occurrences should be verified in the field. Occurrence data are incomplete and limited by where field surveys have been conducted. Some occurrence points may also be geographically general or inaccurate.

## 2.1.4.5 Focal Species Profiles

The following species profiles summarize the regulatory status, species range, habitat requirements, and distribution in the RCIS area for each focal species, sufficient for the analysis in the RCIS. The information provided in the species profiles is not intended to provide a comprehensive summary of the biology and ecology of each focal species. A summary of the historical, current, and projected future stressors and pressures in the RCIS area, including climate change vulnerability, on the focal species is provided in Section 2.3, *Pressures and Stressors on Focal Species and other Conservation Elements*.

### Alkali Mariposa-Lily (*Calochortus striatus*)

#### Status and Range

Alkali mariposa-lily is not currently federally listed under the federal Endangered Species Act (ESA) or state-listed under the California Endangered Species Act (CESA). However, it has a California Rare Plant Rank of 1B.2 (Rare, Threatened, or Endangered in California and Elsewhere) and is listed on CDFW's 2017 List of Special Vascular Plants, Bryophytes, and Lichens. It was included as a focal species in this Antelope Valley RCIS as an indicator species for seasonally moist alkaline habitats such as alkaline meadows and seeps and ephemeral washes. The species is mainly found in California, but its range extends a short distance into southern Nevada. Within California, the species occurs in the southern Central Valley and Mojave Desert. Within the RCIS area, the species occurs in lowland areas of Antelope Valley.

#### Habitat

Alkali mariposa-lily grows in seasonally moist alkaline habitats such as alkaline meadows and seeps, and ephemeral washes, within chaparral, chenopod scrub, and Mojavean desert scrub (California Native Plant Society 2017; California Department of Fish and Game 2012a; Jepson Flora Project 2017). Alkali mariposa-lily grows in calcareous sandy soil (Fiedler 1985 cited in Greene and Sanders 2006). This species is frequently found on clay pans and near sand dunes in the western portion of its range (Edwards Air Force Base 2002), and is also found in saltgrass meadows at large spring complexes situated in the eastern part of its range (i.e., Paradise, Rabbit and Cushenbury Springs).

Occasional flooding or partial seasonal inundation is important to alkali mariposa-lily persistence (Edwards Air Force Base 2002). This flooding or inundation is often through groundwater expression as opposed to surface water pooling, and the species has been reported as absent from areas with surface salts or with permanent standing surface water (Greene and Sanders 2006). This species inhabits elevations from 224 to 5,240 feet (Bureau of Land Management 2010; California Department of Fish and Game 2012a).

#### Distribution in the RCIS Area

There are 59,098 acres of potentially suitable habitat for alkali mariposa-lily in the RCIS area (Appendix F, *Focal Species Habitat Models*). Potentially suitable habitat is concentrated in the north-central portion of the RCIS area, extending south and west from Rosamond Lake north of Lancaster.

### California Juniper (*Juniperus californica*)

#### Status and Range

The California juniper is not currently listed under federal or state endangered species laws. Juniper woodland has not been identified as a conservation target in the Mojave Desert Ecoregion in the SWAP. It is included as a focal species in this Antelope Valley RCIS as an umbrella species to benefit many species in the RCIS area dependent on its vegetation community, including loggerhead shrike, prairie falcon, golden eagle, and coast horned lizard. The species is mainly found in California, but its range extends through most of Baja California and a short distance into southern Nevada and western Arizona. Within the state, California juniper is found at moderate elevations in the Peninsular, Transverse, and Coast Ranges, as well as within the Sacramento Valley and Sierra Nevada foothills. California juniper is found primarily along the southern and western edges of the RCIS area at elevations above 2,500 feet. It often co-occurs with Joshua tree in Mojave Desert environments.

#### Habitat

The species is adapted to one of the driest habitats in which any species in the genus *Juniperus* can survive well. It is locally common in desert scrubland of the Colorado, Mojave, and Sonoran Deserts but extends into chaparral and open woodland in somewhat more mesic sites, which often occur nearer the Pacific coast. Its elevation range is 200 to 5,000 feet. In semi-desert vegetation its common associates are *Yucca brevifolia*, *Y. schidigera*, *Agave deserti*, *Hesperoyucca whipplei*, *Cylindropuntia* spp., and *Opuntia* spp., with *Larrea divaricata* ssp. *tridentata* in the lower, hotter basins, and *Seriphidium tridentatus*, *Artemisia tridentata*, and *Chrysothamnus nauseosus* in cooler uplands. In pine-juniper woodlands a codominant is *Pinus monophylla* and associates include *Quercus* spp., *Ceanothus greggii*, *Ceanothus cuneatus leucodermis*, *Arctostaphylos patula glauca*, and in some areas *Fremontodendron californicum*. In the RCIS area, California juniper often co-occurs with Joshua tree, but is frequently the sole dominant plant in areas such as the upper Santa Clara River watershed (southern RCIS boundary). The California juniper can occur on barren serpentine or among granite boulders, but is not found in rock crevices because it needs (coarse) alluvial material to spread its roots. In much of its range there is a long, dry summer period and rains occur only in winter. In some interior desert valleys, rain is erratic and the junipers may be associated with deeper water sources in alluvial fans.

### Distribution in the RCIS Area

There are 31,810 acres of mapped California juniper habitat in the RCIS area (Appendix F, *Focal Species Habitat Models*). California juniper communities mostly occur in the foothills and toe slopes in the southern RCIS area.

## Joshua Tree (*Yucca brevifolia*)

### Status and Range

The Joshua tree is not listed under federal or state endangered species laws but is included as a focal species in this Antelope Valley RCIS because of its role in benefiting many species in the RCIS area dependent on Joshua tree woodland, including loggerhead shrike, Swainson's hawk, American badger, Mohave ground squirrel, and Tehachapi pocket mouse. Joshua tree woodland has not been specifically identified as a conservation target in the Mojave Desert Ecoregion of the SWAP but is included in the Desert Scrub conservation target. The species is found in California and a short distance into southern Nevada and western Arizona. Within California, Joshua tree woodland coincides closely with the Mojave Desert Ecoregion. The species is common throughout the Antelope Valley RCIS area but is found in higher concentrations along north-facing slopes. The species developed in the ice ages of the Pleistocene, and higher densities in areas with the higher moisture and cooler habitat of north-facing slopes may be a consequence of this origin.

### Habitat

Joshua tree habitats generally occur at moderate elevations in the Mojave Desert between creosote bush scrub and pinyon-juniper woodlands. At lower elevations, Joshua trees intergrade with desert scrub, alkali scrub, and desert succulent shrub. At higher elevations, Joshua trees interface with pinyon-juniper and sagebrush (Thorne 1976). Joshua tree habitats also may be adjacent to desert riparian and desert wash habitats in the elevational zone inhabited by Joshua trees. Because Joshua trees are the only sizable trees in many Joshua tree habitats, this species characterizes the desert scrub habitat in the Antelope Valley RCIS. Joshua trees and other related yuccas are all dependent on a mutual relationship with a moth specific to each yucca species for reproduction. Populations need contiguity with one another to maintain the genetic viability of both the moths and the yuccas including Joshua trees. The small, pollinating moths have been determined to have very limited abilities for long-range flight. Joshua trees may also provide song perches, lookout posts, and nest sites for birds. The sharp, spiny leaves provide protective havens for birds and lizards.

### Distribution in the RCIS Area

There are 43,738 acres of mapped Joshua tree vegetation community in the RCIS area (Appendix F, *Focal Species Habitat Models*). Patches occur throughout the RCIS area, concentrated in the western portion near Highway 138 between 140th W and 220th W Streets. In the eastern part of the Antelope Valley RCIS, Joshua trees are scattered broadly throughout the Antelope Valley floor with concentrations southwest of Palmdale Regional Airport, around Saddleback Butte, and on the toe slopes of the San Gabriel Mountains in the southeastern area of the Antelope Valley RCIS area. The areas with very few Joshua Trees are alkali flats, which are concentrated near the north-central portion of the Antelope Valley RCIS area.

## Spreading Navarretia (*Navarretia fossalis*)

### Status and Range

Spreading navarretia is listed under the ESA as threatened but has no state status. Spreading navarretia has not been identified as a conservation target in the Mojave Desert Ecoregion in the SWAP. The species is found in Southern California and Baja California, Mexico. Within California, the occurrence of the species is restricted to portions of the Mojave Desert and South Coast ecoregions. Within the RCIS area, the species is known from a small number of populations on the northern slopes of the Transverse Ranges west of Lancaster and near Fairmont Butte in vernal pools.

### Habitat

Spreading navarretia is an annual herb and occurs in vernal pool and alkali playa habitat in Southern California and in Baja California, Mexico. Spreading navarretia is dependent on the ephemeral inundation cycle found in vernal pool habitat and playas, but may also occur in human-made depressions and ditches that have the same hydrological dynamics. Plants usually flower in May and June because vernal pools must be devoid of standing water before plants begin to flower.

### Distribution in the RCIS Area

There is a single documented occurrence of spreading navarretia in the RCIS area near the northwestern corner of the Antelope Valley California Poppy Preserve. Other ephemeral water features that may provide suitable habitat conditions for the species have been mapped in portions of the RCIS area in the poppy preserve and just to the north of it, as well as in the foothills around Kings Canyon.

## Short-Joint Beavertail (*Opuntia basilaris* var. *brachyclada*)

### Status and Range

The short-joint beavertail is listed as rare, threatened, or endangered in California and elsewhere (California Native Plant Rank 1B.2) and as a Species of Concern by USFWS. Short-joint beavertail occurs very sporadically on the northern slopes of the San Gabriel Mountains, as well as on northern slopes of the northernmost Castaic Ranges, such as the Portal Ridge vicinity. It occurs from Quigley Canyon and ranges east-northeast to the Anaverde Valley west of Palmdale. From there, it appears to follow the San Andreas rift zone to the Cajon Pass, although it departs somewhat from the rift zone near Mill Creek Summit within the Angeles National Forest. It occurs mostly at elevations between 3,000 and 6,500 feet. CNDDB reports for short-joint beavertail have very little information on population sizes within the RCIS area and there is no information on trend at reported sites. In 1989, Myers (California Department of Fish and Game 1997) reported four locations at City Ranch in the Anaverde Valley west of Palmdale. One of these locations had 300 plants, while another had 12. There are no further population data for these locations, nor are there counts for the other two Anaverde populations. A population with at least 23 individuals was found south of Palmdale near an airstrip in an area a developer retained as natural open space (Bureau of Land Management 2005b), but there is no current information on the status of that population.

### Habitat

Short-joint beavertail is known to occur in chaparral, Joshua tree woodland, Mojave Desert scrub, and pinyon-juniper woodland communities at elevations of 3,000 to 6,500 feet. Throughout much of the RCIS area it is commonly associated with Joshua tree (*Yucca brevifolia*), California juniper (*Juniperus californica*), scrub oak (*Quercus john-tuckeri*), ceanothus (*Ceanothus greggii*), California buckwheat (*Eriogonum fasciculatum* var. *polifolium*), pinyon pine (*Pinus monophylla*), purple sage (*Salvia dorrii*), and linear-leaved goldenbush (*Ericameria linearifolia*). It has also been reported from a wide variety of soils, from sandy to rocky, in open streambeds and on rocky slopes (Bureau of Land Management 2005b).

#### Distribution in the RCIS Area

There are 20,526 acres of potentially suitable habitat for the short-joint beavertail modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat distribution in the RCIS area appears concentrated along the southwestern boundary of the RCIS area in the foothills of the San Gabriel and Castaic Mountains, closely associated with California juniper distribution.

### Coast Horned Lizard (*Phrynosoma blainvillii*)

#### Status and Range

The coast horned lizard has no federal listing but is listed as a California Species of Special Concern. As the name implies, the coast horned lizard is found primarily in coastal areas of the southwestern coast of the United States and the Baja Peninsula of northwestern Mexico. The coast horned lizard has a limited distribution within the RCIS area, but is more widespread elsewhere to the southwest. Due to its limited range and habitat in the RCIS area, species populations are probably stable to slightly imperiled, depending on future development in the foothills of the San Gabriel Mountains (Section 2.3, *Pressures and Stressors on Focal Species and Other Conservation Elements*).

#### Habitat

The coast horned lizard is found in a wide variety of habitats within its range (University of California, Davis 2011). These habitats can include various scrublands, grasslands, coniferous and broadleaf forests, and woodlands. It can range from the coast to elevations of 6,000 feet in the Southern California mountains (California Department of Fish and Game 2000). It is most common in mid-elevations of the coastal mountains and valleys within open habitats that offer good opportunities for sunning. In the RCIS area, suitable habitat is found in the foothills of the San Gabriel Mountains. It is often associated with sandy soils in which it will bury itself; these often support ant colonies (Behler and King 1979).

#### Distribution in the RCIS Area

There are 17,861 acres of potentially suitable habitat for the coast horned lizard modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat distribution in the RCIS area is concentrated around Portal Ridge with smaller patches occurring in the toe slopes of the San Gabriel Mountains along the southeastern border of the RCIS area.

### Desert Horned Lizard (*Phrynosoma platyrhinos calidiarum*)

#### Status and Range

The desert horned lizard does not have special conservation status in California. In the RCIS area, they are threatened by expanding human development and associated stressors. The desert horned lizard has not been identified as a conservation target in the Mojave Desert Ecoregion in the SWAP.

The species is included as an RCIS focal species as an indicator planning species because of its dependence on intact desert habitats. In California, this subspecies is found throughout the Colorado and Mojave Deserts, east and north of the southern mountain ranges to the Colorado River and Baja California border, and north through the Owens Valley to near the Nevada border (CalHERPS 2017). Desert horned lizards are primarily found at lower elevations in Antelope Valley, in the central to northern portion of the RCIS area.

#### Habitat

Desert horned lizards are found in desert areas where patches of sand are generally present, including alluvial fans, dry washes, sandy flats, and at the base of sand dunes (Marangio 2000). Associated vegetation includes cacti, creosote, saltbush, and other desert shrubs. Greater shrub cover, an open understory, and greater cover by cryptobiotic soil crusts are high predictors of desert horned lizard occurrences (Newbold and MacMahon 2014).

#### Distribution in the RCIS Area

There are 25,323 acres of potentially suitable habitat for the desert horned lizard modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat is dispersed throughout the desert habitats of the eastern portion of the RCIS area, including around Alpine Butte and Lovejoy Buttes.

### Agassiz's Desert Tortoise (*Gopherus agassizii*)

#### Status and Range

Agassiz's desert tortoise is listed as threatened under both federal and California endangered species laws. Line distance sampling, long-term study plots, and other studies demonstrate appreciable declines at the local level in much of the western Mojave Desert. The identified downward trend of the species in the western portion of its range has been found valid and is ongoing (U.S. Fish and Wildlife Service 2011). Agassiz's desert tortoise has been identified as a conservation target in the Mojave Desert Ecoregion in the SWAP. Generally, the Agassiz's desert tortoise range extends from the desert areas of California south of the San Joaquin Valley, eastward across the Mojave Desert into southern Nevada, the extreme southwestern corner of Utah (the Beaver Dam Slope), and the extreme northwestern corner of Arizona (U.S. Fish and Wildlife Service 2008). Agassiz's desert tortoise is currently found only within a very small area in the northeastern corner of the RCIS area.

#### Habitat

Agassiz's desert tortoise can be found in a wide variety of habitats, such as alluvial fans, washes, canyons, and saltbush plains (Coachella Valley Conservation Commission 2007). Whereas Agassiz's desert tortoises in the Mojave Desert are commonly associated with creosote bush scrub on alluvial fans and bajadas (U.S. Fish and Wildlife Service 2014), they can also be found in saltbush (*Atriplex* spp.) scrub, Joshua tree woodland, and even in some Juniper woodlands. The presence of shrubs that provide adequate thermoregulatory cover, friable soils in which to burrow, and shrub interspaces that support annual plant growth are critical habitat components. Shrubs not only supply shade for the tortoises during hot weather, but the roots provide support and protection for tortoise burrows.

Habitat loss and fragmentation are substantial factors in reducing tortoise numbers (U. S. Bureau of Reclamation 2008). Residential and infrastructure development, particularly within the expanding

Antelope Valley communities of Lancaster and Palmdale, has dramatically reduced and fragmented tortoise habitat. Furthermore, human uses and activities have considerable indirect effects on Agassiz's desert tortoise, such as common raven and coyote provisioning. These subsidized scavengers are known to prey upon tortoises, especially in dry years. Human infrastructure and recreational vehicle use have also increased the presence and extent of certain invasive plant species, which over time degrade tortoise habitat. Further infrastructure and residential development is anticipated to act as barriers to tortoise movement and fragment dwindling tortoise populations. They also cause tortoise mortality. Models have shown that physically isolated populations are more likely to be extirpated by stochastic, demographic, and/or genetic consequences.

#### Distribution in the RCIS Area

There are 80,678 acres of potentially suitable habitat for the Agassiz's desert tortoise modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Tortoises are currently known to occur in the northeastern corner of the RCIS area, including within a small portion of critical habitat designated for the species.

### Western Pond Turtle (*Actinemys marmorata*)

#### Status and Range

The western pond turtle (*Actinemys marmorata*) is designated as a California species of special concern. Abundance within groups is highly variable, but most Southern California populations, particularly within the Los Angeles basin, have seen precipitous declines in recent years. Western pond turtle has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. Western pond turtles are found from the Pacific coast inland to the interior foothills from Baja California to Washington State. In California, the southern subspecies (*A. m. pallida*) occurs from south of the border with Mexico in Baja California north to southern San Francisco Bay. Farther east in the San Joaquin Valley, turtle populations belong to the northern subspecies (*A. marmorata*). In spite of its strong association with aquatic habitats, scattered populations of western pond turtles are known from desert drainages, including the Mojave River, Afton Canyon, and some Great Basin drainages. Most known populations in Southern California exist in isolated patches, with little or no connectivity between groups. Due to the rarity of open surface waters in the RCIS area, western pond turtles are only known from a few locations. These include Lake Hughes and Ritter Ridge, as well as an additional unconfirmed observation from Una Lake (Kohn pers. comm.).

#### Habitat

Although highly aquatic, pond turtles are habitat generalists, able to use open water of almost any presentation as found in streams, rivers, marshes, and ponds. They have been known to use ephemeral and human-made habitats, including vernal pools, seasonal wetlands, and stock ponds. They appear able to tolerate at least some salinity, having been found in saltmarsh environments. In order to reproduce, pond turtles require adjacent upland habitat suitable for nesting and overwinter refugia. Soil composition in uplands adjacent to suitable wetlands is particularly important. These upland soils need to be friable to allow burrowing yet relatively undisturbed by human activities and vehicular disturbance.

### Distribution in the RCIS Area

Due to the small number of documented occurrences of western pond turtle in the RCIS area and its close association with aquatic features, a habitat distribution model was not created for this species. The species is most likely to occur in aquatic habitat within the Amargosa Creek watershed, where it historically occurred, as well as in similar habitat in the Big Rock Wash and Little Rock Creek watersheds that drain the San Gabriel and Castaic Ranges. Almost any surface water impoundment within the Antelope Valley RCIS area could potentially support this cryptic, focal species. There are recent unconfirmed observations of western pond turtle at Una Lake in 2017 (Kohn pers. comm.).

## Burrowing Owl (*Athene cunicularia hypogea*)

### Status and Range

The western burrowing owl is a California Species of Special Concern, designated as a Sensitive Species by the Bureau of Land Management (BLM) and as a Bird of Conservation Concern by USFWS. The species' distribution and abundance vary considerably throughout its range (Wilkerson and Siegel 2010). The species has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. The burrowing owl is found throughout non-mountainous western North America, from the Great Plains grasslands in southern portions of the western Canadian provinces south through the United States into Mexico. In California, the burrowing owl's range extends throughout the lowlands from the northern Central Valley to the U.S./Mexico border, with large populations in the Imperial Valley of southeastern California (Gervais et al. 2008) and a small (perhaps extirpated) population in the Great Basin bioregion in northeastern California. Burrowing owls currently 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 2003). In the RCIS area, the species is known from scattered locations across the floor of Antelope Valley.

### Habitat

Throughout their range, burrowing owls require habitats with three basic attributes: 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). The importance of burrows in a suitable habitat landscape cannot be overstated, as this species cannot dig its own burrows and will not forage too far from an available, suitable burrow. Burrowing owls occupy grasslands, deserts, sagebrush scrub, agricultural areas (including pastures and untilled margins of cropland), earthen levees and berms, coastal uplands (especially by over-wintering migrants), and urban vacant lots, as well as the margins of airports, golf courses, residential developments, and roads (Gervais et al. 2008). However, some of this potentially suitable habitat is not available for use due to a lack of suitable burrows in proximity.

### Distribution in the RCIS Area

There are 360,703 acres of potentially suitable habitat for the burrowing owl modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat is widely distributed throughout the RCIS area across the floor of Antelope Valley.

## California Condor (*Gymnogyps californianus*)

### Status and Range

The California condor, state and federally listed as endangered, is fully protected in California. It has also been identified as a conservation target in CDFW's (2015) SWAP for the Mojave Desert Ecoregion. Historically, the California condor occurred in northern Baja California, Northern California, Oregon, Washington, and southern British Columbia, with a few reports from Arizona, Nevada, Utah, Wyoming, Colorado, Idaho, Montana, and southern Alberta, Canada. By the mid-20th century, its range was mostly restricted to Southern California (Snyder and Schmitt 2002). Currently, the condor is found in three disjunct populations in the United States: reintroduced populations in both Southern and central–coastal California and a reintroduced population in the Grand Canyon area of Arizona. A reintroduced population also occurs in Baja California, Mexico. The California condor has not been observed to date within the RCIS area, but given observations to the north, south, and west, there is a high potential the species forages on occasion in southern Antelope Valley.

### Habitat

California condors nest in rock formations (crevices, overhung ledges, and potholes), deep caves, and occasionally in cavities in giant sequoia trees (*Sequoiadendron giganteus*) (Snyder and Schmitt 2002). Nest caves have been known to occur from about 2,000 to 6,000 feet in elevation, with a tendency for high-elevation sites to face south and low-elevation sites to face north. A key characteristic of a suitable nest site is a location at least partially sheltered from the weather and easily approachable from the air, such as on a cliff, steep slope, or tall tree (Snyder and Schmitt 2002).

While nesting habitat within the RCIS area is limited, the California condor may use the foothills, grasslands, and grazing lands along in the northwestern and western boundaries of the RCIS area as foraging habitat. Condors tend to forage within 31 to 44 miles of nests, but may travel up to 112 miles in search of food.

### Distribution in the RCIS Area

A California condor habitat distribution model created by U.S. Geological Survey was used to predict the distribution of potentially suitable habitat in the RCIS area. The model differentiates foraging; foraging and roosting; foraging, nesting, and roosting; and roosting habitat types. There are 54,077 acres of these habitat types combined in the RCIS area (Appendix F, *Focal Species Habitat Models*). Condor habitat is concentrated along the foothills of the San Gabriel Mountains and the northern expression of the Castaic Ranges, along the southern border of the RCIS area.

## Golden Eagle (*Aquila chrysaetos*)

### Status and Range

The golden eagle is protected under the 1962 (as amended) Bald and Golden Eagle Protection Act, as well as the 1918 (as amended) Migratory Bird Treaty Act. It is also fully protected in California, a conservation target for the Mojave Desert Ecoregion of the SWAP, and listed as a Bird of Conservation Concern by USFWS. Recent evidence suggests that golden eagle populations across the western United States have been largely stable (U.S. Fish and Wildlife Service 2016). The western

United States populations were estimated to be 30,000 individuals; however, while populations have remained relatively steady, these populations might be declining gradually toward a new, lower equilibrium of about 26,000 individuals (U.S. Fish and Wildlife Service 2016). The golden eagle is predominantly a western North American species, ranging from northern Alaska though the western states and Great Plains to Mexico, with some breeding and wintering locations in eastern North America. In California, the golden eagle is a year-round resident generally inhabiting mountainous and hilly terrain throughout the open areas of the state, where it was once common. Numbers are now reduced near human population centers. In the RCIS area, the species is known from the Acton area and the western Antelope Valley RCIS foothill area foraging out from the adjacent San Gabriel Mountains, Coastal Ranges, and Tehachapi Mountains.

#### Habitat

Golden eagles use nearly all terrestrial habitats of the western states, occurring primarily in mountainous canyon land, rimrock terrain of open desert, and grassland areas (Kochert et al. 2002). In central California, they prefer open grasslands and oak savanna, with lesser numbers in oak woodland and open shrublands. They can also be found in desert grasslands and chaparral habitats. Secluded cliffs with overhanging ledges and large trees are used for nesting and cover. However, wooden pole and steel lattice transmission line towers are also occasionally used as nesting habitat structure. Preferred territory sites include those that have a favorable nest site, a dependable food supply, and broad expanses of open country for foraging. Hilly or mountainous country where takeoff and soaring are supported by updrafts is generally preferred to flat habitats (Johnsgard 1990). Deeply cut canyons rising to open mountain slopes and crags are ideal habitat (Kochert et al. 2002).

#### Distribution in the RCIS Area

There are 51,069 acres of potentially suitable habitat for the golden eagle modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Much of the golden eagle habitat in the RCIS area is situated along the west and south in the foothills of the San Gabriel and Castaic Mountain Ranges. There are also patches of foraging habitat to the east of Palmdale.

### Le Conte's Thrasher (*Toxostoma lecontei*)

#### Status and Range

Le Conte's thrasher is a California Species of Special Concern that has also been listed as a Bird of Conservation Concern by USFWS. It has not been identified as a conservation target for the Mojave Desert Ecoregion in CDFW's (2015) SWAP, but is regularly addressed as a sensitive species in the Antelope Valley RCIS region. The primary range is the desert of southeastern California, southern Nevada, extreme southwestern Utah south into west-central and southwestern Arizona, northeastern Baja California, and northwestern Sonora. Two disjunct populations exist at the edge of the species' range in California: one at the northwestern limit of the San Joaquin Valley in California, the other at the southwestern limit in central and coastal Baja California. Le Conte's thrashers in the San Joaquin Valley may be isolated geographically from other populations. Highest densities of this species occur in the Maricopa area of southwestern Kern County. Recently, this species has been found to range into the Carrizo Plain and Cuyama Valley, much of the San Joaquin Valley, and the Panoche Hills (Shuford and Gardali 2008). Within the RCIS area, the species is known from several foothills and valley floor locations.

### Habitat

The Le Conte's thrasher is typically found in desert wash woodland and scrub, and sparsely vegetated desert dune habitats (California Department of Fish and Wildlife 2015a). Birds seek gentle to rolling, well-drained slopes bisected with dry washes, conditions found most often on bajadas or alluvial fans. Occupied habitats are moderately to sparsely vegetated by common saltbush (*Atriplex polycarpa*), spiny saltbush (*Atriplex confertifolia*), or, in a small area of the Carrizo Plain and Cuyama Valley, desert tea (*Ephedra fasciculata*). The ground is generally bare or has patches of sparse, low-growing grass. Nesting areas must have a few larger, dense shrubs averaging 83 centimeters tall for nest placement (Shuford and Gardali 2008).

### Modeled Distribution in the RCIS Area

There are 344,725 acres of potentially suitable habitat for the Le Conte's thrasher modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for Le Conte's thrasher is predominantly distributed in the eastern portion of the RCIS area throughout the valley floor.

## Least Bell's Vireo (*Vireo bellii pusillus*)

### Status and Range

The least Bell's vireo is listed as endangered under federal and state endangered species laws. USFWS designated critical habitat for the least Bell's vireo in 1994. At the time of its federal listing, least Bell's vireo had been extirpated from most of its historic range, and numbered just 300 pairs statewide (Kus 2002). The least Bell's vireo is increasing throughout Southern California, with a tenfold increase in the recorded population since its listing in 1986. Breeding pairs have been observed in the counties of Monterey, San Benito, Inyo, Santa Barbara, San Bernardino, Ventura, Los Angeles, Orange, Riverside, and San Diego, with the highest concentration in San Diego County along the Santa Margarita River (U.S. Fish and Wildlife Service 2006). USFWS records show a tenfold increase in the least Bell's vireo population since its listing under the federal ESA in 1986, from 291 to 2,968 known territories, with "tremendous" growth of the vireo populations in specific areas in San Diego and Riverside Counties and lower but still significant growth in Orange, Ventura, San Bernardino, and Los Angeles Counties (U.S. Fish and Wildlife Service 2006). The species has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP.

Least Bell's vireo is a migratory species that breeds in North America and overwinters primarily along the Pacific Coast in southern Mexico. The breeding range for least Bell's vireo is from the north-central to southwestern United States and into central Mexico. Breeding by least Bell's vireo has been documented from southwestern California and northwestern Baja California, Mexico, to central South Dakota, east to Illinois and northwestern Indiana, south to the gulf coast and into southern Sonora, Mexico. Breeding in California usually takes place in southwestern California and northwestern Baja California, Mexico. In the RCIS area, the species is known from two valley floor locations in the Lancaster/Palmdale area.

### Habitat

Least Bell's vireo breeds during the summer in riparian scrub. It is largely associated with early successional cottonwood-willow and is known to nest in riparian woodlands dominated by willow (Peterson et al. 2004) and Fremont cottonwood (*Populus fremontii*). Suitable willow woodlands are typically dense with well-defined vegetative strata or layers. The most critical structural component of nesting habitat in California is a dense shrub layer 2 to 10 feet aboveground (Brown 1993). The presence of water, including ponded surface water or moist soil conditions, may be an important component of nesting habitat (Rosenberg et al. 1991). Individuals may forage in scrub or chaparral habitat near nesting habitat. During the winter, Bell's vireo uses scrub vegetation along watercourses or riparian gallery forests along the west coast of northern and central Mexico.

#### Modeled Distribution in the RCIS Area

There are 7,903 acres of potentially suitable habitat for the least Bell's vireo modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat is mostly restricted to small patches of riparian areas in the western foothills of the RCIS area. There are small patches of habitat in the east of the RCIS area along the valley floor.

### Loggerhead Shrike (*Lanius ludovicianus*)

#### Status and Range

The loggerhead shrike is listed as a Bird of Conservation Concern by USFWS and is a California Species of Special Concern. The species has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. This species breeds in Canada in the provinces of southern Alberta, Saskatchewan, and Manitoba; and widely throughout the United States, except in portions of the Northwest and Northeast and at higher elevations. The largest concentrations of the species occur in portions of Texas and Louisiana (Pruitt 2000). In California, the loggerhead shrike is present year-round throughout most of the state. Wintering individuals augment resident populations and occupy non-forested areas locally. Breeding abundance is generally highest in portions of the Central Valley, Coast Ranges, and the southeastern deserts. In winter the shrike can be found throughout the San Joaquin Valley, the south-central and south coasts, and the southeastern deserts (Shuford and Gardali 2008). In the Antelope Valley RCIS area, the species is known from a few observations in the Palmdale region in Joshua Tree woodland.

#### Habitat

The loggerhead shrike typically occupies a variety of habitats including Great Basin pinyon-juniper woodland, big sagebrush scrub, shadscale-saltbush scrub, Mojave and Sonoran desert scrub, desert wash woodland scrub, high desert wash and rangeland scrub, Great Basin upland scrub, and American southwest riparian forest and woodland (California Department of Fish and Wildlife 2015a). In California, loggerhead shrikes breed in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground. Habitat requirements include tall shrubs or trees (in absence of these, fences or power lines) for hunting perches, territorial advertisement, and pair maintenance; open areas of short grasses, forbs, or bare ground for hunting; and large shrubs or trees for nest placement. Loggerhead shrikes impale their prey for storage; therefore, sharp, thorny, or multi-stemmed plants and/or barbed-wire fences are also an important habitat feature. Loggerhead shrikes most commonly occur in Wyoming sagebrush (*Artemisia tridentata* ssp. *Wyomingensis*) and big sagebrush (*A. t.* ssp. *tridentata*) communities in northeastern California, and are less frequently encountered at higher elevations in mountain sagebrush (*A. t.* ssp. *vermiculatus*) communities.

### Modeled Distribution in the RCIS Area

There are 422,995 acres of potentially suitable habitat for loggerhead shrike modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for loggerhead shrike is widely distributed throughout the RCIS area throughout the valley floor.

## Long-Billed Curlew (*Numenius americanus*)

### Status and Range

The long-billed curlew is on the CDFW Watch List and is listed as a Bird of Conservation Concern by USFWS. The species has not been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. Breeding range extends from southern British Columbia, southern Alberta, southern Saskatchewan, and southern Manitoba south to eastern Washington, Mono and northern Inyo Counties of California, Nevada, Utah, southern Colorado, New Mexico, and northern Texas east to southwestern Kansas. Wintering birds occur along the Pacific coast and at interior sites in California and Mexico (Fellows and Jones 2009). In California, long-billed curlews breed only in northeastern counties of Siskiyou, Modoc, Lassen, and Plumas south to Mono and northern Inyo Counties, but they winter all along the California coast, Central Valley, and the Imperial Valley (Fellows and Jones 2009; Audubon California no date). Antelope Valley is the only remaining wintering habitat for the species in Los Angeles County, where migrating and overwintering birds are observed nearly year-round. There is currently no information on the distribution of the species in the RCIS area, but based on their habitat preferences in other locations, they may use Antelope Valley for overwintering habitat.

### Habitat

Within Los Angeles County, long-billed curlew historically wintered in flocks on the coastal plain around Ballona and Venice Marshes and the coastal prairie of Los Angeles County. With development along the coast and the rise of agriculture in Antelope Valley, the wintering range of the species shifted to the interior of the county where it uses agricultural fields and pasture lands for wintering and migrating habitat, including alfalfa, sod fields, pastureland, and plowed dirt fields.

### Modeled Distribution in the RCIS Area

There are 174,592 acres of potentially suitable overwintering and migration habitat for the long-billed curlew modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for long-billed curlew is mostly distributed throughout the wetland and agricultural areas north and east of Lancaster.

## Mountain Plover (*Charadrius montanus*)

### Status and Range

The mountain plover is listed as a Bird of Conservation Concern by USFWS and BLM and is a California Species of Special Concern. The species has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. This species breeds in the high plains east of the Rocky Mountains, from southeastern Alberta and southwestern Saskatchewan to Montana, New Mexico, western Texas, and western Oklahoma south to central Mexico; however, most birds breed in northern Montana and southeastern Colorado and Wyoming (Shuford and Gardali 2008). The primary wintering area for mountain plovers is likely in California, with most birds occurring in the Sacramento, San Joaquin, Panoche, and Imperial Valleys and on the Carrizo Plain (Andres and Stone

2010). In California, the mountain plover is considered a winter visitor from September to mid-March with peak numbers from December through February. The largest numbers of mountain plovers occur in the Imperial Valley and the portion of the Central Valley from southern Colusa County south to Kern County (Shuford and Gardali 2008). In the RCIS area, there are recorded observations for the species throughout the valley floor.

#### Habitat

Mountain plovers in all seasons are strongly associated with short-grass prairie habitats, shrub-stepped tablelands, and disturbed, dry grassland sites that are flat and nearly devoid of vegetation (Shuford and Gardali 2008; Andres and Stone 2010). In many areas of the United States, nesting mountain plovers are strongly associated with prairie dog colonies. Mountain plovers respond to changes in areas occupied by prairie dogs; the size of the colony may positively influence breeding mountain plover density. Mountain plover use of prairie dog colonies likely increases in wetter years, when grasses grow taller in the surrounding landscape (Andres and Stone 2010).

Mountain plovers occur in burned grasslands in breeding areas for nesting and in nonbreeding areas for foraging and night roosting. Birds typically appear on burned sites very soon after a fire, often where fires are still smoldering. Mountain plovers are also attracted to fallow or recently planted fields for nesting and brood rearing (Andres and Stone 2010).

Mountain plovers use wintering habitats that are similar to those on breeding grounds such as heavily grazed pastures, burned fields, fallow fields, and tilled fields. Wintering mountain plovers have been reported annually from the Antelope Valley area from Christmas Bird Counts where the species prefers to use alfalfa fields and other grass and pasture fields after harvest.

#### Modeled Distribution in the RCIS Area

There are 130,218 acres of potentially suitable habitat for the mountain plover modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for mountain plover is distributed throughout the RCIS area. There are large areas of habitat in the grasslands and agricultural areas just east and west of Lancaster.

### Northern Harrier (*Circus cyaneus*)

#### Status and Range

The northern harrier is a California Species of Special Concern. The species has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. The northern harrier occurs year-round in much of its breeding range in the contiguous United States and locally in southwestern and southeastern Canada. Northern harriers typically migrate and winter from southern Canada (locally) to Central America. During breeding times, this species is most numerous in the prairies and plains from southern Canada to the Dakotas and Montana. In California, northern harriers occur year-round within breeding range and some populations may be resident. The species occurs more broadly and in greater numbers during migration and winter than during the breeding season, which generally extends from March through August (Shuford and Gardali 2008). Harriers breed from near the coast at sea level elevations in the Central Valley up to 800 meters in northeastern California in the Sierra Nevada (Zenier et al. 1990; Shuford and Gardali 2008).

#### Habitat

Northern harriers frequent meadows, grasslands, open rangelands, desert sinks, and fresh and saltwater emergent wetlands, but are seldom found in woodlands (Zenier et al. 1990). Harriers also breed in a variety of open, treeless habitats that provide adequate vegetative cover, an abundance of suitable prey, and scattered hunting and perching locations such as shrubs or fence posts. California-specific habitats include freshwater marshes; brackish and saltwater marshes; wet meadows; weedy borders of lakes, rivers, and streams; annual and perennial grasslands; weed fields; ungrazed or lightly grazed pastures; some croplands; sagebrush flats; and desert sinks. Nesting occurs on the ground, typically within patches of dense and tall vegetation in undisturbed areas. Harrier prey includes a variety of small- to medium-sized vertebrates, generally rodents and passerines (Shuford and Gardali 2008). Northern harrier is one of the more common raptor species in the RCIS area, and the species has been extirpated from much of the rest of Los Angeles County. It is most likely to occur around wetted areas and croplands in the western portion of the RCIS area and around Piute Ponds near Edwards Air Force Base.

#### Modeled Distribution in the RCIS Area

There are 16,610 acres of potentially suitable habitat for the northern harrier modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Modeled habitat is concentrated in the northwestern border of the RCIS area and a few smaller patches distributed north of Lancaster near Edwards Air Force Base and east of Palmdale.

### Prairie Falcon (*Falco mexicanus*)

#### Status and Range

The prairie falcon is listed as a Bird of Conservation Concern by USFWS. The species has not been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. Prairie falcons range from central British Columbia to western North Dakota, south to Baja California and Nuevo Leon. Winter range overlaps much of the breeding range and extends farther south into Mexico and east to Minnesota and Missouri (U.S. Fish and Wildlife Service 2015). In California, prairie falcons are uncommon year-round residents and the species has been described as a wanderer rather than a true migrant. Populations breeding in the north will winter in California (Yolo Natural Heritage Program 2009). The species has been observed in the RCIS area east of Lancaster.

#### Habitat

During the breeding season, prairie falcons inhabit open habitats including arid plains, shrub-steppe desert, open desert scrub, grassland, mixed shrub-grasslands, and alpine tundra where cliffs are present for nesting. (Yolo Natural Heritage Program 2009; U.S. Fish and Wildlife Service 2015). This species will also occur near agricultural fields. Nests are typically located on sheltered ledges or in potholes of a high vertical cliff overlooking large, open areas. Common foraging habitat includes desert scrub and grasslands, particularly in Southern California. Prairie falcons prefer to forage in grasslands, oak savannahs, seasonal wetlands, pasturelands, and occasionally in grain and hay fields in the interior Coast Ranges (Yolo Natural Heritage Program 2009). Migration habitat is similar to wintering and breeding habitat with prairie falcons preferring to migrate through open grassland habitat; however, falcons will also seek out montane meadows, alpine tundra, and subalpine habitat in the northern extent of its range (U.S. Fish and Wildlife Service 2015).

#### Modeled Distribution in the RCIS Area

There are 404,548 acres of potentially suitable habitat for the prairie falcon modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for prairie falcon is widely distributed throughout the RCIS area.

### Swainson's Hawk (*Buteo swainsoni*)

#### Status and Range

Swainson's hawk is listed as threatened under the CESA, and while the species is not listed under the federal ESA, it is considered a Bird of Conservation Concern by USFWS. The species has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. In California, the Swainson's hawk is vulnerable to extirpation due to its very restricted range (primarily the Central Valley), few populations, steep population declines, and loss of habitat. Bloom (1980) concluded that the California Swainson's hawk population had declined 90 percent since 1900, when Sharp (1902) considered the species abundant. Much of this decline occurred in Southern California, where the species was once considered abundant in coastal valleys (Sharp 1902), but is now completely absent. Swainson's hawk populations in the Mojave Desert have declined severely in the past century. It is estimated that this region once supported 270 to 1,080 pairs, but its abundance has since declined by as much as 95 percent. Current nesting territories in Southern California may represent recolonizations (Woodbridge 1998).

Swainson's hawk inhabits grasslands, sage-steppe plains, and agricultural regions of western North America during the breeding season and winters in grassland and agricultural regions from central Mexico to southern South America (Woodbridge et al. 1995; Bechard et al. 2010). In California, most breeding occurs in the Central Valley between Modesto and Sacramento, and approximately 95 percent of the breeding pairs now occur in the Central Valley (California Department of Fish and Game 2007). Remnant (or recolonizing) populations in Southern California are found in the Antelope Valley and Mojave National Preserve regions of the western Mojave Desert. Recent Swainson's hawk breeding populations have occurred in, or close to, the RCIS area with the vast majority of occurrences clustered in the western Mojave region along the base of the San Gabriel and Tehachapi Mountain ranges and in Antelope Valley.

#### Habitat

Swainson's hawks are primarily a grassland bird, but they are also found in sparse shrubland and open woodlands (England et al. 1997). In the RCIS area, Swainson's hawks nest primarily in Joshua trees and nonnative ornamental trees or trees planted as windbreaks (California Energy Commission and California Department of Fish and Game 2010). Nesting pairs in Antelope Valley primarily forage in the alfalfa fields and other agricultural areas in the region (Bloom 2011), as well as grasslands, Joshua tree woodlands, and other desert scrub habitats that support a suitable prey base of small rodents, birds, snakes, and insects such as grasshoppers and crickets (Snyder and Wiley 1976; Fitzner 1980; Bednarz 1988; Estep 1989).

#### Modeled Distribution in the RCIS Area

There are 196,681 acres of potentially suitable habitat for the Swainson's hawk modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for Swainson's hawk is widely distributed throughout the RCIS area. There are large areas of habitat distributed throughout the agricultural lands and grasslands to the east and west of Lancaster.

## Tricolored Blackbird (*Agelaius tricolor*)

### Status and Range

Tricolored blackbird was listed as threatened under the CESA on April 19, 2018. Tricolored blackbird's federal status is under review, and petitioned action may be warranted. It is also considered a Bird of Conservation Concern by USFWS. The species has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. Tricolored blackbird is largely endemic to California, and more than 90 percent of the population occurs in the state (California Department of Fish and Wildlife 2018; Churchwell et al. 2005). Population surveys and banding studies of tricolored blackbird in the Central Valley from 1969 through 1972 concluded that its geographic range and major breeding areas were unchanged since the mid-1930s. Tricolored blackbird historical breeding range in California included the Sacramento and San Joaquin Valleys, lowlands of the Sierra Nevada south to Kern County, the coast region from Sonoma County to the border of Mexico, and sporadically on the Modoc Plateau (Grinnell and Miller 1944). Historically, the tricolored blackbird was described as locally common in the coastal area of Southern California. It also bred on the western edge of the desert in Antelope Valley (Garrett and Dun 1981). Tricolored blackbird currently breeds in small, isolated groups in the eastern and western parts of the RCIS area at emergent water areas. Surveys conducted from 1994 to 2000 and from 2008 to 2017 estimated state-wide population declines of 56 and 63 percent, respectively (California Department of Fish and Wildlife 2018). In the west, these are along the San Andreas fault zone. In recent years, one large colony has repeatedly used the small constructed pond, Holiday Lake, on the valley floor.

### Habitat

Tricolored blackbird requires three basic habitat elements for selecting its breeding colony site: open, accessible water; a protected nesting substrate, including flooded, thorny, or spiny vegetation; and suitable foraging habitat providing adequate insect prey within a few miles of the nesting colony (Hamilton et al. 1995; Beedy and Hamilton 1997b, 1999). Tricolored blackbird requires open water within 1,640 feet for colony settlement (Hamilton 2004a).

Breeding tricolored blackbirds form large colonies, typically in freshwater wetlands dominated by cattails (*Typha* spp.) or bulrushes (*Schoenoplectus* spp.) and thorny vegetation such as Himalayan blackberry (*Rubus armeniacus*, formerly *R. discolor*) (Churchwell et al. 2005). They may also nest in willows (*Salix* spp.), thistles (*Cirsium* and *Centaurea* spp.), and nettles (*Urtica* spp.) (Beedy and Hamilton 1999). In addition, triticale, a vigorous wheat and rye hybrid grown to feed the dairy cows, has become an important nesting substrate (Hamilton and Meese 2006; Kelsey 2008).

Tricolored blackbird forage in rice fields, lightly grazed pasture, dairies, or alfalfa fields. With the conversion of wetlands to arable land, tricolored blackbirds began exploiting the rich agricultural fields created by the transition to farming. Recently, the species has been using dairies, which contain many of the necessary characteristics for breeding.

Tricolored blackbirds require robust and healthy foraging grounds within 5 kilometers of their colony sites (rarely up to 13 kilometers); proximity to suitable foraging habitat is very important for the establishment of colony sites (Orians 1961; Beedy and Hamilton 1997b). Ideal foraging conditions for tricolored blackbird are created when shallow flood irrigation, mowing, or grazing keeps the vegetation at an optimal height (less than 6 inches) (Tricolored Blackbird Working Group 2007). Preferred foraging habitats include agricultural crops such as rice, alfalfa, irrigated pastures, and ripening or cut grain fields (e.g., oats, wheat, silage, and rice), as well as annual grasslands, cattle feedlots, and dairies. Tricolored blackbird also forages in remnant native habitats, including wet and dry vernal pools and other seasonal wetlands, riparian scrub habitats, and open marsh borders (Tricolored Blackbird Working Group 2007). In the RCIS area, habitat for tricolored blackbird is limited to human-made lakes and the agricultural fields around Palmdale and Lancaster as well as emergent water areas along the San Andreas fault zone in the western RCIS area. Small marshes in the Fairmont Reservoir have had sizeable breeding colonies reported in this century.

### Modeled Distribution in the RCIS Area

There are 264,177 acres of potentially suitable habitat for the tricolored blackbird modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for tricolored blackbird is widely distributed throughout the RCIS area. There are large areas of habitat distributed throughout the agricultural lands and grasslands to the east and west of Lancaster. Breeding habitat is more confined to emergent wetted areas, and evidenced by documented colony locations.

## Willow Flycatcher (*Empidonax traillii*)

### Status and Range

The willow flycatcher is listed as endangered under the CESA. The species has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. Willow flycatcher populations have declined by 51 percent between 1966 and 2014, according to the North American Breeding Bird Survey (Sauer et al. 2017). The willow flycatcher occurs throughout the United States with the exception of the extreme northeast and the southeast. It winters from southern Mexico to northern South America in habitats similar to those occupied on the breeding grounds. The willow flycatcher breeding range extends from central British Columbia, southern Alberta, southern Saskatchewan, southwestern Manitoba, northern North Dakota, western and southern Minnesota, central Wisconsin, Michigan, southern Ontario, southwestern Quebec, central Maine, New Brunswick, Prince Edward Island, and Nova Scotia (possibly) south to Southern California (local, formerly widespread), northern Baja California and northern Sonora (at least formerly), southern Arizona (locally), southern New Mexico, northeastern Oklahoma, Arkansas (rarely), northeastern Louisiana, central Tennessee, northern Georgia, western South Carolina, western North Carolina, and central and eastern Virginia. Within California, breeding populations exist in the Sierra Nevada and Transverse Ranges. The RCIS area supports migratory and nesting habitat.

### Habitat

Historically, willow flycatchers nested throughout California wherever riparian deciduous shrubs, mainly thickets of willows, occurred. Today willow flycatchers prefer moist, shrubby areas, often with standing or running water. Breeding habitat is typically moist meadows with perennial streams; lowland riparian woodlands dominated by willows primarily in tree form, and cottonwoods; or smaller spring-fed or boggy areas with willow or alders (Whitfield et al. 1997). Riparian deciduous shrubs or trees, such as willow or alder, are essential elements on willow flycatcher territories (Harris et al. 1988). In meadows, willow thickets interspersed with open space are typically used, while large, contiguous willow thickets are avoided. However, in lowland riverine habitats, contiguous willow thickets are used, possibly because the linear nature of these areas provides sufficient edge and/or the tree-like willows typically found in these areas provide sufficient openings within the willow canopy.

#### Modeled Distribution in the RCIS Area

There are 2,706 acres of potentially suitable habitat for the willow flycatcher modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for willow flycatcher is limited in distribution to small patches adjacent to bodies of water throughout the RCIS area.

### American Badger (*Taxidea taxus*)

#### Status and Range

The American badger is designated as a California species of special concern. The species has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. American badgers occur throughout most of California, except for the northern North Coast from below sea level to 12,000 feet above mean sea level. American badgers can be found throughout the RCIS area.

#### Habitat

American badgers are highly specialized fossorial mammals. They occur in most habitat types, though are most abundant in open, drier habitats with dry, friable soils (Ahlborn 1990). Badgers prefer grasslands, meadows, open scrub communities, such as creosote and sagebrush, and open woodland communities, such as juniper and Joshua tree. Terrain is generally flat to gently sloped. Badgers can disperse up to 70 miles through preferred habitat (Penrod et al. 2012). They dig burrows for cover and will frequently reuse old burrows. They are carnivorous and prey upon fossorial rodents, including mice, rats, chipmunks, and especially gophers and ground squirrels (Ahlborn 1990). Will also feed on reptiles, insects, birds, eggs, and carrion, especially when fossorial rodent populations are low (Helgen and Reid 2016).

#### Modeled Distribution in the RCIS Area

There are 389,477 acres of potentially suitable habitat for the American badger modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for badger is widely distributed throughout most of the RCIS area.

### Desert Kit Fox (*Vulpes macrotis arsipus*)

#### Status and Range

The desert kit fox does not have special designation in California. However, in the RCIS area, desert kit foxes are primarily threatened by expanding development and associated ecological stressors. The species has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. The geographic distribution of kit foxes ranges from southern Oregon east to eastern New Mexico and west Texas and south into Baja California and north-central states of Mexico (Penrod et al. 2012). In California, the desert kit fox occurs throughout the arid southern half of California from Inyo County south to Imperial County and west to the western end of Antelope Valley. The elevation range is 1,300 to 6,250 feet (Penrod et al. 2012). Desert kit fox can be found throughout the RCIS area but primarily in lower-elevation portions of Antelope Valley.

#### Habitat

Desert kit fox occurrence is strongly influenced by topography, vegetative cover, prey availability, and prevalence of predators. Ideal habitat is flat to gently sloping terrain with open, arid vegetation communities such as desert grasslands and scrub. Desert kit fox is most often found in habitats with friable soils such as soft clay or alluvial soils, which provide easy digging of burrows and facilitate rodent populations (Penrod et al. 2012). Burrows are dug in level areas with loosely textured soils. Burrows are used year-round for cover, to escape predators, and to bear young. Kit foxes will also use agricultural areas, especially orchards, for foraging and movement

#### Modeled Distribution in the RCIS Area

There are 361,851 acres of potentially suitable habitat for the kit fox modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for kit fox is widely distributed throughout the most RCIS area.

### Mohave Ground Squirrel (*Spermophilus [Xerospermophilus] mohavensis*)

#### Status and Range

The Mohave ground squirrel has no federal listing and is listed as threatened under the CESA. The species has been identified as a conservation target in the Mojave Desert Ecoregion of the SWAP. Endemic to California, the Mohave ground squirrel is exclusively found in the northwestern Mojave Desert in San Bernardino, Los Angeles, Kern, and Inyo Counties. The species likely has been extirpated from portions of its former range due to urban and agricultural development, especially around the Lancaster, Palmdale, and Victorville areas (Leitner 2008; Leitner 2015). The long-term global trend for Mohave ground squirrel is moderately declining to relatively stable, with an estimated 25 percent chance of 50 percent decline in population (NatureServe 2010). Actual population trends, however, are unknown because systematic or sample surveys in the species' range have not been conducted at a level that allows for population estimates.

#### Habitat

The Mohave ground squirrel occurs in a variety of desert shrubland habitats. Although most often found in creosote bush scrub, it has also been recorded in desert saltbush scrub, desert sink scrub, desert greasewood scrub, shadscale scrub, and Joshua tree woodland (Best 1995). Mohave ground squirrel typically occupies areas with open vegetative cover and small bushes (less than 2 feet in height) spaced approximately 20 to 30 feet apart (Best 1995).

Mohave ground squirrel prefers deep, sandy to gravelly soils on flat to moderately sloping terrain and will avoid rocky areas for the most part (Mohave Ground Squirrel Working Group 2011). The species is not known to occupy areas of desert pavement (Mohave Ground Squirrel Working Group 2011). Soil characteristics are particularly important because Mohave ground squirrels construct burrows to provide temperature regulation, avoid predators, and use during the inactive season.

#### Modeled Distribution in the RCIS Area

There are 121,592 acres of potentially suitable habitat for the Mohave ground squirrel modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for the Mohave ground squirrel is predominantly distributed in the northeastern portion of the RCIS area south of Edwards Air Force Base along the valley floor.

## Mountain Lion (*Felis concolor*)

### Status and Range

Mountain lion has no state or federal conservation status. The passage of Proposition 117 in 1990 prohibits the hunting of mountain lions and granted mountain lions the status of a California Specially Protected mammal species. Depredation permits can still be issued for this species. It was included as a focal species in the RCIS as an indicator species for habitat connectivity and function, given its wide-ranging nature.

Mountain lions are widely distributed across the western hemisphere in both North and South America. Within California, mountain lions are widespread, though uncommon where they do occur. Their range extends from sea level to alpine meadows. They occur in most habitats except for the xeric regions of the Mojave and Colorado Deserts and cropland areas of the Central Valley. Their range is closely tied to the range of the mule deer, their primary prey (Ahlborn 1990). Suitable mountain lion habitat in the RCIS areas is predominantly along the southern border in the northern foothills of the Castaic and San Gabriel Mountains.

The home ranges of mountain lions vary by sex, age, and distribution of prey. Home ranges in Southern California averaged 93 square kilometers for females and 363 square kilometers for males. Males occupy distinct areas, while female home ranges may overlap. Mountain lion movements are often in response to changing prey densities. Mountain lion are capable of moving large distances in search of prey and dispersal. Although mountain lions will cross large areas of unsuitable habitat, they prefer not to do so. Dispersal plays a crucial role in mountain lion population dynamics. Recruitment into a local population occurs mainly by immigration of juveniles from adjacent populations (Penrod et al. 2012).

### Habitat

Mountain lions are habitat generalists, but require extensive areas of riparian vegetation and brushy stages of various habitats, with rocky outcrops and tree/shrub/grassland edges. Caves, other natural cavities, and vegetative thickets are used for denning. They prefer to use vegetated ridgetops and stream courses as travel corridors and hunting routes (Penrod et al. 2012). Mule deer make up approximately 60 to 80 percent of their diet throughout the year. Mountain lions will also prey on rabbits, rodents, skunk, coyotes, porcupines, and occasionally domestic livestock (Ahlborn 1990).

### Modeled Distribution in the RCIS Area

The mountain lion habitat species range map was created by CDFW as part of the California Wildlife Habitat Relationships program and used to predict the distribution of potentially suitable habitat and the range of the mountain lion in the RCIS area (Appendix F, *Focal Species Habitat Models*). There are 69,755 acres of mountain lion modeled potentially suitable range/habitat that overlaps with the RCIS area. This range is distributed along the southwestern border of the RCIS area in the foothills of the San Gabriel Mountains.

## Tehachapi Pocket Mouse (*Perognathus alticolus inexpectatus*)

### Status and Range

The Tehachapi pocket mouse (*Perognathus alticola inexpectatus*) is designated as a California Species of Special Concern. The species has not been identified as a conservation target in the

Mojave Desert Ecoregion of the SWAP. The Tehachapi pocket mouse is known from a few scattered areas in the Tehachapi Mountains from Tehachapi Pass on the northeast to the areas of Mt. Pinos on the southwest, and around Elizabeth, Hughes, and Quail Lakes on the southeast (Brylski 1998). In 2010, individuals were captured on the south slope of the Tehachapi Mountains. It has been recorded between 3,500 and 6,000 feet in elevation (Dudek & ICF 2012).

#### Habitat

Tehachapi pocket mouse is known to occur in Joshua tree woodland, pinyon-juniper woodland, oak savannah, and native and nonnative grasslands. At higher elevations, the species uses open pine forests and at lower elevations, chaparral and coastal sage scrub communities (Dudek & ICF 2012).

#### Modeled Distribution in the RCIS Area

There are 7,390 acres of potentially suitable habitat for the pocket mouse modeled in the RCIS area (Appendix F, *Focal Species Habitat Models*). Habitat for the pocket mouse is limited in distribution to small patches in the northwestern region of the RCIS area along the western borders around State Route 138.

## 2.1.5 Other Conservation Elements

CFGC 1852(c)(4) states that an RCIS will include "important resource conservation elements within the strategy area, including, but not limited to, important ecological resources and processes, natural communities, habitat, habitat connectivity, and existing protected areas, and an explanation of the criteria, data, and methods used to identify those important conservation elements." This section identifies important conservation elements other than focal species and natural communities that occur within the RCIS area. Other conservation elements were identified based on guidance from the Steering Committee, as well as from existing literature and data relevant to the RCIS area, as described in each section that follows.

## 2.1.5.1 Habitat Connectivity

Human development, primarily urban and rural development, is the primary driver of change within the West Mojave subecoregion. The cities of Lancaster and Palmdale in the RCIS area both have populations larger than 150,000, with a population within the greater Antelope Valley of over 500,000 (Greater Antelope Economic Alliance 2015), making the dominant land cover change in the RCIS area the conversion of grasslands/shrublands to developed land. This conversion from natural to developed lands disrupts habitat connectivity and creates fragmentation throughout Antelope Valley.

As described in Section 2.1.1, *Ecoregions*, most of the RCIS area occurs within the West Mojave section of the American Semi-Desert and Desert Province, but it also includes a small portion of the Southern California Mountains and Valleys section of the California Coastal Range Open Woodland—Shrub—Coniferous Forest—Meadow province. A part of the upper Santa Clara River and a small portion of the headwaters of the Santa Clara River watershed near Elizabeth Lake and the Petersen Mitigation Bank are also included in the Antelope Valley RCIS. Much of the length of the San Andreas fault zone in Los Angeles County is included in the Antelope Valley RCIS. This multi-ecoregion composition indicates that the RCIS area includes important transition areas for wildlife movement within and across the RCIS area boundaries. Transition zones between ecoregions are critical habitat linkages that are often species-rich, as the plant and animal communities characteristic of each region abut one another, and species interact in novel combinations. Connectivity, both within the Mojave Desert and between ecoregions, is important in the face of global climate change, as some species may need to move to track shifts in the locations of areas with suitable temperature and rainfall regimes. Because habitat suitability varies among species, it is important to maintain landscape integrity at multiple scales. Conserving connections between preferred habitats allows individual movements and multi-generational dispersal, thereby increasing long-term species viability. For species that are not able to move far, protecting adjacent habitat can be critical to their survival because activities on surrounding lands can disrupt or alter the ecosystem processes that support them.

The California Essential Habitat Connectivity Project (California Department of Transportation and California Department of Fish and Game 2010)[5] does not include any linkages through the RCIS area (Figure 2-9). The California Essential Habitat Connectivity Project depicts the large natural landscape blocks occurring in the Angeles National Forest along the southern boundary of the RCIS area, which connect to natural landscape blocks in the Tehachapi Mountains. These natural landscape blocks were also identified in the California Missing Linkages Project (Penrod et al. 2003) as important transitions from the floor of the Mojave Desert to the base of the southern Tehachapi Mountains. The linkages to the foothills along the base of the San Gabriel Mountains, Angeles National Forest, and drainages that connect to the Los Padres National Forest and Coastal Ranges farther west are generally contiguous and connected, although somewhat fragmented by Interstate 5 and the California Aqueduct channels.

The largest and most intact linkage in the RCIS area is the Edwards Air Force Base-San Gabriel Mountains linkage identified in the Linkage Network for California Deserts (Penrod et al. 2012). The Edwards Air Force Base-San Gabriel Mountains linkage runs north-south along the eastern boundary of the RCIS area connecting Edwards Air Force Base with the San Gabriel Mountains (Figure 2-9). The linkage supports fairly contiguous natural land cover.

An extensive habitat connectivity analysis was conducted for this RCIS to identify fine-scale important habitat linkages in the RCIS area. This analysis is described in Chapter 3, *Conservation Strategy*.

[5] https://www.wildlife.ca.gov/conservation/planning/connectivity/CEHC

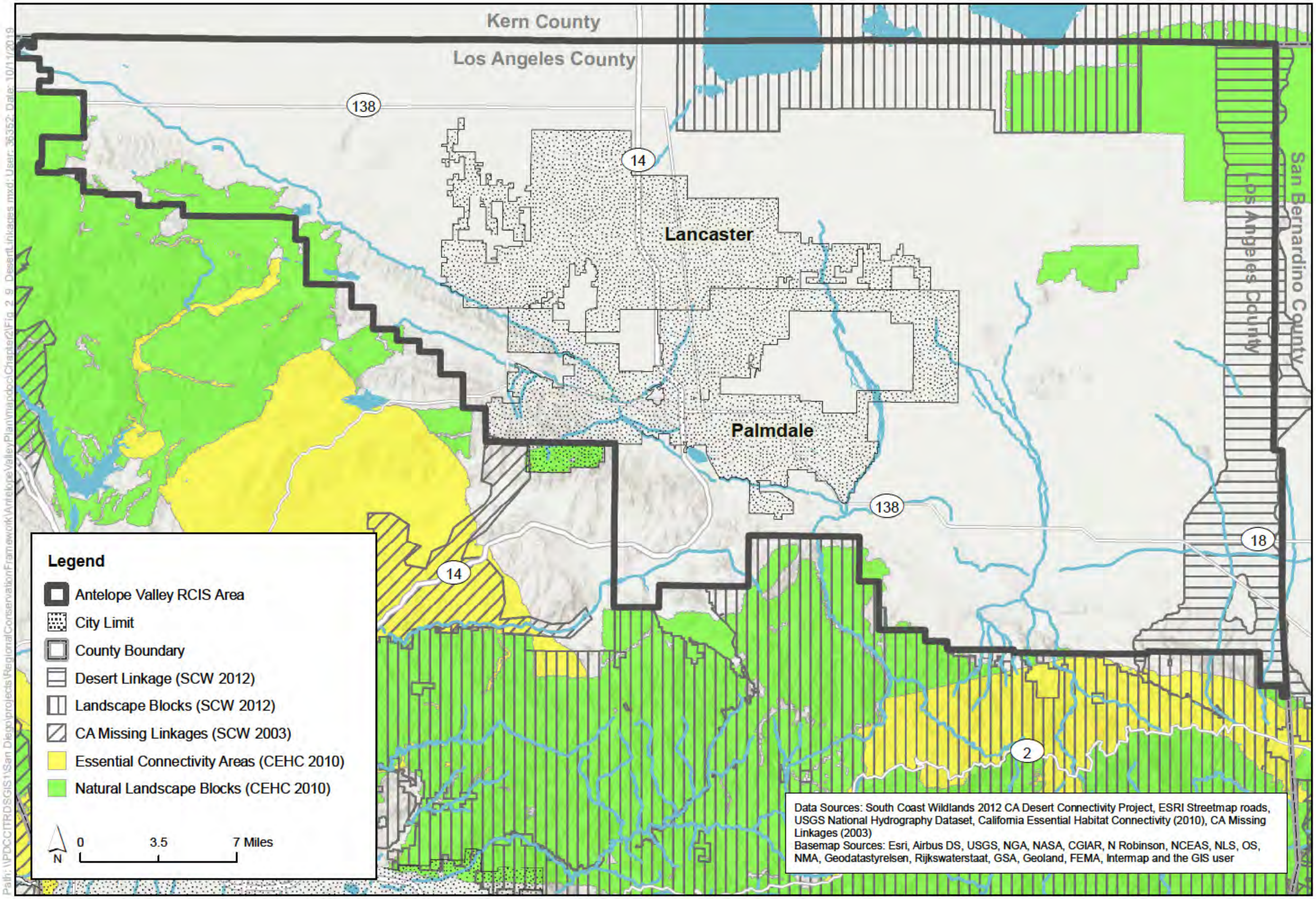


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**Figure 2-9**
**Previously Identified Landscape Linkages in the Antelope Valley RCIS Area**

### Ecosystem Services

Providing connectivity between habitats allows biotic and abiotic resources to move between the habitat patches, providing ecosystem services (Mitchell et al. 2013). The primary ecosystem service provided by habitat connectivity and wildlife linkages is allowing species access to additional habitat patches and increasing genetic connectivity across the species' range, increasing the likelihood of success of the species (Leibold et al. 2004). The current literature indicates that loss of habitat connectivity has a negative effect on ecosystem services such as the provisioning of food and water; the regulation of climate, disease, disturbance, flood control, pollination, seed dispersal, soil erosion, and water quality; and cultural services such as aesthetics, recreation, and spiritual services (Mitchell et al. 2013).

## 2.1.5.2 Working Lands

CFGC 1852 (e)(1) requires that an RCIS consider "the conservation benefits of working lands for agricultural uses." To support this analysis, the following section describes the extent of farmland and rangeland in the RCIS area. This information is based on the latest annual report of agricultural production in Los Angeles County compiled by the county's Agricultural Commissioner (Los Angeles County 2015a). The stressors on conservation goals posed by farmland and rangeland are discussed in Section 2.3.

### Farmland

Antelope Valley is historically known for its extensive alfalfa fields and fruit crops. In more recent years, farmland has shifted to support a wider variety of crops. Currently, the region supports a combination of planted fields and greenhouses (irrigated row, field crops, orchards, and vineyards account for 38,383 acres in the RCIS area), with apples, tomatoes, onions, bell peppers, carrots, and grapes as a part of the area's offerings (Figure 2-8). However, as housing tracts continue to build through the middle of Antelope Valley, farm operations are being marginalized to the western and eastern sides of the RCIS area more than in previous decades.

#### Ecosystem Services

Farmlands in the Antelope Valley RCIS area provide ecosystem services in the form of provisioning, habitat, and cultural services. In 2015, agricultural commodities in Los Angeles County exceeded $192 million in value. Top five crops grown include root vegetables ($60 million), woody ornamentals ($48 million), bedding plants ($20 million), alfalfa hay ($11 million), and dairy and livestock ($8 million) (UCCE 2019). Many species now depend on habitat created by agricultural lands in Antelope Valley, especially irrigated pastures such as alfalfa and sod fields. These species include the mountain plover, Swainson's hawk, and tricolored blackbird, among others. Cultural services provided by farmlands include agritourism, farm stands, u-pick, farm stays, tours, farm classes, festivals, pumpkin patches, and corn mazes.

### Rangeland

The grassland, shrubland, and woodland natural communities in the RCIS area evolved under the influence of prehistoric herbivores—including deer and pronghorn antelope—and without competition from nonnative annuals, which currently dominate much of the region. Prior to agricultural expansion and other human development, Antelope Valley had a major component of native wildlife grazing, supporting large herds of pronghorn or "antelope" in native grasslands that were also wildflower fields.

Livestock grazing can be a valuable range management tool, providing a surrogate for grazing ungulates that are far less prevalent than prehistoric levels, to manage infestations of invasive plants, promote populations of native plants and animals, and reduce wildfire fuel loads. With supplemental water, European-derived domestic cattle, sheep, and goats can provide the cropping services of the native large herbivores but domestic livestock will need fairly intense management to avoid habitat damage under fenced conditions. Livestock grazing is the most widespread land management practice in the world, affecting 70 percent of the land surface of the western United States (Krausman et al. 2009). Grazing reduces the amount of accumulated plant litter, which could favor native plant establishment and growth and enhance the overall composition of native plant communities. Nonnative annual grasses and herbs tend to monopolize landscapes rapidly and can inhibit the germination of seeds and growth of native species through the capture of water and mineral resources and the physical and chemical effects of accumulated plant litter. Moderate levels of grazing are ideal for maintaining and enhancing native vegetation by reducing competition from more aggressive, nonnative annual plants. Moderate grazing can also improve conditions for rodents and their predators by reducing dense ground cover, which can impede movement and decrease populations of burrowing rodents.

Rangeland is generally concentrated in the western portion of the RCIS area (Figure 2-10). According to Farmland Mapping and Monitoring Program (California Department of Conservation 2014) data, approximately 15.6 percent of the RCIS area is rangeland.

#### Ecosystem Services

Rangeland can provide a variety of ecosystem services, including erosion control, water quality benefits, groundwater recharge, livestock forage, wildlife and pollinator habitat, threatened and endangered species habitat, outdoor recreation, and carbon sequestration (O'Connell and Livingston 2018). Rangeland supporting populations of burrowing mammals such as the California ground squirrel (*Spermophilus beecheyi*) can provide optimal foraging and breeding habitat for the burrowing owl when properly managed (Artis 2011). Rangelands also provide provisioning services for humans from the cattle they produce and may provide cultural services in the form of agritourism, wedding and dinner venues, youth camps, barn dances, hunting and fishing, and guest ranches (University of California Cooperative Extension 2017). The ecosystem services provided by a given area of rangeland can vary depending on how it is managed. For example, heavily grazed rangeland would improve the services provided to burrowing owl habitat (Dechant et al. 1999; Rosenberg et al. 2009), but would decrease the erosion control and water quality services.

### 2.1.5.3 Natural Communities of Conservation Importance

The RCIS area boundary is largely contained (90 percent) within the High Desert Plains and Hills U.S. Department of Agriculture Ecological Subsection (generally called the West Mojave subecoregion). Approximately 130 different natural or semi-natural vegetation classes mapped by CDFW occur within the Mojave Desert ecoregion section that encompasses approximately 90 percent of the RCIS area and the Southern California Mountains and Valleys ecoregion section that encompasses the remaining 10 percent of the RCIS area. These ecoregion sections provide the context for the unique natural or semi-natural communities encountered there.

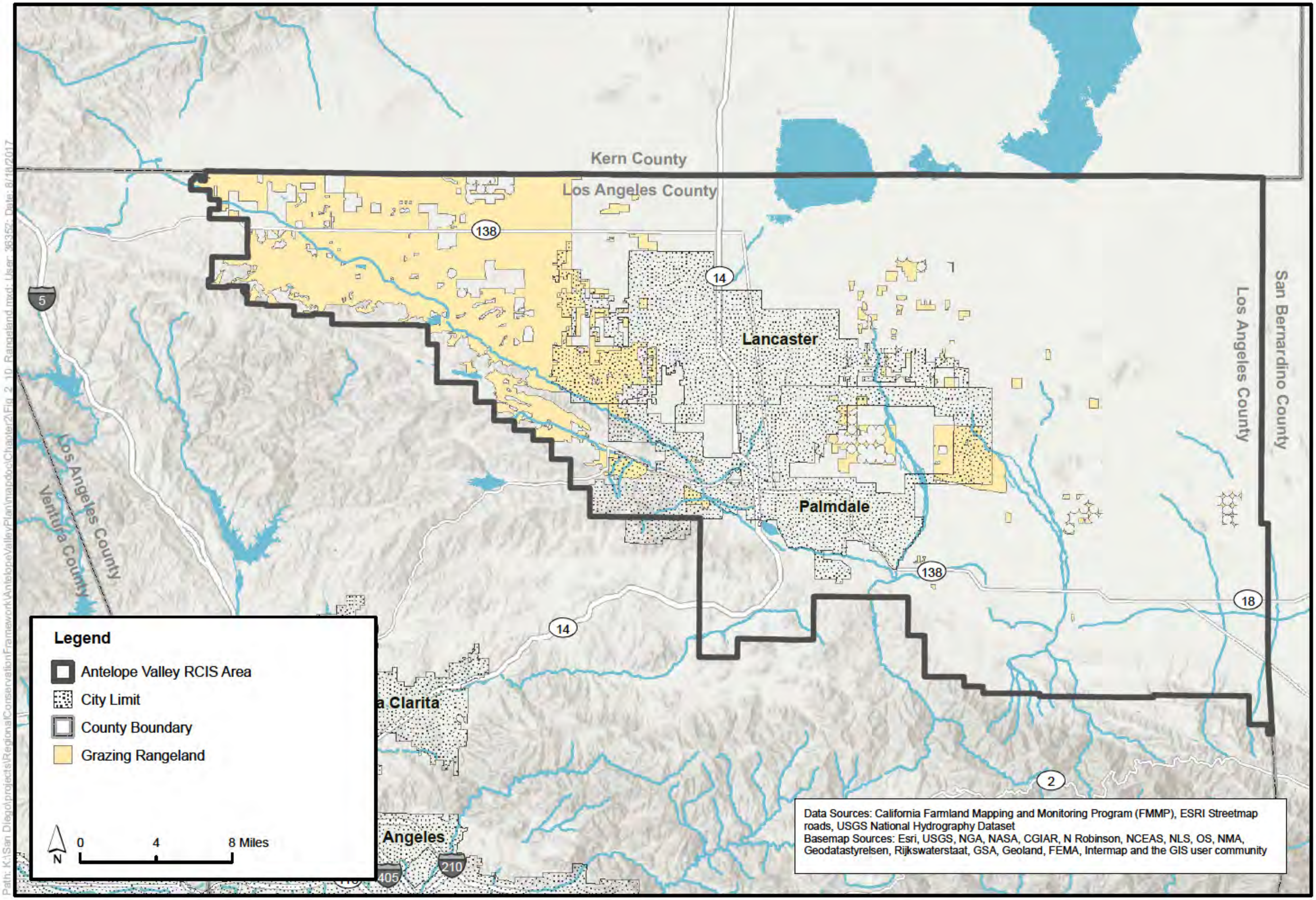


**Figure 2-10**
**Rangeland in the Antelope Valley RCIS Area**

Natural communities of conservation importance can be biologically diverse "hot spots" that often support one or more focal plant or wildlife species. These communities may be rare and imperiled because they have been lost to development and are currently under threat from climate change, invasive exotic species, human disturbance, disease, or a combination of these threats. Natural communities of conservation importance were incorporated into the biological value mapping to ensure that they were considered as key conservation elements for the RCIS.

Natural communities of conservation importance were evaluated using the NVCS Name field in the composite vegetation dataset, which corresponds to different levels in the vegetation classification hierarchy (e.g., Macrogroup, Group, and Alliance). These natural communities are shown on Figure 2-11 and listed in Table 2-6. The process for identifying natural communities of conservation importance is described in Chapter 3, *Conservation Strategy*, in Section 3.2.1.2, *Natural Communities*.

**Table 2-6. Natural Communities of Conservation Importance**

| Natural Community (NVCS Name) | Imperiled/Vulnerable | Acres |
|---|---|---|
| *Achnatherum hymenoides* | Critically imperiled | 618 |
| *Aesculus californica* | Vulnerable | 14 |
| *Encelia* (*actoni*, *virginensis*) | Vulnerable | 37 |
| *Ericameria linearifolia* | Vulnerable | 118 |
| *Forestiera pubescens* | Imperiled | 105 |
| *Krascheninnikovia lanata* | Vulnerable | 14 |
| *Lepidospartum squamatum* | Vulnerable | 3,056 |
| *Lycium cooperi* | Vulnerable | 26 |
| *Platanus racemosa* | Vulnerable | 81 |
| *Populus fremontii* | Vulnerable | 956 |
| *Prosopis glandulosa* | Vulnerable | 897 |
| *Prunus fasciculata* | Vulnerable | 901 |
| *Pseudotsuga macrocarpa* | Vulnerable | 97 |
| *Purshia tridentata* | Vulnerable | 1,397 |
| *Quercus lobata* | Vulnerable | 697 |
| *Salix laevigata* | Vulnerable | 135 |

NVCS = National Vegetation Classification System

### Ecosystem Services

Ecosystem services provided by natural communities of conservation importance will vary to some degree by community type and condition. They may provide such services as soil development, soil retention, nutrient cycling, water regulation, water treatment, climate regulation, carbon sequestration, pollination and seed dispersal, biodiversity, habitat, traditional medicines, pharmaceuticals, and moderation of extreme events (flooding, fires, or droughts). They also provide cultural services such as recreation, hiking, bird watching, camping, ecotourism, and cultural identity and spiritual services (Millennium Assessment 2005; O'Connell and Livingston 2018).

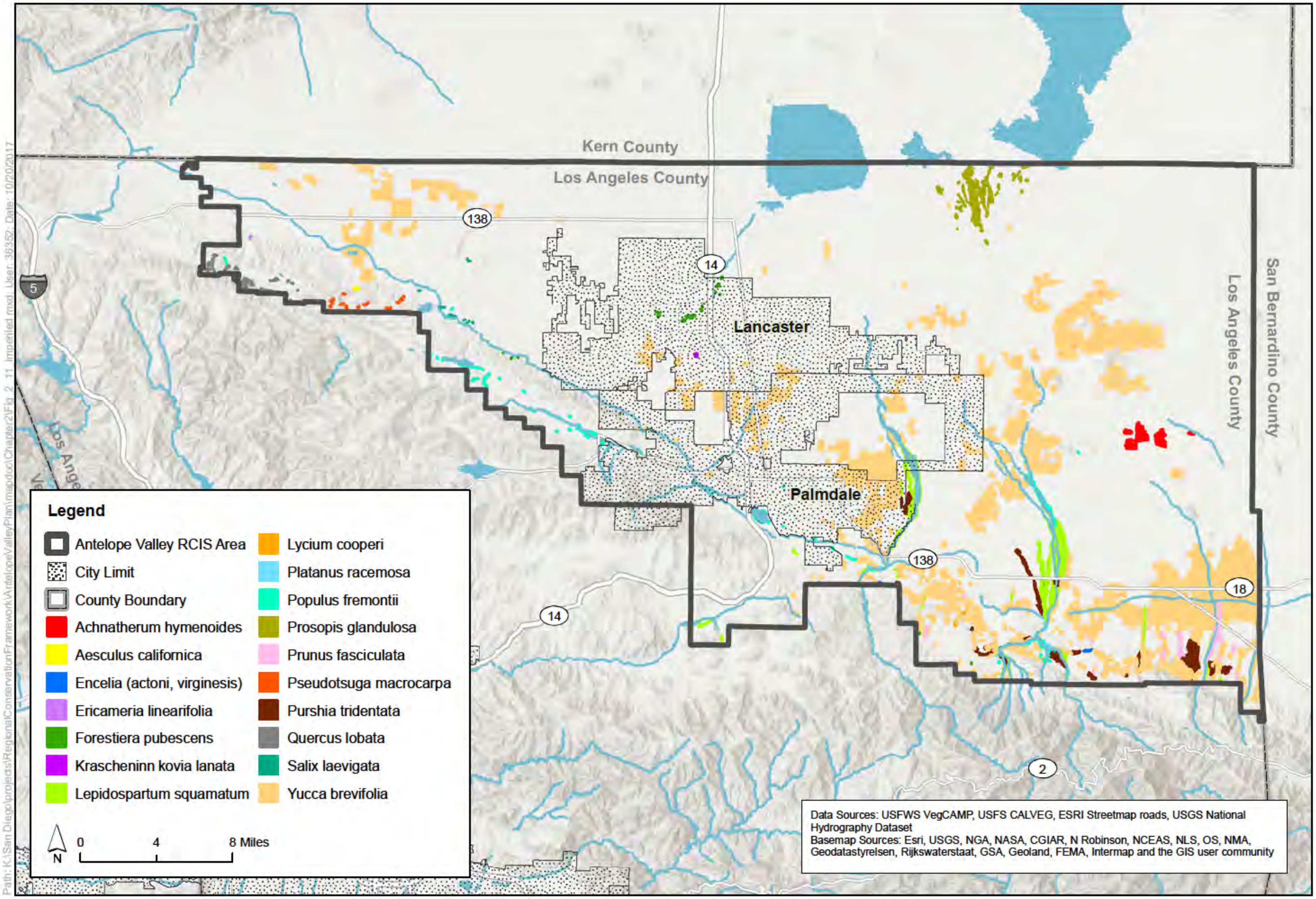


**Figure 2-11**
**Natural Communities of Conservation Importance in the Antelope Valley RCIS Area**

### 2.1.5.4 Key Aquatic Habitats

As noted in the California SWAP, "Because of the extreme weather conditions and limited water availability, the aquatic ecosystems of the deserts significantly differ from the rest of the state and provide unique environments for native species" (California Department of Fish and Wildlife 2015). The RCIS area includes the following key aquatic habitats, as identified by the SWAP, which are important habitats for many of the focal species (this list is not intended to be all-inclusive).

- Streams: Big Rock Creek, Pallett Creek, Sandrock Creek, Little Rock Creek, Antelope Wash, Kings Canyon
- Springs: Mapped unnamed springs in the RCIS area are shown on Figure 2-12.
- Ponds, lakes, reservoirs: Lake Palmdale, Una Lake, Elizabeth Lake, Fairmont Reservoir, Tweedy Lake, Quail Lake, Lake Hughes
- Other ephemeral water sources
- Human-created aquatic features: Piute Ponds, Kings Canyon Percolation Basin

Known locations of these key aquatic habitats are shown on Figure 2-12; many smaller or ephemeral aquatic features are not comprehensively mapped in the RCIS area.

#### Ecosystem Services

Aquatic habitats provide a wide variety of ecosystem services including fish and wildlife habitat and forage, migrating bird habitat, water quality improvement, water storage, recreation, aesthetic appreciation, biodiversity, nutrient cycling, and carbon sequestration (Environmental Protection Agency 2016). Ecosystem services provided by aquatic habitats will vary by both type and position within the watershed.

## 2.2 Built Environment

This section describes government jurisdictions and plans, as well as existing infrastructure and infrastructure planning in the RCIS area. Assessing these elements of the built environment within the RCIS area helps to determine where foreseeable future urbanization will occur so that it can be considered in planning for future conservation.

The RCIS area is located entirely within the northeastern or Antelope Valley portion of Los Angeles County. Within the RCIS area, there are two incorporated cities, Lancaster and Palmdale. Both cities have growing populations of more than 150,000 residents. There are several smaller unincorporated communities within the RCIS area, but none has a population of more than 10,000; many have populations of fewer than 1,000 residents. Federal military land (Edwards Air Force Base) composes a large portion of the northeastern portion of the RCIS area.

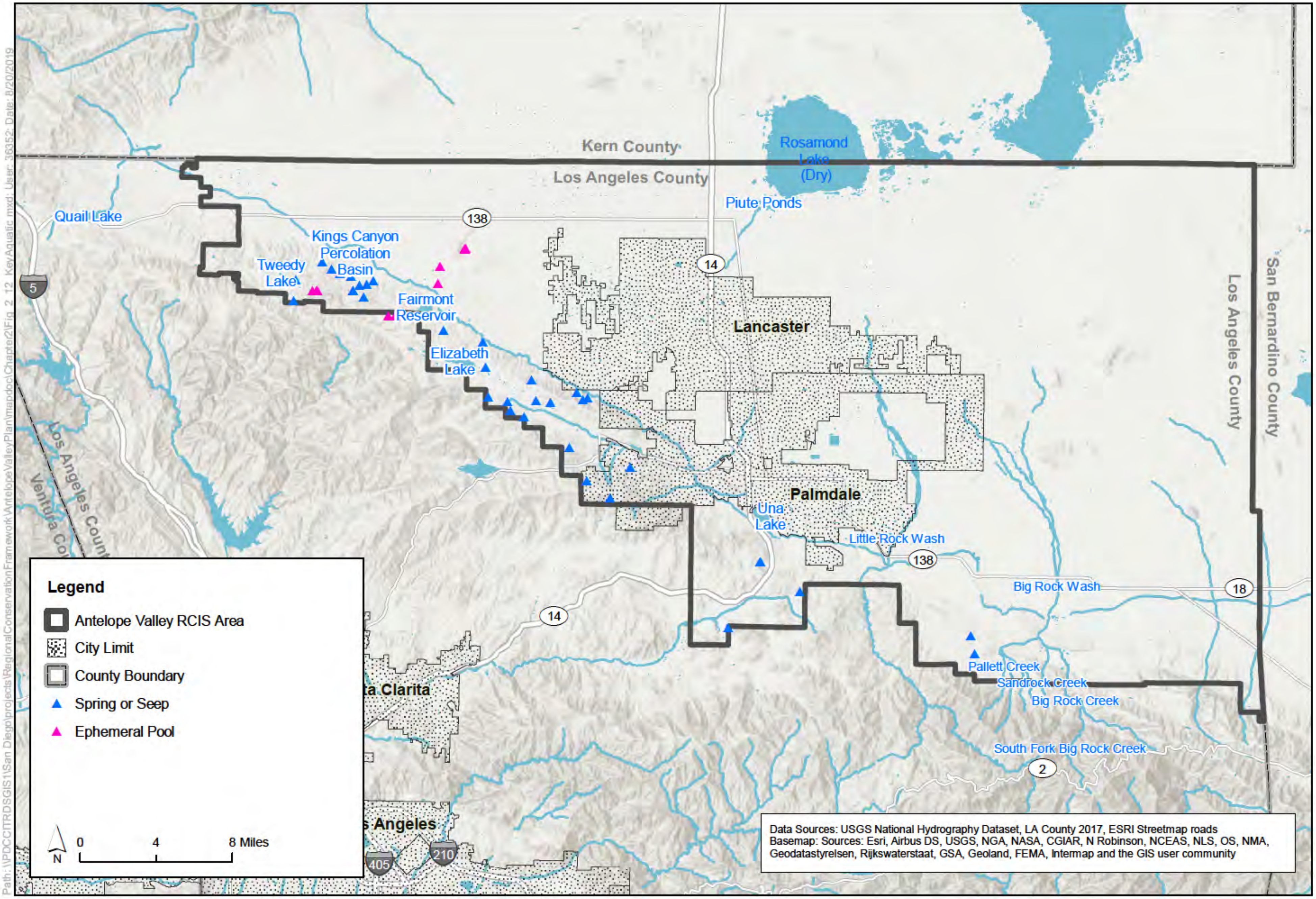


**Figure 2-12**
**Key Aquatic Habitats of the Antelope Valley RCIS Area**

Lancaster is located near the central portion of the of the RCIS area in the northern portion of Los Angeles County, approximately 70 miles north of downtown Los Angeles. The entire sphere of influence of the city of Lancaster, including the incorporated city limits, comprises approximately 268 square miles. Currently, approximately 30 percent of the incorporated land area is developed.

Palmdale is south of Lancaster and is approximately 60 freeway miles north of Los Angeles. The city is bordered by Lancaster and the unincorporated community of Quartz Hill to the north, unincorporated communities of Lake Los Angeles and Littlerock to the east, the unincorporated community of Acton to the south, and the unincorporated community of Leona Valley to the west. The city of Palmdale encompasses approximately 174 square miles.

## 2.2.1 Local Government Planning Boundaries

CFGC 1852(c)(6) requires "consideration of . . . city and county general plan designations that accounts for reasonably foreseeable development of . . . housing in the RCIS area." This section describes urban development areas and city and county general plan designations that describe future urban development that is reasonably foreseeable.

The Antelope Valley RCIS is a non-regulatory, nonbinding voluntary strategy that, when adopted by CDFW, will provide information to support advance mitigation through voluntary mitigation credit agreements between willing participants. Adoption of this RCIS by CDFW is consistent with CFGC Sections 1850(e) and 1852(c)(7). By authorizing CDFW to approve RCISs, it is not the intent of the Legislature to regulate the use of land, establish land use designations, or to affect, limit, or restrict the land use authority of any public agency. Therefore, this RCIS does not preempt the authority of local agencies to implement infrastructure and urban development described in local general plans. Actions carried out as a result of this RCIS will be in compliance with all applicable state and local requirements.

Based on CFGC Sections 1852(c)(7) and 1855(b), the Antelope Valley RCIS:

- Does not establish a presumption under the California Environmental Quality Act (CEQA) that any project's impacts are, or are not, potentially significant.
- Does not prohibit or authorize any project or project impacts.
- Does not create a presumption or guarantee that any proposed project will be approved or permitted, or that any proposed impact will be authorized, by any state or local agency.
- Does not create a presumption that any proposed project will be disapproved or prohibited, or that any proposed impact will be prohibited, by any state or local agency.
- Does not alter or affect, or create additional requirements for, the general plan of the city, county, or city and county, in which it is located.
- Does not have any binding or mandatory regulatory effect on private landowners or mitigation credit project proponents.
- Does not preempt the authority of local agencies to implement infrastructure and urban development in local general plans.

## 2.2.2 Local Government Plans

Cities and counties are required by state law to develop and periodically update general plans with land use designations that typically include uses for urban development at various densities, rural development at various densities, commercial development, industrial development, and open space. Table 2-7 and Figure 2-13 show the consolidated land use designations of unincorporated Los Angeles County and the two cities in the RCIS area. For the purposes of the figure and this analysis, designations of different densities were consolidated into a single category (e.g., light industrial and heavy industrial shown as industrial; different residential designations shown as one residential category).

**Table 2-7. Land Use Designations in the RCIS Area**

| City or Unincorporated County | Land Use Designations |
|---|---|
| Los Angeles County (unincorporated) | Rural Land, Residential, Public and Semi-Public Facilities, Military Land, Open Space – Conservation/Parks and Recreation/National Forest/Bureau of Land Management, Water, Rural Commercial, Light Industrial, Heavy Industrial, Mixed Use – Rural |
| Lancaster | Nonurban Residential, Urban Residential, Multi-residential, Mixed Use, Commercial, Office/Professional, Light Industrial, Heavy Industrial, Health Care, Public Use, Open Space |
| Palmdale | Equestrian Residential, Low Density Residential, Single Family Residential, Multi-Family Residential, Office Commercial, Neighborhood Commercial, Community Commercial, Regional Commercial, Downtown Commercial, Commercial Manufacturing, Business Park, Industrial, Airfield, Mineral Resource Extraction, Open Space, Public Facilities |

Sources: City of Lancaster 2009a; Los Angeles County 2015b; City of Palmdale 1993

### 2.2.2.1 County of Los Angeles General Plan 2035

The *Los Angeles County General Plan 2035* (General Plan) (Los Angeles County 2015b) is the foundational document for all community-based plans that serve the unincorporated areas within the county. The General Plan identifies 11 planning areas, including Antelope Valley, which has the corresponding *Antelope Valley Area Plan* (Area Plan). The purpose of the Planning Areas Framework is to provide a mechanism for local communities to work with the County to develop plans that respond to their unique and diverse character. The General Plan provides the policy framework and establishes the long-range vision for how and where the unincorporated areas will grow, and establishes goals, policies, and programs to foster healthy, livable, and sustainable communities through 2035.

The County's role in the protection, conservation, and preservation of natural resources and open space areas is vital, as most of the natural resources and open space areas in Los Angeles County are located in the unincorporated areas. The County must act as the steward for natural resources and available open space areas, and conserve and protect these lands and resources from inappropriate development patterns.

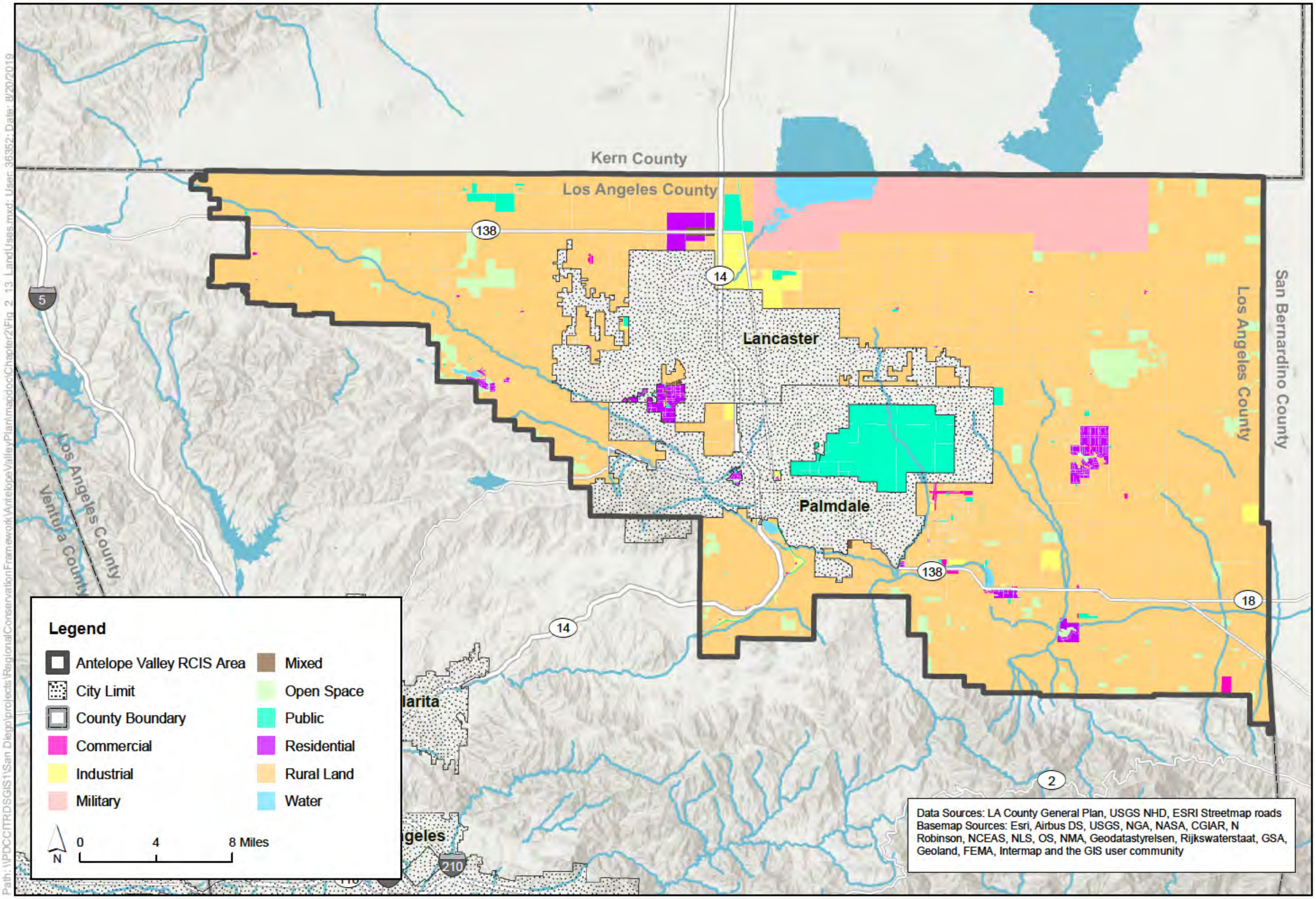


**Figure 2-13**
**Land Use Designations in the RCIS Area**

The Conservation and Natural Resources Element of the General Plan guides the long-term conservation of natural resources and preservation of available open space areas. The Conservation and Natural Resources Element addresses the following conservation areas: Open Space Resources; Biological Resources; Local Water Resources; Agricultural Resources; Mineral and Energy Resources; Scenic Resources; and Historic, Cultural and Paleontological Resources. The County also identifies Significant Ecological Areas (SEAs), which are further described below. Specific policies of note in the General Plan that pertain to biological resources include the following:

- Policy Land Use (LU) 2.1: Limit the amount of potential development in Significant Ecological Areas, including Joshua Tree Woodlands, wildlife corridors, and other sensitive habitat areas, through appropriate land use designations with very low residential densities, as indicated in the Land Use Policy Map (Map 2.1) of this Area Plan.
- Goal Conservation and Natural Resources (C/NR) 3: Permanent, sustainable preservation of genetically and physically diverse biological resources and ecological systems including: habitat linkages, forests, coastal zone, riparian habitats, streambeds, wetlands, woodlands, alpine habitat, chaparral, shrublands, and SEAs.
- Policy C/NR 3.1: Conserve and enhance the ecological function of diverse natural habitats and biological resources
- Policy C/NR 3.4: Conserve and sustainably manage forests and woodlands.
- Policy C/NR 3.8: Discourage development in areas with identified significant biological resources, such as SEAs.
- Policy C/NR 3.9: Consider the following in the design of a project that is located within an SEA, to the greatest extent feasible:
    - Preservation of biologically valuable habitats, species, wildlife corridors and linkages; Protection of sensitive resources on the site within open space;
    - Protection of water sources from hydromodification in order to maintain the ecological function of riparian habitats;
    - Placement of the development in the least biologically sensitive areas on the site (prioritize the preservation or avoidance of the most sensitive biological resources onsite);
    - Design required open spaces to retain contiguous undisturbed open space that preserves the most sensitive biological resources onsite and/or serves to maintain regional connectivity;
    - Maintenance of watershed connectivity by capturing, treating, retaining, and/or infiltrating storm water flows on site; and
    - Consideration of the continuity of onsite open space with adjacent open space in project design.
- Policy C/NR 3.10: Require environmentally superior mitigation for unavoidable impacts on biologically sensitive areas, and permanently preserve mitigation sites.
- Policy C/NR 3.11: Discourage development in riparian habitats, streambeds, wetlands, and other native woodlands in order to maintain and support their preservation in a natural state, unaltered by grading, fill, or diversion activities.
- Goal C/NR 4: Conserved and sustainably managed woodlands.
- Policy C/NR 4.1: Preserve and restore oak woodlands and other native woodlands that are conserved in perpetuity with a goal of no net loss of existing woodlands.

## Significant Ecological Areas

SEAs are officially designated areas in Los Angeles County identified for their biological value. SEAs are designated to have special management because they contain biotic resources that are considered rare or unique, are critical to the maintenance of wildlife, represent relatively undisturbed areas of county habitat types, or serve as linkages. SEA boundaries were delineated to promote connectivity and biodiversity, with an overarching goal of protecting all representative biota of Los Angeles County, rather than focusing solely on rare species. The following four SEAs, as established in 2015 as part of the County General Plan Update, overlap with the boundaries of the Antelope Valley RCIS (Figure 2-14) (see Appendix E of the General Plan for more information about each SEA).

- The **Antelope Valley SEA** is located primarily east of the cities of Palmdale and Lancaster, extending from the Angeles National Forest to the playa lakes within Edwards Air Force Base. The RCIS area encompasses the majority of this SEA, which is focused on the principal watercourses of the area: Little Rock Wash and Big Rock Wash and tributaries, such as Mescal Creek. The Antelope Valley SEA contains habitat for core populations of endangered and threatened plant and animal species and plant and animal species that are either unique or are restricted in distribution in the county and regionally, including the Agassiz's desert tortoise and Mohave ground squirrel. The geographical features of the SEA serve as a major habitat linkage and movement corridor for all wildlife species within its vicinity and, in an intergenerational sense, many of the plant species. The Little Rock Wash and Big Rock Wash, combined with the upland terrestrial Desert-Montane transect portion of the SEA, ensure linkage and direct movement areas for all of the wildlife species present within the county portion of Antelope Valley.
- The **Joshua Tree Woodlands SEA** is in the western portion of the RCIS area west and northwest of the Antelope Valley California Poppy Reserve in an unincorporated area of the county. This SEA encompasses many of the remaining old-growth stands of Joshua trees on the west side of Antelope Valley. Joshua tree woodland is a complex biological community of the gradual slopes of higher-elevation desert areas that once covered much of this part of Antelope Valley around the Antelope Wash. Joshua trees only occur within the Mojave Desert, and the county population is the western extreme location for the species.
- The **San Andreas SEA** is located along the southwestern portion of the RCIS area. The northwestern portion of the SEA is where multiple ecoregions converge. Wildlife corridors extend along the course of the San Gabriel Mountains in the RCIS area, as well as along the San Andreas fault and Garlock fault, which provide a great variety of habitats and frequent emergent water that is important for wildlife and plant movement and connectivity. The location and orientation of the SEA coincide with a segment of the San Andreas fault zone. The SEA includes a small portion of the western south-facing Tehachapi foothills, which are known for wildflower field displays in years of good rainfall. The SEA includes Quail Lake, a former sag pond enhanced to receive water from the West Branch of the California Aqueduct. From Quail Lake, the SEA extends up the northern foothills of Liebre Mountain and Sawmill Mountain, and includes Portal Ridge, large portions of Leona Valley, Ritter Ridge and Fairmont and Antelope buttes, and portions of Anaverde Valley. It also includes a disjunct area that encompasses water bodies along the fault, Lake Palmdale, and Una Lake, with a terminus at Barrel Springs.

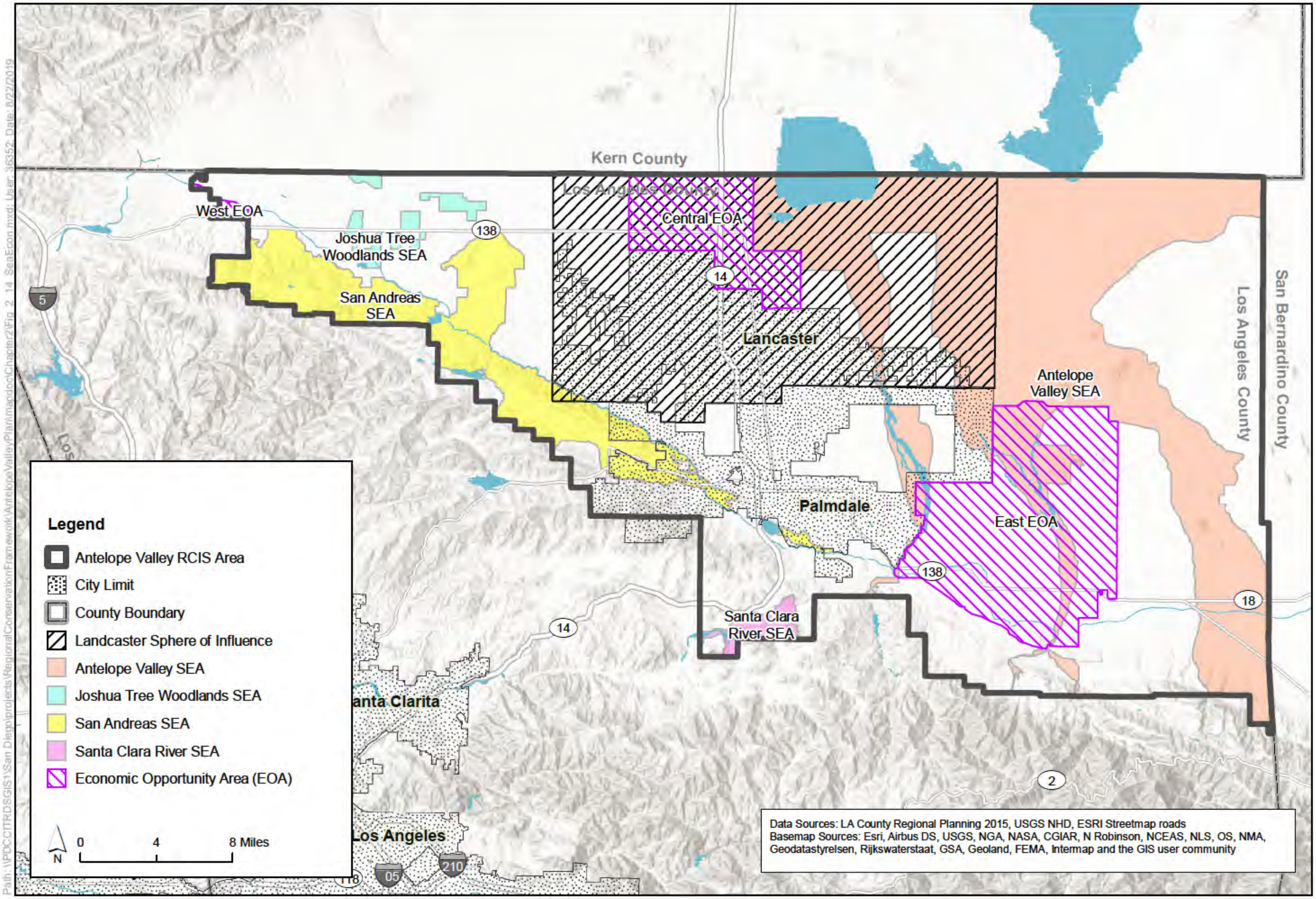


**Figure 2-14**
**Los Angeles County Significant Ecological Areas (SEA) and Economic Opportunity Areas**

- The **Santa Clara River SEA** extends along the entire reach of the Santa Clara River in Los Angeles County; only its easternmost portion extends into the RCIS area. The river is an important wildlife corridor in Los Angeles County. Nearly all of the SEA is designated by Audubon California as a Globally Important Bird Area. The Santa Clara River Important Bird Area extends beyond the SEA upstream, across Soledad Pass to the Barrel Springs area in Antelope Valley.

### 2.2.2.2 Antelope Valley Area Plan

The Area Plan was adopted in June 2015 (Los Angeles County 2015c). The planning area boundary encompasses the RCIS area, except for a small portion where the Palmdale city boundary runs adjacent to the Santa Clarita Valley Area Plan. Area plans cover smaller geographic areas than general plans and address neighborhood and/or community-level policy issues. The unique characteristics and needs of each plan area guide the development of each area plan. Area plans provide opportunities to update community-based plans, as well as implementation tools of the general plan, such as specific plans and community standards districts. The Antelope Valley plan area is predominantly rural and has major constraints, including natural hazards, environmental issues, lack of infrastructure, and limited water supply. While much of the growth has been at urban densities in and adjacent to the cities of Palmdale and Lancaster, the desirability of rural living and the availability of affordable housing have led to significant growth in the many unincorporated communities in Antelope Valley. In turn, many residents have had to commute longer distances to access employment opportunities.

The Area Plan's vision statement notes the "extraordinary environmental setting that includes agricultural lands, natural open spaces, expansive mountain views, and diverse ecological habitats" that unify the communities in Antelope Valley (Los Angeles County 2015c). As described in the Area Plan, the planning vision includes a Rural Preservation Strategy that is based on four types of environments that serve different purposes: rural town center areas, rural town areas, rural preserve areas, and economic opportunity areas. The plan goes on to describe rural preserve areas as those that are largely undeveloped and generally not served by existing or planned infrastructure and public facilities. Many of these areas contain environmental resources, such as SEAs. The primary benefit of rural preserve areas is that they provide habitat for regionally significant biological species while simultaneously providing scenic value to residents. A secondary benefit of these areas is that they contain natural resources that provide economic opportunities. The Area Plan's vision for these areas is limited development at very low densities, light and heavy agricultural uses, including equestrian and animal-keeping uses, and other uses where appropriate. Policies from the Area Plan that pertain to biological resources include the following:

- Goal Conservation and Open Space (COS) 4: Sensitive habitats and species are protected to promote biodiversity.
- Policy COS 4.2: Limit the amount of potential development in Significant Ecological Areas, including the Joshua Tree Woodlands, wildlife corridors, and other sensitive habitat areas, through appropriate land use designations with very low residential densities, as indicated in the Land Use Policy Map (Map 2.1) of this Area Plan.
- Policy COS 4.3: Require new development in Significant Ecological Areas to comply with applicable Zoning Code requirements, ensuring that development occurs on the most environmentally suitable portions of the land.
- Policy COS 4.4: Require new development in Significant Ecological Areas, to consider the following in design of the project, to the greatest extent feasible:

- Preservation of biologically valuable habitats, species, wildlife corridors and linkages;
- Protection of sensitive resources on the site within open space;
- Protection of water sources from hydromodification in order to maintain the ecological function of riparian habitats;
- Placement of development in the least biologically sensitive areas on the site, prioritizing the preservation or avoidance of the most sensitive biological resource onsite;
- Design of required open spaces to retain contiguous undisturbed open space that preserves the most sensitive biological resources onsite and/or serves to maintain connectivity;
- Maintenance of watershed connectivity by capturing, treating, retaining and/or infiltrating storm water flows on site; and
- Consideration of the continuity of onsite open space with adjacent open space in project design.

#### Economic Opportunity Areas

Economic Opportunity Areas (EOAs) are areas in Antelope Valley (Figure 2-14) where major infrastructure projects are being planned by state and regional agencies, which would bring opportunities for growth and economic development in their vicinity. These projects include the High Desert Corridor on the east side of Antelope Valley, and the Northwest 138 Corridor Improvement Project on the west side. Both projects are being undertaken by the Los Angeles County Metropolitan Transportation Authority and California Department of Transportation.

The Antelope Valley Area Plan identifies three EOAs along the proposed route of the two projects: the East EOA, encompassing the communities of Lake Los Angeles, Sun Village, Littlerock, Pearblossom, Llano, and Crystalaire; the Central EOA, located along Avenue D, just north of William J. Fox Airfield and west of State Route 14; and the West EOA near Interstate 5 along State Route 138/Avenue D, immediately east and west of the California Aqueduct and including portions of the Neenach and Gorman communities.

The land use policies of the Antelope Valley Area Plan direct the majority of future growth to rural town centers and EOAs. EOAs contain land use designations that would allow for a balanced mix of residential, commercial, and light industrial uses, while preserving the rural character and ecological resources of the surrounding areas. The Area Plan encourages development within EOAs, including fewer policy restrictions around resources such as water features, riparian areas, groundwater recharge basins, and national forests and identifies EOAs as areas where future planning would be appropriate with the completion of these infrastructure projects.

### 2.2.2.3 City of Lancaster General Plan 2030

The *City of Lancaster General Plan 2030* was adopted on July 14, 2009, and the horizon year for the adopted general plan is currently 2030 (City of Lancaster 2009b). The plan is the City's long-term outlook for the future, and is the vision of the City. The plan identifies the types of allowable development and the general pattern of future development. The plan contains goals, objectives, policies, and specific actions that provide the framework for achieving the community's long-term vision. All subdivisions, public works, redevelopment projects, zoning decisions, and other various implementation tools must be consistent with the general plan. In order to keep the plan on course, the City may reexamine the goals, objectives, policies, and specific actions to ensure that the plan remains in line with the community's priorities.

### 2.2.2.4 City of Palmdale General Plan

The *City of Palmdale General Plan* was adopted in 1993 (City of Palmdale 1993). It serves as a foundation in making land use decisions based on goals and policies related to land use, transportation routes, population growth and distribution, development, open space, resource preservation and utilization, air and water quality, noise impacts, safety issues, and other related physical, social, and economic development factors. In addition to serving as a basis for local decision making, the plan established a clear set of development rules for citizens, developers, decision makers, and neighboring cities and counties, and provides the community with an opportunity to participate in the planning and decision making process.

The Environmental Resources Element of the plan addresses the related issues of resource conservation and open space, and provides a basis to evaluate existing resources and plan for their protection. The goal of this element is to improve the long-term quality of life for Palmdale residents through the rational management of natural resources and open space lands. The element establishes policies concerning air, water, land open space, recreation, and energy resources that relate to their conservation, preservation, and managed use. The element informs the public of the goals and policies of the City concerning conservation, open space, outdoor recreation, and scenic highways. It also provides an implementation program to serve as a guide for the day-to-day operational decisions of City staff.

## 2.2.3 Major Infrastructure

CFGC 1852(c)(6) requires that an RCIS include "consideration of major water, transportation and transmission infrastructure facilities . . . that accounts for reasonably foreseeable development of major infrastructure facilities, including, but not limited to, renewable energy . . . in the RCIS area." This section describes existing and reasonably foreseeable development of major infrastructure facilities in the RCIS area, including major water, transportation, transmission facility, and renewable energy projects.

### 2.2.3.1 Water

Major water infrastructure in the RCIS area including canals, engineered channels, reservoirs, artificial marshes, artificial water features, and flood control channels is shown on Figure 2-15.

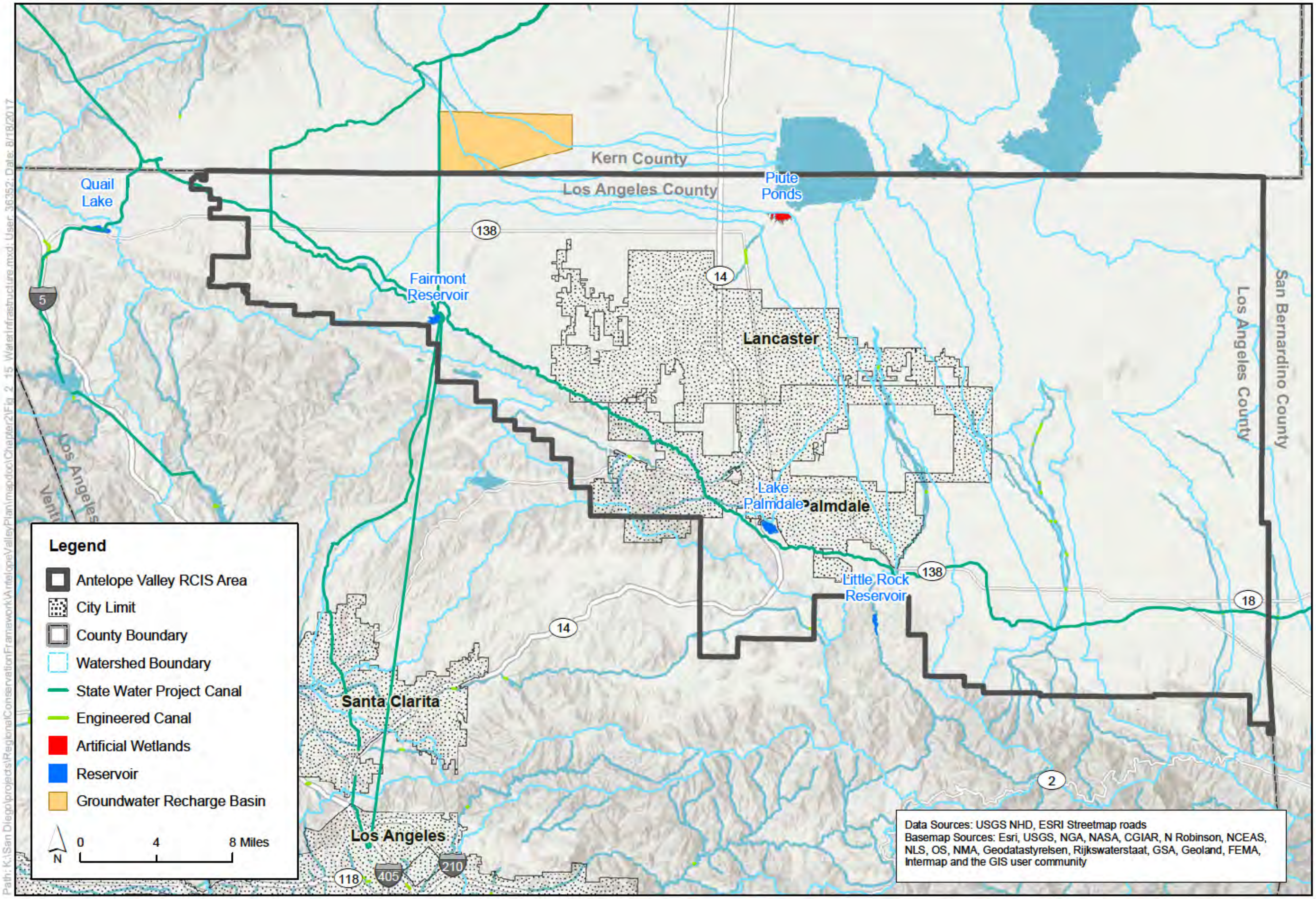


**Figure 2-15**
**Water Infrastructure within the RCIS Area**

## Antelope Valley-East Kern Water Agency

The Antelope Valley-East Kern Water Agency is the largest water district in the RCIS area, encompassing nearly 2,400 square miles in northern Los Angeles and eastern Kern Counties as well as a small portion of Ventura County. The agency constructed and manages several large water infrastructure projects within the RCIS area, including the 3-million-gallon reservoir at Vincent Hill and the Westside Water Bank, which started operations in 2010 and currently includes approximately 400 acres of groundwater recharge basins and nine groundwater recovery wells (up to 20 new wells may be constructed as a part of the Westside Water Bank project). Other projects are the Eastside Water Banking and Blending Project, which started operations in 2016 and includes three 2-acre recharge basins and three groundwater wells, and the South North Intertie Pipeline and Pump Station/Turnout Project, which connects the existing Rosamond Water Treatment Plant and the Quartz Hill Water Treatment Plant.

## Palmdale Water District

The Palmdale Water District produces an average of 6.83 billion gallons of water each year using more than 400 miles of pipe, 24 wells, 20 tanks, two reservoirs, and a state-of-the-art treatment plant. Lake Palmdale is an artificial lake completed in 1924 as part of the California State Water Project and is fed by the California Aqueduct (Figure 2-15). The Palmdale Water District is entitled to take 21,300 acre-feet (5.6 billion gallons) of water each year from the aqueduct into Palmdale Lake, where it is stored for eventual use. This water is then treated at the district's water treatment plant for distribution to the public.

The other source of surface water is Littlerock Reservoir, created by Littlerock Dam. Littlerock Dam was originally built in 1922 and was recently renovated to increase the storage capacity of the reservoir to 3,500 acre-feet (1.1 billion gallons) of water. Littlerock Reservoir, just outside and to the south of the RCIS area boundary, is fed by natural runoff from snowpack in the local mountains and from rainfall. The water is then transferred from Littlerock Reservoir to Palmdale Lake. After entering Palmdale Lake, this water is treated at the district's water treatment plant for distribution.

The population of Palmdale is expected to more than double over the next 25 years, causing water demands to more than double. A strategic water resources plan has been developed to address these demands. It identifies a number of water resource options available to meet these needs including the use of imported water from the State Water Project, groundwater, local runoff, recycled water, conservation, and water banking. The Palmdale Water District is carrying out major capital improvement projects to ensure each facility functions as intended. The district is currently constructing two water quality projects within the area: the Palmdale Regional Recharge and Recovery Project and the Littlerock Sediment Removal Project.

## California Aqueduct

The California Aqueduct carries water from the Sacramento–San Joaquin Delta to the San Joaquin Valley and Southern California. Water entering the RCIS area is generally released from Lake Oroville in the north, where it travels south through the delta and is pumped into the California Aqueduct. Antelope Valley is served by the eastern branch of the aqueduct. The California Aqueduct enters the RCIS area at its northeastern end and runs diagonally across State Route 138 and through the entire southern portion of the RCIS area east to west. The aqueduct is an open, cement-lined canal through most of this extent, with limited areas where it is routed underground including where it crosses major drainages such as Little Rock Wash and Big Rock Wash as they exit the San Gabriel Mountains foothills.

## Antelope Valley Integrated Regional Water Management Plan

The *Antelope Valley Integrated Water Management Plan* (Antelope Valley Integrated Regional Water Management Group 2013) was updated in 2013 through a collaborative effort between multiple water users and agencies in the valley, including Antelope Valley–East Kern Water Agency, the Cities of Palmdale and Lancaster, and Los Angeles County Waterworks District No. 40, Antelope Valley.[6] It provides a sustainable water management strategy within Antelope Valley through 2035. In order to improve water supply, quality, and flood management, a number of water infrastructure projects are in their conceptual stage. These includes projects that identify approximately 30,000 acre-feet per year of new supply, while also identifying up to approximately 600,000 acre-feet per year of water bank storage capacity, protecting natural streams and recharge areas from contamination, maximizing beneficial use of recycled water, and improving flood management in the region, including beneficial use identification, existing flood hazard mapping, development of policy actions, and flood mitigation.

The environmental resource management objective of the *Antelope Valley Integrated Water Management Plan* will also require more projects. Proposed projects that would help meet environmental resource management targets are mainly multiple-benefit projects that would provide water supply, water quality, and/or flood improvements in addition to providing open space and habitat. Section 6 suggests development of a habitat conservation plan for Antelope Valley, and promotion of land conservation projects that enhance flood control, aquifer recharge, and watershed and open space preservation to further identify projects to meet this objective. Similarly, additional projects may be necessary to achieve targets that include preserving farmland, increasing recreational space, and coordinating a regional land use plan. Many of the projects identified would indirectly support these targets by providing water to irrigate farm and recreational lands, but few projects would directly support these targets.

## Antelope Valley Groundwater Adjudication

The Antelope Valley Groundwater Adjudication case was launched October 29, 1999, when Diamond Farming Co. sued the cities of Lancaster and Palmdale, the Palmdale Water District, Antelope Valley Water Company, Palm Ranch Irrigation District, Quartz Hill Water District, Rosamond Community Services District, and Mojave Public Utilities District. In 2001, Bolthouse Farms sued all the water providers named in the 1999 complaint, and added Littlerock Creek Irrigation District and Los Angeles County Waterworks districts 37 and 40. In 2006, Antelope Valley–East Kern Water Agency filed for declaratory and injunctive relief to protect its overlying rights and rights to pump the supplemental yield from imported state water. The settlement covers six cases involving groundwater rights filed in California superior courts in Kern, Los Angeles, and Riverside Counties.

[6] According to Appendix A of the Antelope Valley Integrated Water Management Plan (Memorandum of Understanding), the complete list of parties is Antelope Valley-East Kern Water Agency, Palmdale Water District, Quartz Hill Water District, Littlerock Creek Irrigation District, Antelope Valley State Water Contractors Association, City of Palmdale, City of Lancaster, County Sanitation District No. 14 of Los Angeles County, County Sanitation District No. 20 of Los Angeles County, Rosamond Community Services District, and Los Angeles County Waterworks District No. 40, Antelope Valley.

The 2015 judgment cleared the way for water management limits and placed restrictions on the pumping of water so that no more water is pumped out than is replenished to the basin. The judgment allows anyone who was a party to the case to pump from the basin. There may be charges for pumping depending on a party's prior pumping and some pumping is subject to the watermaster's approval. The court will maintain continuing jurisdiction over the basin, and five watermaster board members will administer the basin in conjunction with the court (Best Best & Krieger 2016).

## 2.2.3.2 Transportation

Improvements to State Route 138 and State Route 14 compose the major highway transportation infrastructure projects that are planned within the RCIS area (Los Angeles County 2015b). Other large-scale transportation infrastructure development projects planned for Antelope Valley include the California high-speed rail system, with a station in Palmdale to provide links to Northern California and other portions of Southern California, and a high-speed rail system linking Palmdale to Victorville. Another project will establish a regional transportation hub in Palmdale with feeder transit service to the rural areas of the unincorporated Antelope Valley (Los Angeles County 2015b).

Many smaller-scale projects are also planned for the RCIS area. These include the development of a network of greenways, trails, and/or bike paths that connect population centers and an integrated system of safe and attractive pedestrian routes linking residents to rural town center areas, schools, services, transit, parks, and open space areas, as described in the Mobility Element of the Area Plan.

State Route 138 connects to Interstate 5, which is just to the west of the RCIS area and connects all three west coast states, running from the Mexico border to the Canada border. State Route 14 connects the adjacent Santa Clarita Valley, just north of metropolitan Los Angeles, to the eastern portion of the RCIS area. Figure 2-16 shows major transportation infrastructure in the RCIS area.

The following major roads transect parts of the RCIS area.

- Angeles Forest Highway, a key county road, connects Palmdale with Angeles Crest Highway as an alternate route to the Los Angeles basin.
- Antelope Valley Freeway (State Route 14).
- State Route 18 (connects State Route 138 east of Palmdale to Victor Valley and U.S. Route 395). There is currently a proposal to turn this into a freeway.
- State Route 138 (of which Pearblossom Highway composes the eastern leg).

### Northwest 138 Improvement and High Desert Corridor Projects

On the western side of Antelope Valley, the Northwest 138 Corridor Improvement Project will connect Interstate 5 with State Route 14. On the eastern side of Antelope Valley, the High Desert Corridor Project will connect State Route 14 with State Route 18 in San Bernardino County, and promote connectivity, traffic safety, and goods movement. Both the High Desert Corridor and the Northwest 138 Corridor projects are joint initiatives of the Los Angeles County Metropolitan Transportation Authority and the California Department of Transportation.

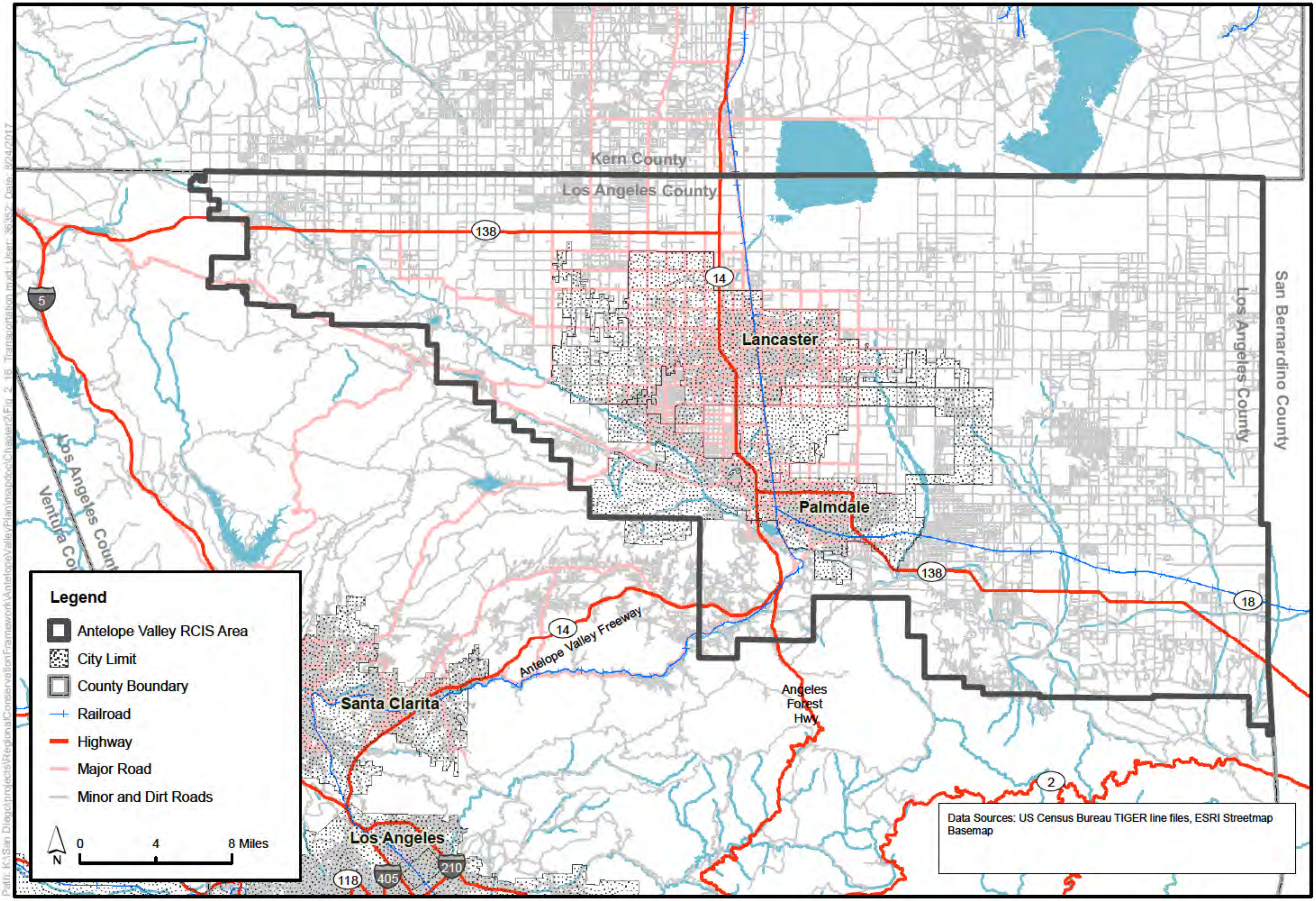


**Figure 2-16**
**Transportation Infrastructure in the Antelope Valley RCIS Area**

### Antelope Valley Transit Authority

The Antelope Valley Transit Authority was formed under an agreement between the County of Los Angeles and the Cities of Lancaster and Palmdale to provide transit services to the Antelope Valley region. Projects completed by or that are under construction by the authority include the following.

- Lancaster City Park Transfer Center Enhancement Project
- Palmdale Transportation Center Expansion
- New Lancaster Metrolink Intermodal Station
- Introduction of high-speed train service

### Metrolink

Metrolink is a commuter rail system serving Southern California that operates in Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. The Antelope Valley Line runs from Los Angeles Union Station through Santa Clarita, Soledad Canyon, and Palmdale to Lancaster. There are no planned expansions of the Antelope Valley Line.

### High-Speed Rail Project

The California High-Speed Rail Authority is responsible for planning, designing, building, and operating the first high-speed rail system in the nation. California High-Speed Rail will connect the largest cities of the state. By 2029, the system will run from San Francisco to the Los Angeles basin in under 3 hours at speeds of more than 200 miles per hour. The system will eventually extend to Sacramento and San Diego, totaling 800 miles with up to 24 stations. Two sections of the California High-Speed Rail are planned for construction within the RCIS area.

- The Bakersfield to Palmdale Section will provide a link between the Central Valley and Southern California by closing the gap in the statewide passenger rail system between these two regions. The approximately 80-mile route will cross the Tehachapi Mountains and include stations at Bakersfield and Palmdale.
- The Palmdale to Burbank Section will connect Antelope Valley to the San Fernando Valley in Southern California. The approximately 35- to 45-mile section has multiple alignment options under study and will tunnel under the San Gabriel Mountains. It will include stations at Palmdale and Burbank.

## 2.2.3.3 Electric and Gas Transmission

Transmission lines in the RCIS area include those supporting distribution of natural gas and electricity. Figure 2-17 shows transmission facilities in the RCIS area including major electric transmission lines (greater than 230 kilovolts) and natural gas pipelines. Southern California Edison (SCE) owns and operates all of the gas and electric transmission lines in the RCIS area. The company delivers power to 15 million people in 50,000 square miles across central, coastal, and Southern California. The most recent major transmission project conducted by SCE is the Tehachapi Renewable Transmission Project (TRTP).

The TRTP is a series of new and upgraded high-voltage electric transmission lines and substations capable of carrying 4,500 megawatts of electricity (enough energy to supply 3 million homes) from renewable and other generators in Kern County south through the RCIS area to San Bernardino

County. The project is designed to provide added capacity to strengthen SCE's electrical system and deliver clean, renewable energy to the region to help meet California's renewable energy goals. SCE completed construction of the 173-mile TRTP electric transmission line and energized the line in the fourth quarter of 2016 (Figure 2-17).

### 2.2.3.4 Renewable Energy

Given the intention of the RCIS program to address infrastructure projects, the focus of the discussion on renewable energy in the RCIS area is on utility-scale facilities (greater than 1 megawatt); dispersed generating facilities (e.g., building-mounted photovoltaic panels) are not addressed herein. Antelope Valley and the RCIS area are home to several large utility-scale solar energy production facilities. Two of the largest, Solar Star and the Antelope Valley Solar Ranch, are within the RCIS area. Existing and approved renewable energy development in the RCIS area is shown on Figure 2-18. The 586-megawatt Solar Star project is among the largest solar photovoltaic projects in the world. The project spans 3,200 acres in Kern and Los Angeles Counties (approximately 1,000 acres within the RCIS area) and is under a long-term power purchase agreement with SCE. The Antelope Valley Solar Ranch One project is located on 1,372 acres in the RCIS area near Lancaster.

The Area Plan[7] includes the following policies for renewable energy development:

- Policy ED 1.11: Encourage the development of utility-scale renewable energy projects at appropriate locations and with appropriate standards to ensure that any negative impacts to local residents are sufficiently mitigated.
- Policy ED 1.13: Ensure early discussions with Edwards Air Force Base and U.S. Air Force Plant 42 regarding new industries, such as utility-scale renewable energy production facilities, to limit potential impacts on mission capabilities.

Los Angeles County adopted a Renewable Energy Ordinance in January of 2017. The Renewable Energy Ordinance updates the County's planning and zoning code for the review and permitting of solar and wind energy projects. The purpose and goals of the Renewable Energy Ordinance include incentivizing small-scale projects through a streamlined review process and regulating ground-mounted utility-scale projects to better address community concerns and minimize environmental impacts. The ordinance prohibits ground-mounted utility-scale solar facilities in SEAs and EOAs designated in the County's General Plan and Area Plan. Utility-scale wind facilities are prohibited in all zones and areas within the unincorporated county. There are no operating wind energy facilities in the RCIS area.

[7] Refer to the Antelope Valley Area Plan for more Conservation and Open Space and Economic Development policies pertaining to renewable energy development, including ED 1.21 and COS 7.2, 10.1–10.6, 11.1–11.3, 12.1–12.2, 13.1–13.9, and 14.1–14.7.

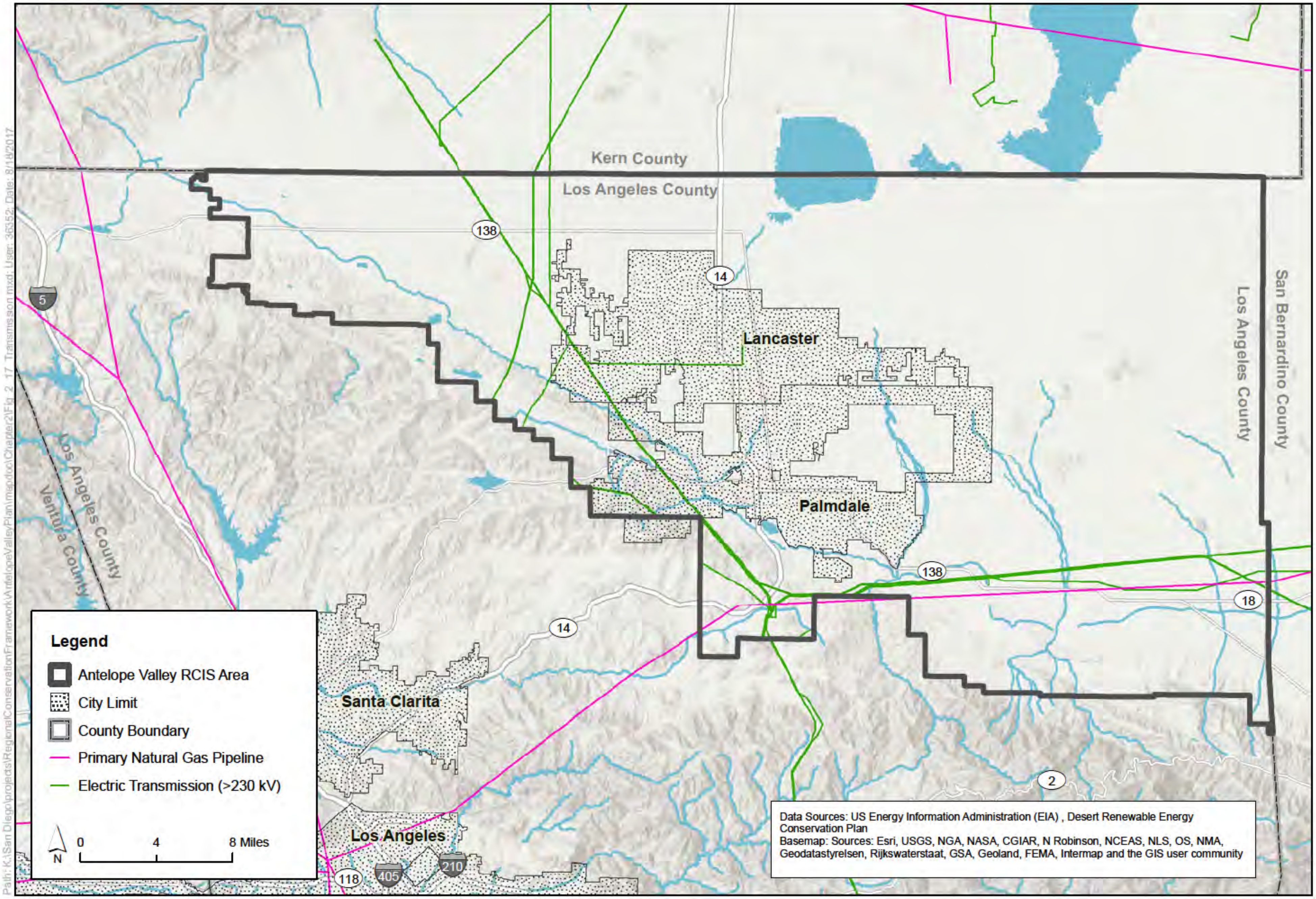


**Figure 2-17**
**Transmission Infrastructure in the Antelope Valley RCIS Area**

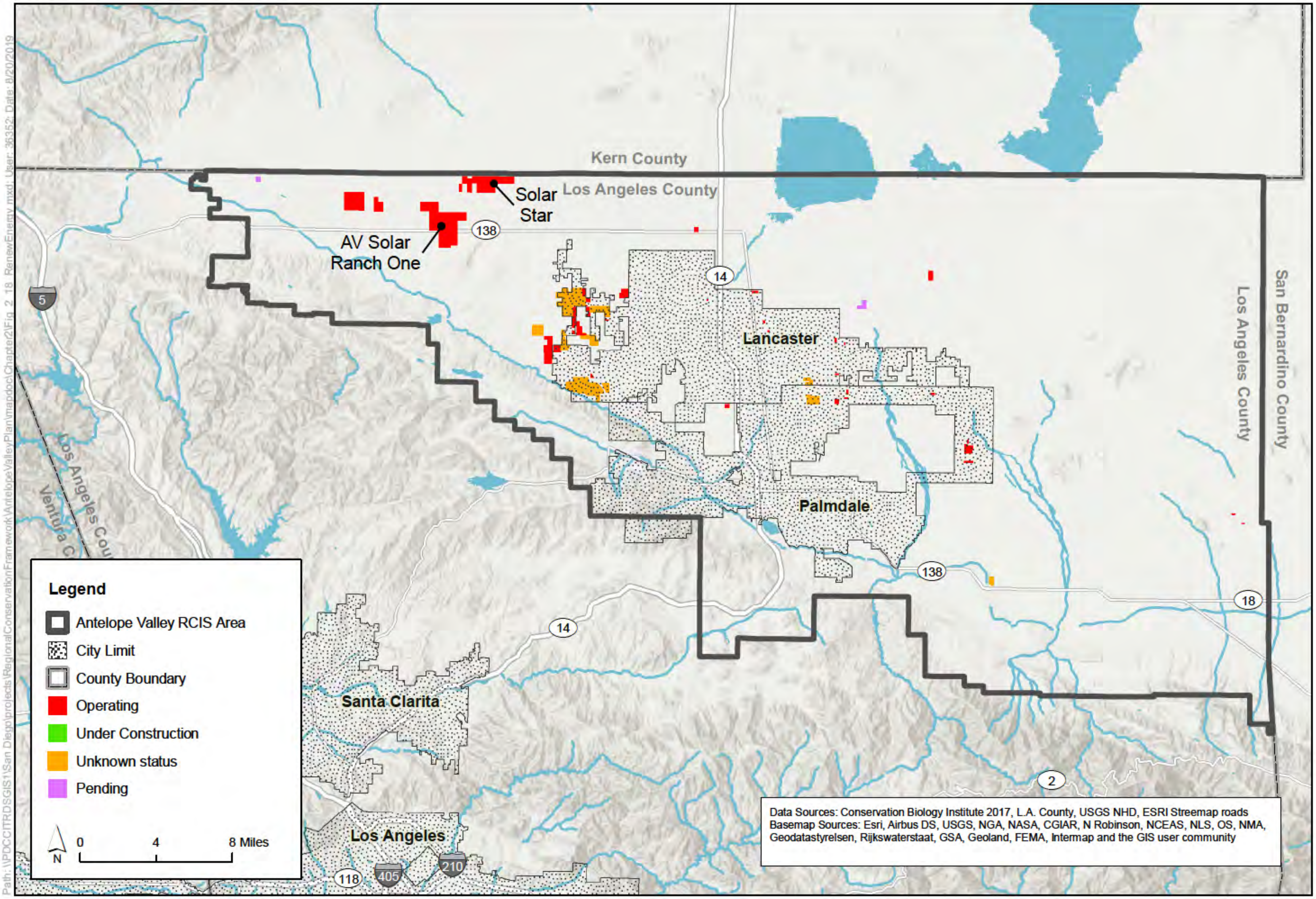


**Figure 2-18**
**Solar Energy Projects in the Antelope Valley RCIS Area**

## 2.2.4 Protected Areas

The Antelope Valley RCIS identified protected areas using the California Protected Areas Database, which assigns four levels of protection following the Gap Analysis Project (GAP) conservation status code categories, as follows (U.S. Geological Survey no date).

- GAP Status 1: An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, intensity, and legacy) are allowed to proceed without interference or are mimicked through management.
- GAP Status 2: An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but that may receive uses or management practices that degrade the quality of existing natural communities, including suppression of natural disturbance.
- GAP Status 3: Area having permanent protection from conversion of natural land cover for the majority of the area. Subject to extractive uses of either broad, low-intensity type (e.g., logging) or localized intensity type (e.g., mining). Confers protection to federally listed endangered and threatened species throughout the area.
- Unassigned Public Lands: Public land holdings that do not meet the International Union for Conservation of Nature definition of a protected area or are not GAP Status 1, 2, or 3. The majority of these lands within the RCIS area include military lands, but also some local land holdings by water districts, schools, etc.

The Antelope Valley RCIS protected areas database was based on the Antelope Valley and West Mojave Ecoregion Protected Areas Database (Conservation Biology Institute 2016). Additional data were provided by several regional and local agency and nongovernment partners, including the Transition Habitat Conservancy and BLM land use plan amendment from the DRECP (California Energy Commission et al. 2014). Easements were derived from the most recent (October 2015) National Conservation Easement Database, with more recent updates from local nongovernment groups and mapped mitigation lands. These protected lands were assigned GAP Status codes to augment existing California Protected Areas Database data to create the protected lands layer for the RCIS area (Conservation Biology Institute 2016).

### 2.2.4.1 Definition of Protection, Preservation, and Permanently Protect

*Protection* is defined in this RCIS as acquisition of land in fee title ownership and/or a conservation easement to benefit the conservation of species, habitats, and agricultural lands.

GAP Statuses 1–3 and Unassigned Public Lands are all evaluated as protected lands in the Antelope Valley RCIS. The level of *preservation*, defined below, varies among GAP Statuses 1–3, with GAP Status 1 generally having the highest level of preservation.

*Preservation* is defined in this RCIS to mean additional conservation measures above and beyond basic land protection, as defined above, and includes funding and implementation of long-term management and monitoring.

*Permanently Protect* is defined in the Program Guidelines as "(1) recording a conservation easement and (2) providing secure, perpetual funding for management of the land, monitoring, and legal enforcement."

This definition of *permanently protect* requires the actions of *protection* and recording of a conservation easement, as well as *preservation* as we have defined them here in the Antelope Valley RCIS.

The identification of an area as protected in this RCIS does not imply that all conservation objectives have been met and no further conservation actions are needed. Additional preservation including conservation actions such as restoration, enhancement, and implementation of a long-term management and monitoring may be needed on some protected lands to achieve the conservation goals and objectives for focal species. Therefore, additional conservation actions may occur throughout the RCIS area, including on lands that are designated as protected.

Similarly, preparation of a mitigation credit agreement may include the establishment of mitigation credits on protected lands through the implementation of restoration and enhancement activities or other conservation actions such as funding long-term management and monitoring, which further the conservation goals and objectives of this RCIS. Note that the RCIS program does not allow mitigation credit agreements to be created on a site that has already been permanently protected (as defined in the Program Guidelines) and has been used, or is currently in use, to fulfill compensatory mitigation requirements for one or more projects.

The establishment of quantitative conservation goals for focal species includes setting target acreages for protection and preservation of habitat (see Section 3.3, *Gap Analysis for Focal Species*), including possible additional preservation on lands that are already protected.

### 2.2.4.2 Protected Areas in the RCIS Area

The RCIS area includes existing protected areas that are public or private lands where the primary intent of land management is to manage the land for open space use. Protected areas include large parks and open space areas that are managed primarily for their ecological functions and values. Protected areas may also include semi-developed areas such as recreational parks that maintain some ecological value or may provide habitat for some species. The Antelope Valley RCIS protected areas database was compiled as described above to inform the development of the conservation strategy (Chapter 3, *Conservation Strategy*), including identifying gaps in protection and preservation (e.g., gaps in protection of focal species populations, habitat, movement corridors, or other natural resources), and to inform the development of conservation goals and objectives, and prioritization of conservation opportunities.

Protected areas in the RCIS area vary by the mechanisms by which the land is protected (e.g., fee title, conservation easement, agricultural easement) and the degree to which land is also preserved through management and monitoring of biological resources and ecological values (e.g., land protected primarily for the conservation of natural resources; land protected for multiple uses, including conservation and recreation; or land protected primarily for recreation, military, or natural resource use).

In the Antelope Valley RCIS area there are 55,928 acres of protected area in GAP Statuses 1–3, including 3,112 acres in conservation easement (Figure 2-19 and Table 2-8). There are an additional 54,321 acres in the unassigned lands category, which are predominantly military lands. Collectively, these areas currently provide some level of protection for important habitat as well as public recreational opportunities. The largest landowner in the RCIS area is the U.S. Military (Edwards Air Force Base) (47,778 acres). Publicly owned protected lands outside of Edwards Air Force Base total approximately 43,627 acres in the RCIS area. The largest owner of preserved lands within the RCIS area is Transition Habitat Conservancy (over 2,000 acres). Petersen Ranch Mitigation Bank owns over 4,000 acres, but only 1,600 acres are currently protected by a conservation easement. Petersen Ranch Mitigation Bank is discussed further in Section 2.2.4.3 below.

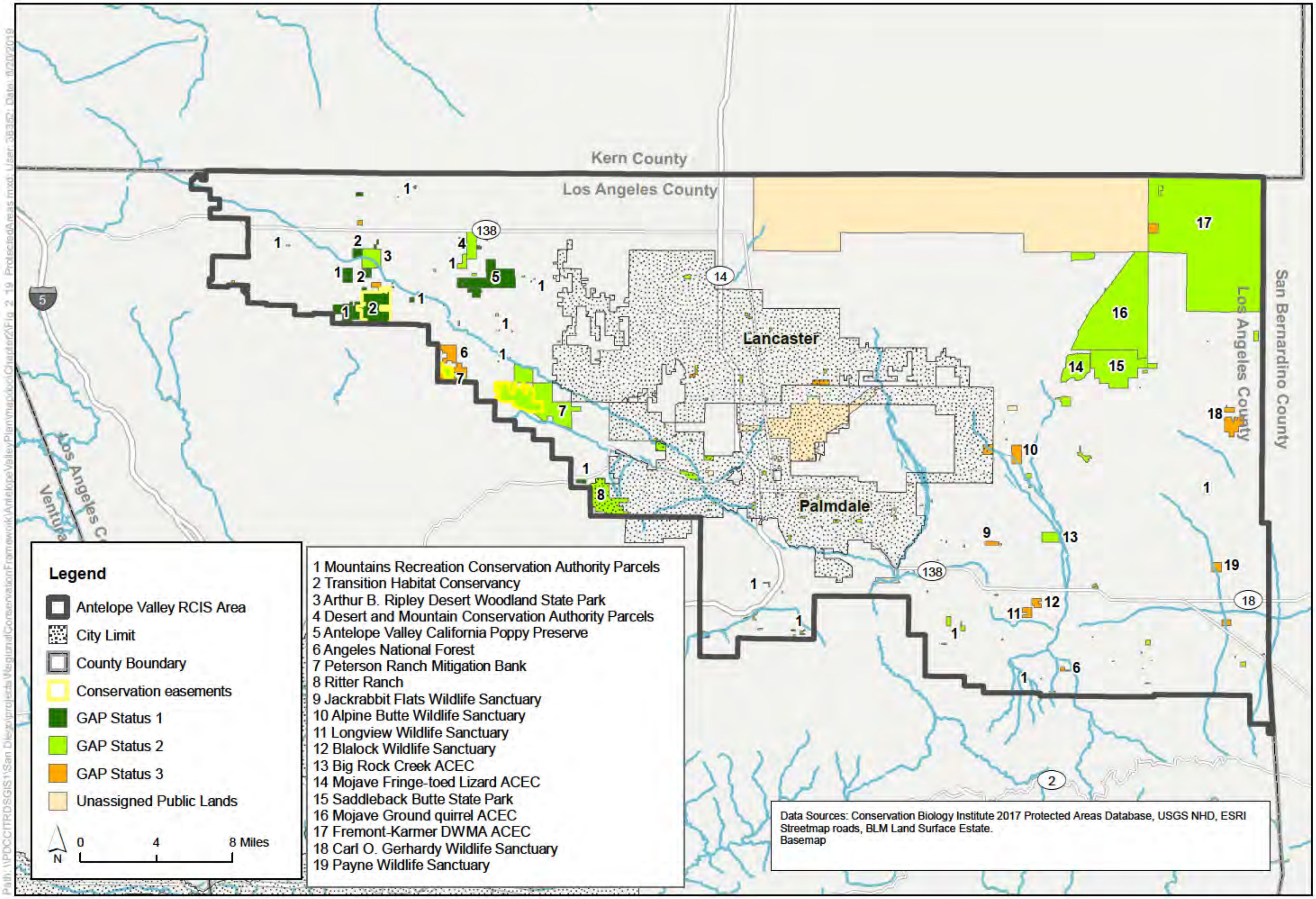


**Figure 2-19**
**Protected Areas in the Antelope Valley RCIS Area**

### Table 2-8. Protected Areas and GAP Status in the Antelope Valley RCIS

| Protected Area Name | Acres | Protected Area Name | Acres |
|---|---|---|---|
| **GAP Status 1 Lands** | 7,419 | *GAP Status 2 Lands (continued)* | |
| Transition Habitat Conservancy | 2,096 | Lancaster Park | 64 |
| Mountains Recreation Conservation Authority Parcels | 2,043 | Apollo Community Regional Park | 54 |
| Antelope Valley California Poppy Preserve | 1,772 | Blanche Hamilton Wildlife Sanctuary | 51 |
| All Other GAP 1 Lands < 50 acres | 20 | All Other GAP 2 Lands < 50 acres | 656 |
| **GAP Status 2 Lands** | 45,191 | **GAP Status 3 Lands** | 3,318 |
| Fremont-Kramer Desert Wildlife Management Area ACEC | 23,544 | Angeles National Forest | 1,056 |
| Mohave Ground Squirrel ACEC | 8,869 | Carl O. Gerhardy Wildlife Sanctuary | 552 |
| Peterson Ranch Mitigation Bank (1,600 acres in easements) | 4,223 | Alpine Butte Wildlife Sanctuary | 323 |
| Saddleback Butte State Park | 2,953 | Big Rock Creek Wildlife Sanctuary | 161 |
| Ritter Ranch | 1,564 | Phacelia Wildlife Sanctuary | 161 |
| Mojave Fringe-toed Lizard ACEC | 1,090 | Payne Wildlife Sanctuary | 157 |
| Mountains Recreation Conservation Authority Parcels | 656 | Blalock Wildlife Sanctuary | 140 |
| Arthur B. Ripley Desert Woodland State Park | 568 | Longview Wildlife Sanctuary | 139 |
| Desert and Mountain Conservation Authority Parcels | 481 | Jackrabbit Flats Wildlife Sanctuary | 114 |
| Big Rock Creek ACEC | 309 | Mescal Wildlife Sanctuary | 99 |
| Joshua Ranch | 187 | George R. Bones Wildlife Sanctuary | 99 |
| Antelope Valley Indian Museum | 162 | All Other GAP 3 Lands < 50 acres | 316 |
| A.C. Warnack Nature Park | 131 | | |
| Stephen Sorensen Park | 108 | **Unassigned Lands** | 54,321 |
| Santa Monica Mountains Conservancy Parcel | 103 | Edwards Air Force Base | 47,788 |
| SCC Plum Canyon | 83 | Air Force Plant No. 42 | 5,915 |
| COGO | 82 | Little Rock Wash | 293 |
| Marie Kerr Park | 77 | County of Los Angeles Parcel | 80 |
| Pelona Vista Park | 76 | All Other Unassigned Lands < 50 acres | 243 |

ACEC = Area of Critical Environmental Concern; GAP = Gap Analysis Program

### 2.2.4.3 Mitigation Banks and Conservation Banks in the RCIS Area

CFGC 1852(b)(12) requires that an RCIS provide “a summary of mitigation banks and conservation banks approved by the department or the United States Fish and Wildlife Service that are located within the RCIS area or whose service area overlaps with the RCIS area.” The Program Guidelines (California Department of Fish and Wildlife 2017a) further specify that the summary include banks approved by the U.S. Army Corps of Engineers, as well as information on the types of credits available and where information can be found on the number of available credits.

Conservation and mitigation banks are generally large, connected areas of preserved, restored, enhanced, or constructed habitats for target species that are set aside for the express purpose of providing mitigation for project impacts on wetlands, threatened and endangered species, and other sensitive resources. CFGC 1797.5 defines terms associated with mitigation banking in California. In summary, a conservation or mitigation bank is privately or publicly owned land that is managed for its natural resource values, with an emphasis on the targeted resource (species or aquatic resources, respectively). Overseeing agencies typically require that the establishment of a mitigation bank include the restoration or creation of aquatic resources. Conservation banks may include restoration or creation projects, but they are more heavily focused on the protection and management of existing occupied habitats of the target species. In exchange for permanently protecting and managing the land—and in the case of mitigation banks, restoring or creating aquatic resources—the bank operator is allowed to sell credits to project proponents who need to satisfy legal requirements for compensating environmental impacts of development projects.[8] The only approved mitigation or conservation bank in the RCIS area is the Petersen Ranch Mitigation Bank. The Santa Paula Creek Mitigation Bank does not have any mitigation properties in the RCIS area, but its service area does extend over the southwestern border of the RCIS area. These mitigation banks and their service areas are described in the following sections.

#### Petersen Ranch Mitigation Bank

The Petersen Ranch Mitigation Bank is an approximately 4,200-acre property located in an unincorporated area of Los Angeles County and includes the Petersen Ranch and Elizabeth Lake parcels (Figure 2-20). Approximately 1,600 acres of the Petersen Ranch and Elizabeth Lake parcels are currently in conservation easements and entitled as a mitigation bank, with most of the remainder of the property planned for inclusion in future phases of the bank.

Upon the passing of Robert Einer Petersen, publishing magnate and benefactor of the Petersen Automotive Museum in Los Angeles, the ranch passed into ownership of Land Veritas, a mitigation bank company, who now manages the land for conservation purposes.

The site is located in the Leona Valley within the San Andreas Rift Zone SEA and includes a portion of Portal Ridge up to the Angeles National Forest and down to the Antelope Valley floor. The site drains to two watersheds, with the western portion of the site draining into the Santa Clara River watershed and the eastern portion draining into the Antelope Valley watershed. It is also within the boundaries of the DRECP and is the largest mitigation bank in California.

[8] For additional information on banking, see the following websites: https://www.wildlife.ca.gov/Conservation/Planning/Banking and www.fws.gov/sacramento/es/cons_bank.htm.

The site is topographically and biologically diverse, with dominant vegetative communities including annual grasslands, mixed chaparral, California buckwheat scrub, rabbitbrush scrub, sagebrush scrub, mixed Mojave woodland scrub, riparian forest, willow scrub, and wetlands. Some of the key biological resources on Petersen Ranch (Figure 2-21) include large stands of California juniper, populations of short-jointed beavertail cactus, and frequent use and/or occupancy by western pond turtle, tricolored blackbird, Swainson's hawk, prairie falcon, ferruginous hawk, and loggerhead shrike.

This property provides CEQA mitigation for renewable energy projects affecting sensitive habitats throughout the desert and desert-foothill regions of Kern and Los Angeles Counties, as well as Regional Water Quality Control Board and U.S. Army Corps of Engineers mitigation for impacts on wetlands/waters within the Antelope-Fremont Valley and Santa Clara River watersheds. The service areas include portions of Los Angeles, Kern, Ventura, and San Bernardino Counties (Figure 2-20).

The bank is approved by the U.S. Army Corps of Engineers, CDFW, and California Water Resources Control Board/Lahontan Regional Board to provide mitigation for permitted impacts under U.S. Army Corps of Engineers 404 permits, Regional Water Quality Control Board 401 certifications, Porter-Cologne Water Quality Control Act Waste Discharge Requirements, and CDFW 1600 agreements. It also provides CEQA/CESA mitigation for a wide variety of species and habitats including alluvial fan, stream, open water, riparian, willow, cottonwood, cismontane woodland, mule fat, chaparral, great basin scrub, seeps, meadows, marshes, grassland, and Swainson's hawk.

### Santa Paula Creek Mitigation Bank

The Santa Paula Creek Mitigation Bank consists of 200 acres in northern Ventura and Los Angeles Counties that are protected for their natural resource values in perpetuity. Those with permit conditions requiring mitigation can buy bank credits from the Santa Paula Creek Mitigation Bank in order to meet legal and other permitting requirements to compensate for the environmental impacts of development projects. Credits are available for sale to offset impacts on both wetland and upland habitats. This can include wetlands and riparian areas designated as waters of the U.S., plus several upland covered habitats and the sensitive plant and wildlife species they support.

The Santa Paula Creek Mitigation Bank is authorized to assist with mitigation related to permits involving resources administered by the U.S. Army Corps of Engineers, USFWS, the U.S. Environmental Protection Agency, CDFW, and the Los Angeles Regional Water Quality Control Board.

The primary service area for U.S. Army Corps of Engineers permits is the combined sub-basins, watersheds, and sub-watersheds of the Santa Clara River within Los Angeles and Ventura Counties. This primary service area just extends into the RCIS area's southern and western portions (Figure 2-20). The secondary service area for U.S. Army Corps of Engineers permits in Los Angeles, Ventura, and Santa Barbara Counties does not overlap with the RCIS area.

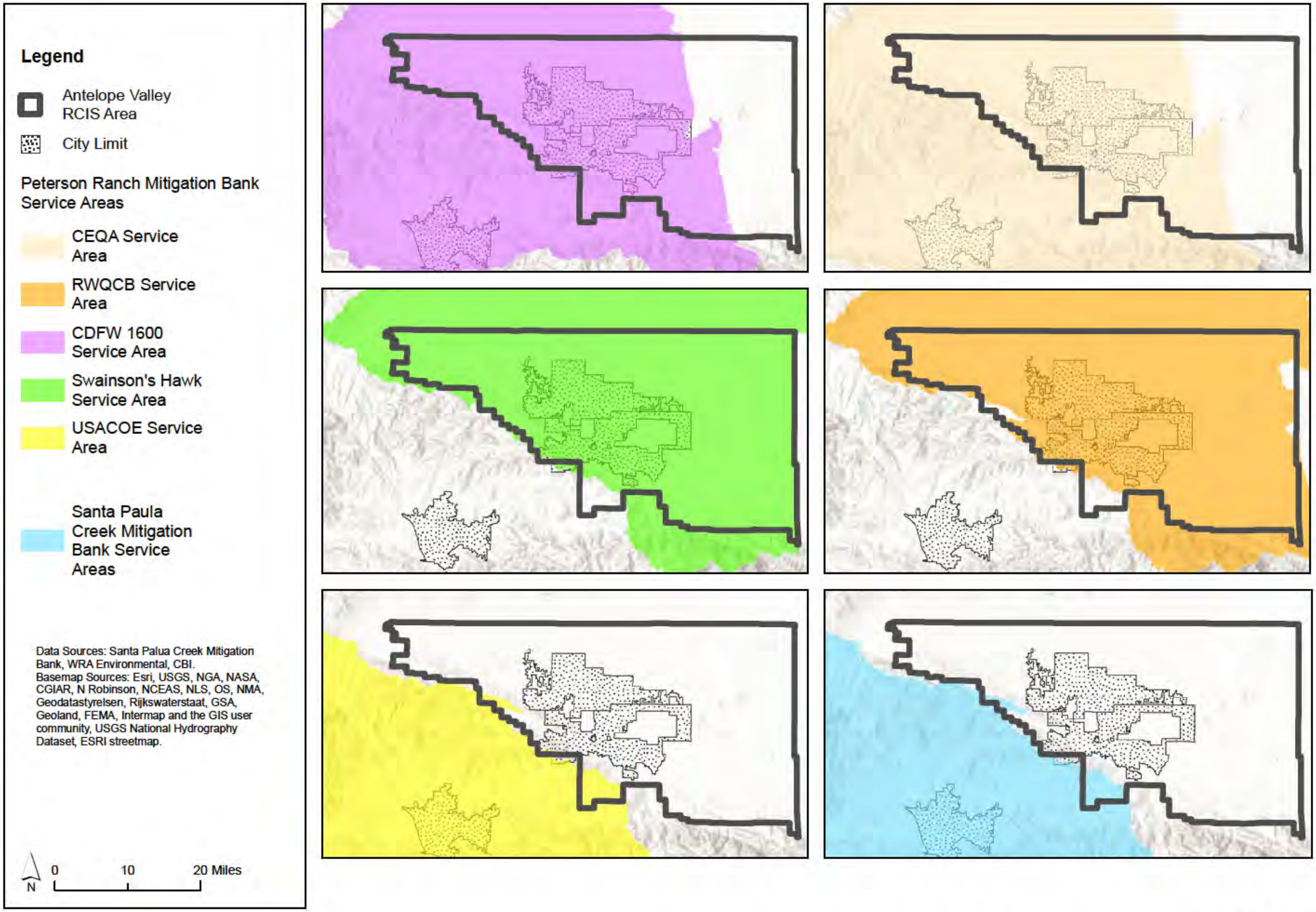


**Figure 2-20**
**Mitigation and Conservation Bank Service Areas in the RCIS Area**

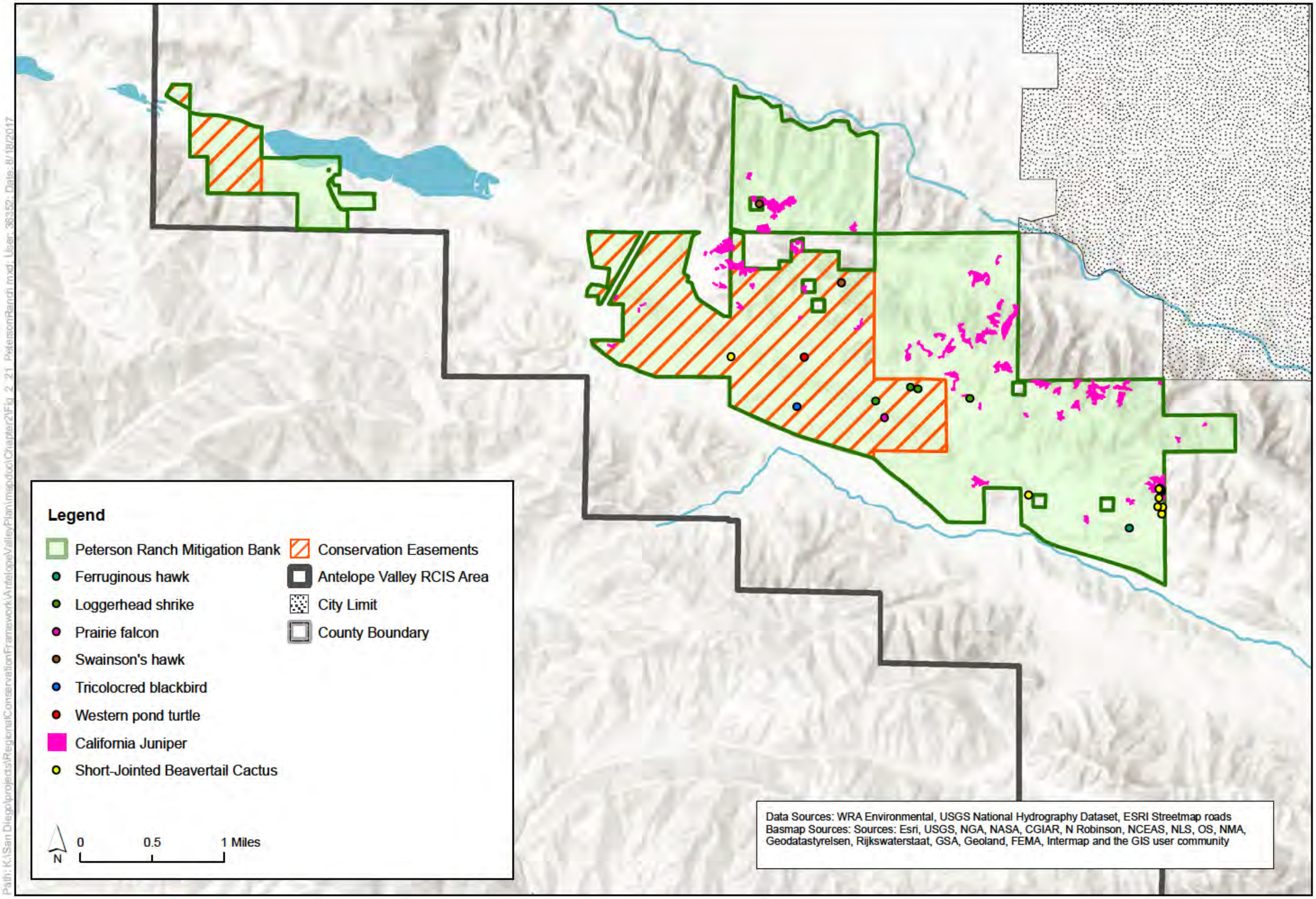


**Figure 2-21**
**Key Biological Resources and Conservation Easements on Petersen Ranch**

# 2.3 Pressures and Stressors on Focal Species and on other Conservation Elements

Section 1852(c)(5) of CFGC requires that an RCIS include a summary of historic, current, and projected future stressors and pressures in the RCIS area, including climate change vulnerability, on the focal species, habitat, and other natural resources, as identified in the best available scientific information, including, but not limited to, the SWAP. The SWAP (California Department of Fish and Wildlife 2015) defines *pressures* as an anthropogenic (human-induced) or natural driver that could result in changes to the ecological conditions of the target. Pressures can be positive or negative depending on intensity, timing, and duration. The SWAP defines *stress* as a degraded ecological condition of a target that resulted directly or indirectly from negative impacts of pressures.

Understanding the current and potential future pressures and stressors experienced by the focal species and their habitats within the RCIS area is one of the critical steps necessary to define conservation actions to counteract them. This Antelope Valley RCIS identifies eight primary pressures on focal species, their habitat, and other natural resources in the RCIS area. The list and description of these primary pressures are largely based on the pressures described in the SWAP for the Desert Province.

- Airborne pollutants
- Annual and perennial non-timber crops
- Climate change
- Commercial and industrial areas
- Groundwater pumping
- Fire and fire suppression
- Housing and urban areas; roads and railroads
- Industrial and military effluents
- Invasive plants and animals
- Livestock, farming, and ranching
- Military activities
- Mining and quarrying
- Recreational activities
- Renewable energy
- Utility and service lines

Each of these pressures and stressors is summarized and discussed in detail in relation to the focal species and other conservation elements discussed in this chapter. A matrix showing the association between pressures and stressors and each focal species is included in Table 2-9. Stressors on species are indicated in Table 2-9 when the stressors are expected to overlap with habitat for that species, or are otherwise expected to notably affect the species. The focal species and other conservation elements discussed in the following sections can be referenced in Section 2.1.4, *Focal Species*, and Section 2.1.5, *Other Conservation Elements*, respectively.

**Table 2-9. Primary Pressures and Stressors on Each Focal Species**

| Primary Pressures | Airborne pollutants | Annual and perennial non-timber crops | Climate change | Commercial and industrial areas | Groundwater pumping | Fire and fire suppression | Housing and urban areas; roads and railroads | Industrial and military effluents | Invasive plants and animals | Livestock, farming, and ranching | Military activities | Mining and quarrying | Recreational activities | Renewable energy | Utility and service lines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Focal Species** | | | | | | | | | | | | | | | |
| Alkali mariposa-lily | X | X | X | X | X | | X | X | | X | X | | X | X | |
| California juniper | X | X | X | | | X | X | | X | X | | | X | X | |
| Joshua tree | X | X | X | | | X | X | | X | X | X | | X | X | X |
| Spreading navarretia | X | X | X | | X | | X | | | | | | X | X | |
| Short-joint beavertail | X | X | X | | | X | X | | X | | | X | X | X | X |
| Coast horned lizard | | X | X | | | X | X | | X | X | | | | X | X |
| Desert horned lizard | | X | X | | | X | X | | X | X | X | | X | X | |
| Agassiz's desert tortoise | | X | X | | | X | X | | X | X | X | | X | X | |
| Western pond turtle | | | X | | X | | X | | X | | | X | | | |
| Burrowing owl | | X | | X | | | X | | X | | X | X | X | X | X |
| California condor | | X | | | | | X | | | X | | | X | X | X |
| Golden eagle | | X | | X | | | X | | | X | X | | X | X | X |
| Le Conte's thrasher | | X | X | X | | X | X | | X | X | X | X | | | X |
| Least Bell's vireo | | | X | | X | X | X | X | X | X | X | X | | | |
| Loggerhead shrike | | X | X | X | X | X | X | | X | X | X | X | X | | X |
| Long-billed curlew | | X | X | X | X | | X | | | X | X | X | | | X |
| Mountain plover | | X | | | | | X | | | X | X | | | | X |
| Northern harrier | | X | X | X | X | X | X | | | X | X | | X | | X |
| Prairie falcon | | X | X | X | | | X | | | X | X | X | | | X |
| Swainson's hawk | | X | X | X | X | X | X | | | X | X | X | | | X |
| Tricolored blackbird | | X | X | X | X | | X | X | X | X | X | | | | X |

| Primary Pressures | Airborne pollutants | Annual and perennial non-timber crops | Climate change | Commercial and industrial areas | Groundwater pumping | Fire and fire suppression | Housing and urban areas; roads and railroads | Industrial and military effluents | Invasive plants and animals | Livestock, farming, and ranching | Military activities | Mining and quarrying | Recreational activities | Renewable energy | Utility and service lines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Willow flycatcher | | X | X | | X | | X | X | X | X | X | | | | |
| American badger | | X | | X | | | X | | | X | X | X | X | X | X |
| Desert kit fox | | X | | X | | | X | | X | X | X | X | X | X | X |
| Mohave ground squirrel | | X | | X | | | X | | | X | X | | X | X | |
| Mountain lion | | X | | X | | | X | | | X | | | X | X | X |
| Tehachapi pocket mouse | | X | | X | | X | X | | X | X | | | X | X | |
| **Other Conservation Elements** | | | | | | | | | | | | | | | |
| Habitat connectivity | | X | X | X | X | X | X | | X | X | X | X | X | X | X |
| Working lands | | | X | X | X | X | X | | X | | | | | X | |
| Natural communities of conservation importance | X | X | X | X | X | X | X | | X | X | X | X | X | X | X |
| Key aquatic habitats | | X | X | X | X | | X | X | X | X | X | X | X | X | X |

Note: Stressors on species are indicated in Table 2-9 when the stressors are expected to overlap with habitat for that species, or are otherwise expected to notably affect the species.

## 2.3.1 Airborne Pollutants

Particulates, pollutants, and pathogens deposited from the air can degrade aquatic and terrestrial ecosystems. Discharges from power plants, sewage plants, and other industrial facilities are high in pollutants and pathogens. Pollutants, primarily water pollutants, are discussed in other sections below, including Section 2.3.7, *Housing and Urban Areas, Roads, and Railroads*, and Section 2.3.10, *Livestock, Farming, and Ranching*. This section specifically discusses air pollutants, nitrogen in particular, not covered elsewhere. Other air pollutants, such as carbon dioxide and methane, can have effects on climate change patterns and associated effects as described in Section 2.3.3, *Climate Change*.

Nitrogen deposition from air pollution is ongoing and increasing (Weiss 1999; California Energy Commission 2006). Nitrogen deposition is predicted to continue to increase as population growth occurs in the RCIS area, which results in an increase in air pollutant emissions from passenger and commercial vehicles and other industrial and non-industrial sources (although it could possibly decrease if future automobile technologies address this issue). Emissions from these sources are known to increase airborne nitrogen, of which a certain amount is converted into forms that can fall to Earth as depositional nitrogen.

### 2.3.1.1 Effects on Focal Species and Habitats

Air pollutants are identified for their effects on increased competition for focal plant species (Table 2-9). Nitrogen deposition has been shown to greatly increase available nitrogen in soils and, in turn, increase the success of nonnative plants (Allen et. al. 2000). Nonnative plants may also compete with native plants for water, nutrients, light, and safe sites for germination, crowding out native plants (ICF International 2012).

### 2.3.1.2 Effects on Other Conservation Elements

Nitrogen deposition can also affect other conservation elements, notably unique land cover types. California grasslands are believed to be among the most sensitive to nitrogen deposition (Fenn et al. 2010). Because air pollutants, and particularly nitrogen, are greater closer to their sources, natural habitats that occur near population centers and roads are likely to be more affected. These include the *Yucca brevifolia*, *Purshia tridentata*, *Lepidospartum squamatum*, *Forestiera pubescens*, *Populus fremontii*, and *Krascheninnikovia lanata* natural communities of conservation importance.

## 2.3.2 Annual and Perennial Non-Timber Crops

Agriculture in the RCIS area is concentrated in the northeastern portion of the RCIS area and the areas west of Lancaster. There are smaller agricultural areas scattered throughout the RCIS area. Commercial crops include alfalfa and small grains, hay, onions, carrots, potatoes, peaches, pears, and nectarines. Cherries, apples, and grapes are also grown on a smaller scale, generally as u-pick farms. Irrigated row and field crops are located generally in the northwestern portion of the RCIS area and in the area east of Lancaster and north of Palmdale. Deciduous orchards are scattered along the base of the foothills at the southern edge of the RCIS area.

### 2.3.2.1 Effects on Focal Species and Habitats

Agricultural areas may both provide benefits and act as stressors to focal species. Row crops, including those grown in the RCIS area, provide foraging habitat for Swainson's hawks and other raptors. Tricolored blackbirds also depend upon agriculture within the RCIS area for their foraging habitat. However, use of chemical fertilizers, herbicides, rodenticides, and other chemicals can negatively affect both terrestrial focal species that live or forage in the agricultural fields, as well as aquatic species when these chemicals are transported to waterways during rain events.

Agricultural areas within the RCIS overlap with high conservation value habitat for tricolored blackbird, Tehachapi pocket mouse, Swainson's hawk, spreading navarretia, short-joint beavertail cactus, prairie falcon, mountain plover, mountain lion, long-billed curlew, loggerhead shrike, Le Conte's thrasher, Joshua tree, golden eagle, desert kit fox, desert horned lizard, coast horned lizard, California condor, burrowing owl, and American badger.

### 2.3.2.2 Effects on Other Conservation Elements

Farming, in particular orchards and vineyards, can have a negative impact on water resources by diverting water and altering the local hydrology. This can negatively affect key aquatic resources by reducing their water supply or supplying them with nutrient- and sediment-laden water, degrading their condition. While conversion of native habitats to agriculture has vastly decreased since the 1970s, the conversion of row crops to orchards can reduce or prevent use of the land by focal species and cause habitat fragmentation.

## 2.3.3 Climate Change

Climate change is a major challenge to the conservation of natural resources in California and the RCIS area. Climatic changes are already occurring in the state and have resulted in observed changes in natural systems. Projected changes in climate, including extreme events such as fire, drought, flood, extreme temperatures, and storm events, are likely to have significant impacts on habitats, species, and human communities in the near future. The climatic changes presented below will likely affect all focal species and their habitats identified in this document. Climate change has been included as a pressure for a subset of targets that are considered more vulnerable to climate impacts, and/or in instances where it was determined that interactions between climate change and other pressures could be addressed in a meaningful way through a conservation strategy.

While a warmer and drier climate may shift the distribution of habitats for most of the focal species, some species are more vulnerable than others due to limitations such as range size, limited dispersal capacity, and dependence on riparian and aquatic habitats. Table 2-10 lists those species identified as climate vulnerable in the SWAP Species of Greatest Conservation Need, or are otherwise limited by range and dispersal capacity or dependence on riparian and aquatic habitats.

Climate change has also been addressed through modeling of climate stability, climate refugia, and climate water deficit to identify portions of the RCIS area that have physical characteristics that make them more resilient to the effects of climate change relative to other portions of the RCIS area. The rate at which environmental conditions change across the landscape can have serious consequences for species dispersal and species range shifts. Adequate habitat connectivity to areas with greater resilience to the effects of climate change is an important feature to accommodate shifting species distributions. Therefore, the climate modeling has been integrated into the overall habitat connectivity modeling for this Antelope Valley RCIS (Section 3.2, *Identifying Areas of High Conservation Value*).

**Table 2-10. Climate-Vulnerable Focal Species in the Antelope Valley RCIS**

| Common Name | Scientific Name | SWAP SGCN Climate Vulnerability List |
|---|---|---|
| **Plants** | | |
| Joshua tree | *Yucca brevifolia* | No |
| Spreading navarretia | *Navarretia fossalis* | No |
| **Reptiles** | | |
| Coast horned lizard | *Phrynosoma blainvillii* | Yes |
| Western pond turtle | *Actinemys marmorata* | No |
| **Birds** | | |
| Least Bell's vireo | *Vireo bellii pusillus* | Yes |
| Swainson's hawk | *Buteo swainsoni* | Yes |
| Tricolored blackbird | *Agelaius tricolor* | No |
| Willow flycatcher | *Empidonax traillii* | No |

Source: California Energy Commission et al. 2014
SGCN = Species of Greatest Conservation Need

## 2.3.3.1 Temperature

Average annual temperatures within the Mojave Desert are expected to increase between 1.9 and 2.6 degrees Celsius (3.4 to 4.7°F) by 2070 (Point Reyes Bird Observatory 2011). January average temperatures are projected to increase 2°F to 4°F by 2050 and 5°F to 8°F by 2100, while July average temperatures are projected to increase 3°F to 5°F by 2050 and 6°F to 9°F by 2100 (California Office of Emergency Services 2012). Hotter, drier weather will stress water resources available to people, wildlife, and vegetation. This is likely to translate into less water for wildlife, particularly riparian, vernal, and aquatic species. The ecological functioning of upland habitats is also likely to be disrupted as individual species respond differently to climatic changes. Some species will likely adapt in place while others are forced to move to seek suitable climates, and the rest will experience different rates of population or health declines.

## 2.3.3.2 Precipitation and Snowpack

The California desert is projected to experience greater variation in annual rainfall as a result of climate change, with some locations receiving more rain in the future, others less, and some with little to no change (California Emergency Management Agency 2012). A thorough discussion of the predicted effects of climate change on desert ecosystems in California can be found in Appendix P of the DRECP.

## 2.3.3.3 Wildfire Risk

Climate change is expected to contribute to increased likelihood of wildfire risk, but may also include shifts in the timing, frequency, and intensity of wildfire events. Fire is a natural component of many ecosystems and natural communities within the RCIS area, including grasslands and pinyon-juniper woodland. For these natural communities, fire frequency and intensity influence community regeneration, composition, and extent. For example, more frequent, intense fires caused by high fuel loads and increased encroachment by nonnative annuals into grasslands could negatively affect community composition by favoring early successional species. Additionally, frequent, intense fires are known to cause *type conversion*, increasing the extent of certain natural communities, such as grassland, at the expense of other more diverse communities, such as pinyon-juniper woodlands and Joshua tree woodlands.

## 2.3.3.4 Effects on Focal Species and Habitats

Climate change may alter habitats in the RCIS area as temperatures and precipitation levels change, which could lead to reduction in population sizes, require focal species in the RCIS area to migrate to other areas, or cause extirpation of focal species that rely on those habitats when there are no remaining areas that meet their habitat needs within their migration range. Many of the focal species in the RCIS area are of special conservation concern because of their risk of extinction. Species that are particularly vulnerable often occur within a limited geographic range, exist in small populations, have specialized habitat requirements, and have low dispersal ability, which make it difficult for them to migrate to more suitable areas as habitats shift with climate change. Aquatic and riparian species are particularly at risk (e.g., pond turtle, least Bell's vireo) because they could be extirpated by loss of habitat during extended periods of drought. By identifying species most at risk from the effects of climate change, conservation and management efforts can be targeted to reduce and mitigate these impacts, such as by protecting and restoring existing habitat and linkages between habitats and climate change refuges, or through assisted migration. This RCIS uses new climate modeling with input from three climate projections (CCSM4, CanESM2, and MIROC 5) plus the ensemble and two future time periods, 2016–2045 and 2046–2075, compared to the historical period, 1971–2000. The modeling predicts three climate change components relative to species vulnerability or resilience to climate change, including climate stability, climate exposure, and climate physical refugia (see Section 3.2.1.3, *Habitat Connectivity and Climate Change*, and Appendix G, *Modeling Methodology*).

## 2.3.3.5 Effects on Other Conservation Elements

Climate change will also affect habitat connectivity, natural communities of conservation importance, working lands, and key aquatic habitats in the RCIS area. Increasing temperature and prolonged drought conditions will put greater stress on agricultural lands dependent on irrigation, such as alfalfa and sod fields that support focal species; aquatic habitats will also be put under greater stress from water shortage. Natural communities of conservation importance in the RCIS area are at risk from climate change because of their narrow distribution in the RCIS area. Dam and water management/use have put increased pressure of the ranges of these land cover types, and this pressure will only increase in the context of climate change. Some unique land cover types may be severely reduced in range and distribution or even extirpated with prolonged, extreme climate-driven events such as severe drought or increased fire frequency. As the range of these habitat types is restricted, habitat connectivity between patches will also be degraded, which will increase extinction risk for focal species utilizing these habitats.

## 2.3.4 Commercial and Industrial Areas

Commercial and industrial areas are located throughout the RCIS area, with the largest designated area north of Lancaster, and other large areas designated for commercial and industrial uses to the southeast of Palmdale along the Highway 138 corridor.

Past conversion of natural communities for development, including commercial and industrial areas, affects remaining patches of natural communities and aquatic resources. Isolated patches of habitat are often less suitable or unsuitable for focal species (this stressor is discussed in greater detail in Section 2.3.4.1, *Effects on Focal Species and Habitats*) than large, contiguous patches of habitat. Other stressors include light pollution, noise pollution, and degradation of aquatic resources. Aquatic resource degradation occurs through both point-source (e.g., wastewater treatment plant releases) and non-point source (e.g., stormwater runoff) releases. Both point and non-point sources are regulated by the Lahontan Regional Water Quality Control Board; however, capture and/or treatment of non-point sources is an ongoing challenge in urban areas. Impervious areas in commercial and industrial developments contribute to increased runoff, especially during storm events, due to increased extent of impermeable surfaces common to urban areas. Such increases can result in greater levels of scour and/or incision of local creeks, increased sediment loads, alterations of downstream hydrology, and decreased groundwater recharge.

Industrial facilities including power plants, sewage plants, and others also contribute pollutants to local aquatic resources. An increase in the quantity of pollutants reaching local waterways through higher runoff may affect the biological and physical characteristics of aquatic habitats. High runoff temperature may also result in an increase of in-stream water temperatures when runoff enters local streams.

### 2.3.4.1 Effects on Focal Species and Habitats

As further discussed in Section 2.3.7, *Housing and Urban Areas, Roads, and Railroads*, habitat fragmentation from development negatively affects all focal species. Commercial and industrial areas reduce and fragment habitats, but also increase proximity to pollution and the possibility of trampling converted lands and their inhabitants. Additionally, the burrowing owl, American badger, desert kit fox, mountain lion, and Tehachapi pocket mouse may be further affected by nighttime lighting that is common at commercial and industrial developments. This may reduce their use of adjacent lands, further restricting their habitat.

### 2.3.4.2 Effects on Other Conservation Elements

All of the other conservation elements in the RCIS area could be affected by land conversion. The major impact of new development is the conversion from undeveloped to developed land cover, which reduces biodiversity and eliminates natural habitat. Habitat conversion may further isolate areas of remaining natural habitat, increasing the edge (i.e., boundary) and the distance between habitats, limiting habitat connectivity and landscape linkages. Additionally, development can convert farmland and rangeland to areas with large amounts of impervious surfaces (e.g., concrete or asphalt), which have little or no value for the focal species in the RCIS area. Commercial and industrial areas currently overlap the *Forestiera pubescens*, *Lepidospartum squamatum*, and *Purshia tridentata* natural communities of conservation importance, and thus have the potential to negatively affect these conservation elements.

## 2.3.5 Groundwater Pumping

The primary pressures on aquatic habitats in the RCIS area are groundwater pumping for agricultural, industrial, and domestic uses. Antelope Valley became a productive agricultural area in the early part of the 20th century. From the 1920s to the 1950s groundwater pumping increased significantly, until over 400,000 acre-feet of water were being pumped out of Antelope Valley each year (Kennedy/Jenks Consultants 2007). The groundwater table dropped precipitously, until it became uneconomical to pump groundwater and agricultural lands began to recede in Antelope Valley in the 1960s and 1970s. Despite the decline in agriculture, groundwater pumping continued to overdraft the basin until the ruling on the Antelope Valley Groundwater Adjudication (Section 2.2.3.1, *Antelope Valley Groundwater Adjudication*) set a limit on the amount of groundwater pumping to prevent overdraft of the basin. Although population growth has slowed over the past several years, development and demand for water have still grown. In order to recharge the groundwater basin to balance pumping demands, water management infrastructure (catchment basins, pipelines, recharge basins) is likely to increase, further altering natural land cover and hydrologic regimes in the RCIS area, with wide-ranging and in many cases uncertain effects on focal species.

### 2.3.5.1 Effects on Focal Species and Habitats

Due to their elevated importance in desert environments as the prime limiting resource, any adverse effects on aquatic resources can have substantial impacts on numerous focal species that are dependent on aquatic habitats. Aquatic habitats not dependent on water from human-made lakes and reservoirs, such as springs, seeps, vernal pools, and other types of ephemeral water features, are particularly vulnerable. Focal species dependent either entirely or partially on these natural aquatic features include Alkali mariposa lily, spreading navarretia, western pond turtle, willow flycatcher, least Bell’s vireo, tricolored blackbird, and most mammals including mountain lion, badger, and Tehachapi pocket mouse.

### 2.3.5.2 Effects on Other Conservation Elements

Groundwater pumping lowers the groundwater table and causes springs, riparian areas, and other key aquatic habitats in desert environments to dry up, causing water-stressed cottonwoods, willows, and other riparian vegetation to perish. In some areas of the West Mojave subecoregion, where dropping groundwater levels have caused more than 50 percent of the cottonwood trees to perish (California Department of Fish and Wildlife 2015), unique vegetation communities in the RCIS area are associated with seeps, springs, and other ephemeral water features that are affected by changing groundwater levels that result from pumping. Exacerbating the issue is the establishment and spread of tamarisk (saltcedar), a nonnative plant that invades areas where the native riparian habitat is stressed. Tamarisk roots can reach deeper for water, causing groundwater to recede farther (California Department of Fish and Game 2005).

## 2.3.6 Fire and Fire Suppression

Desert scrub natural communities are naturally slow to recover from fire episodes and are more vulnerable to proliferation of nonnative grasses that can often successfully compete with and overcome native assemblages and alter fire regimes (California Energy Commission et al. 2014). This pressure has come to the forefront as frequency of wildfire increases because of the invasion of desert habitats by nonnative plant species has increased (Brooks 1998; U.S. Fish and Wildlife Service 1995). Off-highway vehicle (OHV) activity, roads, livestock grazing, agricultural uses, and other activities contribute to the spread of nonnative annual grass species (or the displacement of native species) and perpetuate the spreading of these species that increase the potential for wildfire. Human-caused ignitions are also more likely as human activity levels increase in the RCIS area with population growth.

#### 2.3.6.1 Effects on Focal Species and Habitats

Changes in plant communities caused by nonnative plants and recurrent fire can destroy or permanently alter natural communities and negatively affect focal species, including Agassiz's desert tortoise, by altering habitat structure and species available as food plants (Brooks and Esque 2002). Fires may also result in increased mortality for less mobile focal species utilizing these habitats, which will increase the risk of local extinction events.

#### 2.3.6.2 Effects on Other Conservation Elements

Increased frequency of fire disturbance within the RCIS area driven by human activity, climate change, and invasion by nonnative annual grasses is likely to have negative impacts on natural communities of conservation importance. This will be primarily through overgrowth and displacement of native vegetation during post-fire succession. The remaining conservation elements are likely to be unaffected by these changes in fire regime.

### 2.3.7 Housing and Urban Areas, Roads, and Railroads

The western Mojave region has experienced growth as residential development spread northward from the Los Angeles basin. Existing local government general plans provide for residential growth in the western Mojave region to reach a population of 5 million (California Department of Fish and Game 2005).

In the RCIS area, sprawling development replaces and fragments habitat. Growing communities require additional rights-of-way for power lines, pipelines, and roads, which further fragment habitat. Population growth, especially suburban residential growth, requires larger roads and freeways, as well as public transportation such as railroads, for residents traveling to work within the Los Angeles metropolitan area. Residential single-family home development results in wide-spread habitat degradation and fragmentation. The Highway 14, 18, and 138 corridors currently act as either partial or complete barriers to wildlife movement in both the east to west and north to south directions. This pattern and density of growth dramatically increases the severity of development's effects on wildlife (California Department of Fish and Game 2005). Development also increases pressure to overdraw groundwater. Groundwater levels began dropping because of over-drafting in the 1950s, drying up riverbeds, springs, and seeps and diminishing riparian ecosystems that depend on flowing water and saturated soils. The new water demands of rapid growth also reduce the options for recharging and restoring groundwater levels.

While regional planning efforts can reduce some of the habitat effects of expanding housing, transportation infrastructure, and other urban areas, areas of known or foreseeable potential future urbanization and infrastructure development will continue to be a stressor for habitat in the RCIS area. Consequently, these areas of known or foreseeable potential future urbanization are generally not suited for achieving long-term conservation goals and objectives. Foreseeable potential future urbanizing areas were mapped based on local land use planning resources and known planned future development and infrastructure projects (shown on Figure 2-22).

#### 2.3.7.1 Effects on Focal Species and Habitats

All of the focal species are affected by habitat loss and fragmentation caused by expanding housing and urban areas and roads and railroads (Table 2-10). For example, Agassiz's desert tortoise, Mohave ground squirrel, and burrowing owl populations have experienced dramatic declines in the RCIS area due to widespread habitat loss and habitat fragmentation, resulting from the conversion of grassland and desert scrub habitat to urban and suburban areas. In addition, burrowing owl has lost suitable agricultural lands to development. Equally important for this and other raptor species such as Swainson's hawk is the loss of fossorial rodents, such as ground squirrels, caused, in part, by rodent control efforts. Occurrences of the focal plant and animal species are also directly affected by habitat conversion and habitat fragmentation. Habitat loss can result in the elimination of individuals or populations of these species from the area that is converted, and these species can also be affected by proximity to converted lands from pollution and trampling.

#### 2.3.7.2 Effects on Other Conservation Elements

This pressure is important in driving losses to habitat connectivity and natural communities of conservation importance. The major impact of housing, urban areas, roads, and railroads is the conversion from undeveloped to developed land cover, which eliminates natural habitat and reduces biodiversity and unique land cover types. Habitat conversion may further isolate areas of remaining natural habitat by increasing the edge (i.e., boundary) and the distance between habitats, limiting habitat connectivity and wildlife linkages. Fragmentation and resulting land management activities like fire suppression modify the natural disturbance regime necessary to sustain the unique land cover types in the RCIS area. Additionally, urban development can convert farmland and rangeland to habitat with large amounts of impervious surfaces (e.g., concrete, asphalt), which have little or no value for the focal species in the RCIS area.

### 2.3.8 Industrial and Military Effluents

Due to the nature of military activities, information on potential effluent sources is not publicly available; however, the Edwards Air Force Base Environmental Compliance Program assists base organizations to comply with all applicable environmental laws, statutes, and regulations, including those regulating effluents. Industrial effluents may come from industrial production sites or wastewater treatment plants. The Lahontan Regional Water Quality Control Board regulates effluents from industrial sites.

#### 2.3.8.1 Effects on Focal Species and Habitats

Industrial and military effluents can change the local hydrology by introducing unseasonal flows from industrial applications to the local waterways. This can cause a shift in the plant composition and the fauna supported in the area. Effluents may also change the chemical composition of local waterways, affecting species that use these waters. If effluents are high in nutrients, they can also cause algal blooms that impair the ability of other organisms to use these resources.

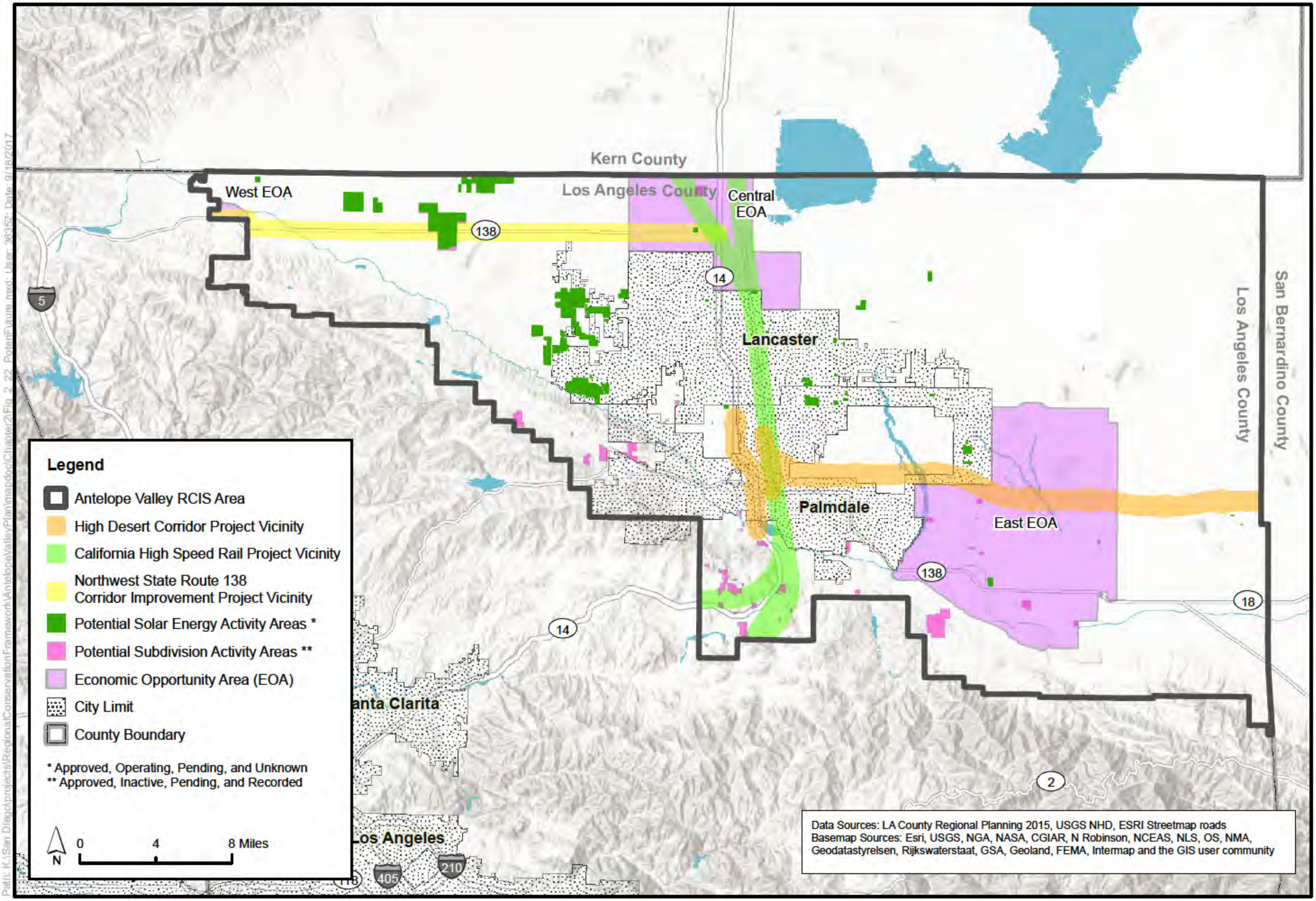


**Figure 2-22**
**Areas of Foreseeable Potential Future Infrastructure and Urbanization**

### 2.3.8.2 Effects on Other Conservation Elements

Effluents may negatively affect key aquatic resources by altering the hydrology through unseasonal flows or a change in the normal flow amount. These changes can increase erosion and have the potential to alter the plant communities supported by the key aquatic resources. Effluents with high nutrient loads can cause algal blooms.

## 2.3.9 Invasive Plants and Animals

Many of the conservation actions described in this RCIS address prevention, early detection, and rapid response to new invasive plants to prevent them from becoming widespread. Distribution maps and summary reports for invasive plants, as well as regional strategic plans for prioritized invasive plant species, can be found on the CalWeedMapper website.[9] Some of the invasive species affecting the RCIS area are discussed below.

Numerous nonnative plants have altered plant communities across large areas of the Mojave Desert, outcompeting native species and degrading upland and riparian habitats for native wildlife. The abundance of nonnative forbs and annual grasses (particularly *Bromus tectorum*, *Bromus diandrus*, *Bromus madritensis rubens*, *Schismus barbatus*, *S. arabicus*, and *Bromus madritensis rubens*) increases the fuel and continuity of fuels, facilitating more-frequent and hotter fires. This changes the fire frequency and fire intensity that native plants evolved with and favors other nonnative plants that thrive in disturbed areas, further transforming the plant communities (California Department of Fish and Game 2005).

Imported tamarisk, a plant of inferior habitat value for native wildlife, has replaced native cottonwoods and willows in watercourses in the region. The leaves of tamarisk concentrate and shed salts, thus degrading soil conditions for native plants (Smith et al. 1998). Tamarisk is more drought tolerant than native cottonwood trees and willows. In areas where groundwater levels are receding, tamarisk outcompetes water-stressed native plants (Cleverly et al. 1997; California Department of Fish and Game 2005).

In 2002, state and federal agencies signed the Mojave Weed Management Area Memorandum of Understanding, which spells out a coordinated planning effort to prevent, control, and eradicate weeds and to educate the public about weed control in the region (Desert Managers Group 2002). The memorandum identifies a priority list of species to control in the Mojave Desert.

### 2.3.9.1 Effects on Focal Species and Habitats

Invasive annual grasses and forbs have displaced native plants, often greatly diminishing the native forage for Agassiz's desert tortoise and other focal bird and small mammal species. These nonnative grasses and forbs now dominate plant communities throughout the region. In Agassiz's desert tortoise critical habitat of the western Mojave Desert, nonnative plants account for more than 60 percent of the annual vegetative biomass (California Department of Fish and Game 2005). Some invasive plants, such as Saharan mustard, continue to spread across the region.

[9] Available at http://calweedmapper.cal-ipc.org.

#### 2.3.9.2 Effects on Other Conservation Elements

Natural communities of conservation importance are particularly at risk from invasive annual grasses. The effects of invasive plants are linked closely with changes in fire regime as detailed in Section 2.3.6, *Fire and Fire Suppression.* Because of their limited spatial distribution, these communities are at greater risk from fire disturbance by being likely to be completely engulfed by single events. Invasive plants are able to recolonize rapidly after fire disturbance, and can often outcompete natives during early succession. Finally, invasive annual grasses can increase the frequency of fire disturbance to a point where natural communities of conservation importance can no longer successfully recolonize.

### 2.3.10 Livestock, Farming, and Ranching

Agriculture expanded greatly in Antelope Valley with groundwater pumping (Section 2.3.5, *Groundwater Pumping*) from the 1920s to 1950s. This resulted in large-scale conversions of natural land cover to pastures and crops that resulted in extensive habitat loss for many desert species while expanding habitat for some species better adapted to pastures and crops. By the 1970s, the groundwater table was drawn down so much as to no longer support agricultural expansion, and the conversion of natural vegetation to agriculture in Antelope Valley slowed; many areas previously farmed have been converted to residential or urban land uses. The remaining agriculture in the valley, especially alfalfa fields and other irrigated crops, continues to support a number of focal species such as Swainson's hawk, long-billed curlew, loggerhead shrike, mountain plover, and burrowing owl. Given that some of these species now depend on irrigated agricultural land, they are imperiled by expanding residential growth and increasing water demand that threatens the irrigation supply for these remaining agricultural lands.

Excessive livestock grazing has altered ecosystems across the desert. Unmanaged livestock grazing, especially where plants are not adapted to large, herbivorous mammals or where the nonnative plant species are less palatable than the natives, can preferentially remove native vegetation, leaving nonnative plants to grow under reduced competition (Wittenberg and Cock 2001). During drought that diminishes other forage, domestic livestock in restricted (fenced) fields typically will uproot native bunchgrass. Eventually, livestock grazing can cause the demise of native grassland, especially in arid locations. In turn, fires are more frequent where invasive annual grasses are abundant, preventing the natural restoration of native vegetation and further disturbing habitat for native wildlife. Another problem of domestic livestock grazing is that through defecation and trampling, livestock with access to natural water sources for drinking can destroy the water quality and native, often rare, vegetation associated with aquatic habitats. Refer to Figure 2-10 for a map of rangeland in the RCIS area.

#### 2.3.10.1 Effects on Focal Species and Habitats

Several focal species depend upon the agricultural lands in the RCIS area for foraging and wintering habitat; the extent to which these lands support focal species is largely dependent on the type of crops grown and the farming practices conducted by landowners. Grazing has altered the desert scrub ecosystems, reducing preferred native shrubs and herbaceous plants that support Agassiz's desert tortoise and other reptiles, the Mohave ground squirrel, and other small mammals, birds, and butterflies (Avery 1999 in California Department of Fish and Wildlife 2015). Heavy grazing facilitates the spread of cheatgrass and other invasive annual grasses, replacing native grasses, herbs, and perennial shrubs, further diminishing habitat conditions for wildlife (California Department of Fish and Game 2005). Rodent control efforts, when conducted on rangelands, can also adversely affect focal species including the Mohave ground squirrel, raptors, American badger, and burrowing owl. Grazing at the appropriate intensity can also provide a management tool for grassland communities that are adapted to large ungulates, with benefits conveyed to grassland focal species (Section 2.1.5.2, *Working Lands*)

#### 2.3.10.2 Effects on Other Conservation Elements

Grazing has been particularly detrimental to key aquatic habitats important for maintaining wildlife diversity in the desert, denuding and eroding fragile soils around rivers, springs, and seeps and polluting scarce surface water. Unless managed properly, livestock can reshape streambeds and trample or consume vegetation and seedlings of native trees and shrubs, preventing regeneration. Refer to Section 2.1.5.2, *Working Lands*, for a discussion of the potential beneficial effects of grazing on the RCIS area rangelands.

### 2.3.11 Military Activities

The southern edge of Edwards Air Force Base overlaps with a large portion (47,778 acres) of the northeastern portion of the RCIS area. Potential uses in this area include bombing ranges, supersonic corridors, low-altitude high-speed maneuvers, radar intercept areas, and refueling areas. While, by nature, military activities and locations are undisclosed, the Edwards Air Force Base Environmental Conservation Group completes an environmental analysis of test programs and construction within the base, as well as managing the protection and conservation of natural and cultural resources.

Edwards Air Force Base has also been identified as an open space area by the County of Los Angeles and as one end of the Edwards Air Force Base San Gabriel Mountains linkage, an important wildlife corridor in the region. It has also been identified as the Edwards core habitat area for this RCIS.

#### 2.3.11.1 Effects on Focal Species and Habitats

The sand dunes within Edwards Air Force base are specifically identified as habitat for alkali mariposa lily. Ground disturbance from military activity in saltbrush scrub, particularly areas with claypans or along dunes, or disrupting the hydrology of drainages would negatively affect this focal species. Norther harriers are also identified as having habitat near to the base. They, along with other raptors, are likely to use Edwards Air Force Base as foraging habitat. Raptor focal species may be negatively affected by military flight activities. Finally, the majority of modeled habitat for Mohave ground squirrel overlaps with Edwards Air Force Base, and may be affected by military activities.

Edwards Air Force Base overlaps with high conservation value habitat for the American badger, burrowing owl, desert horned lizard, desert kit fox, desert tortoise, Joshua tree, least Bell's vireo, Le Conte's thrasher, loggerhead shrike, long-billed curlew, Mohave ground squirrel, mountain plover, northern harrier, prairie falcon, Swainson's hawk, willow flycatcher, and tricolored blackbird.

#### 2.3.11.2 Effects on Other Conservation Elements

Rosamond Lake (dry) is within Edwards Air Force Base and identified as a key aquatic resource in the RCIS. Military activities have the potential to negatively affect this resource; however, these effects will likely be mitigated through the base's environmental review process, to some extent. Edwards Air Force Base is also identified as the eastern end of the largest and most intact wildlife linkage in the region between Edwards Air Force Base and the San Gabriel Mountains. Edwards Air Force Base also acts as one end of habitat for the Edwards Antelope Buttes, Edwards-Portal Ridge, Little Rock Wash, Alpine Butte-Edwards, and Edwards-Saddleback landscape linkages. Military activities that cause a change in wildlife behavior will reduce the efficacy of this area as both habitat and as a corridor for movement. Additionally, the *Prosopis glandulosa* natural habitat of conservation importance is located within Edwards Air Force Base, and subject to potential impacts from military activities.

### 2.3.12 Mining and Quarrying

Los Angeles County is the largest consumer of sand and gravel in the country, but it is also a major producer of this resource. The Little Rock Creek Fan production region is within the RCIS area and currently contains ten aggregate and mineral mines. This mining area produces an estimated 12.7 tons per year, and is anticipated to continue to produce until 2046 (California State Mining and Geology Board 1999). Mining and quarrying directly affect the habitats where they occur, and can also increase air pollution from dust and trucks to transport the mined product. Airborne pollutants are further discussed in Section 2.3.1, *Airborne Pollutants*.

Extraction land uses and mines within the RCIS area overlap with the Big Creek Wash core habitat area and the Little Rock and Big Rock Wash habitat linkage areas.

#### 2.3.12.1 Effects on Focal Species and Habitats

Construction and operation of mining and quarrying operations can have the following effects on focal species in the RCIS area:

- Conversion of natural habitats
- Barriers and alterations to movement
- Introduction of nonnative species
- Direct mortality as a result of construction and operation

The Little Rock Creek watershed, which overlaps with the Little Rock Creek Fan production area, contains historical habitat of the western pond turtle. Ponded areas within the RCIS area, including this area, are target conservation areas for the western pond turtle. Little Rock Creek is identified as a target area for habitat conservation and management of ecological processes to support the alkali mariposa lily. Additionally, mining operations are within the Swainson's hawk priority conservation area. Swainson's hawks are sensitive to noise during the breeding season and may be negatively affected by noise from mining and extraction operations.

### 2.3.12.2 Effects on Other Conservation Elements

Little Rock Creek, where the mining operations are located, is identified as a key aquatic habitat. Creeks and riparian areas provide important habitat connectivity for many species. Mines within the RCIS area are within the Little Rock and Big Rock Wash landscape linkages. Mining activity can reduce use of these potential wildlife corridors through direct habitat removal, degradation of habitat from invasive species, and deterrence of wildlife movement from lighting and increased human presence. The following natural communities of conservation concern occur in the vicinity of mining operations and are subject to potential impacts: *Yucca brevifolia*, *Purshia tridentata*, and *Lepidospartum squamatum*.

## 2.3.13 Recreational Activities

The number of OHV registrations in California has more than doubled since 1980, and the rapid growth of the numbers of OHV recreationists continues. In addition to resident recreationists, the Mojave Desert attracts millions of OHV visitors annually. While the vast majority of motorcyclists and all-terrain vehicle riders are responsibly recreating at designated OHV parks or on designated trails and roads on public lands, many others are carving new trails across threatened Agassiz's desert tortoise and Mohave ground squirrel habitat, often across sensitive habitats in closed portions of designated areas of critical environmental concern.

While desert planning efforts attempt to minimize OHV damage to natural resources by designating open, limited use, and closed areas, damage to natural resources continues. The lack of public education regarding the rules and road networks, lack of adequate enforcement staff, and outright defiance by a small segment of the OHV community have thwarted efforts to protect wildlife and vegetation, including areas around desert springs and other sensitive sites. However, teaming with responsible OHV enthusiast groups has been an effective strategy for the Transitions Habitat Conservancy in some of its holdings in San Bernardino County to prevent degradation from OHV use.

The number of BLM rangers or county Sheriffs is small relative to their jurisdiction of enforcement acreage, so the risk of receiving a citation for riding in restricted areas is correspondingly small. Agencies have posted signs indicating where vehicles are prohibited, but in many areas this is futile. BLM concluded in the June 2003 Decision Record for the Western Mojave Desert Off-Road Vehicle Designation Project: "The least effective short-term action taken in the Ord Mountains was signing the closed route network. Not only did this effort consume a great deal of staff time; in addition, signs were removed almost as quickly as they were put up. The need to resign routes placed additional demands on scarce staff time and material."

The Decision Record also revealed that BLM was unable to keep OHVs out of sensitive areas. The frequent destruction of signs led BLM to sign the open route network and to cease signing the closed areas, reasoning that people are less likely to destroy "open area" signs than "closed area" signs. While this saves signs, this policy makes it difficult to inform recreationists where OHV activities are prohibited, providing less protection for important habitats.

The issue is not limited to federal lands. The Los Angeles County Sheriff's Department applied for additional funding to patrol lands in Antelope Valley for illegal OHV use, noting erosion and destruction of vegetation as effects. The application notes the largest areas of enforcement responsibility as Acton, Agua Dulce, Leona Valley, Lake Hughes, Green Valley, Lake Elizabeth, Littlerock, Pearblossom, Llano, Wrightwood, Lake Los Angeles, Hi Vista, Fairmont, and Antelope Acres (Los Angeles County Sheriff 2017).

## 2.3.13.1 Effects on Focal Species and Habitats

The impacts of OHVs on fragile desert landscapes have been described by scientists and resource managers for more than 30 years. The 1980 California Desert Conservation Area Plan referred to OHVs as the "most pervasive management issue in the area." Along with direct collisions with Agassiz's desert tortoises and other wildlife, and the crushing of animal burrows, OHVs compact soils, fragment habitat, spread invasive plant species, and denude the landscape of vegetation. Off-highway driving or riding has essentially a non-restorable impact on some desert habitat; damaged soils and perennial vegetation are not likely to recover for several hundred years or more (California Department of Fish and Game 2005). Without active treatment of soils compacted by years of unmanaged recreational vehicle use, and enhancement of native vegetation production, even closed routes will remain as they are: wind-swept, eroded surfaces with no vegetative productivity and unsuitable burrowing substrate. Additionally, this prolonged recovery is likely to only occur if vehicle use no longer occurred on closed routes, which is likely to require exclusion measures (e.g., fencing) and enforcement.

## 2.3.13.2 Effects on Other Conservation Elements

Unauthorized OHV use in sensitive desert habitat drives the loss of habitat connectivity and degradation of natural communities of conservation importance in the same manner as for focal species and their habitats.

## 2.3.14 Renewable Energy

California's deserts contain some of the highest-rated solar energy resources in the world. Renewable energy projects, including geothermal energy, wind energy, and solar energy, have been constructed and are proposed throughout the Western Mojave Desert. In the RCIS area, wind energy is prohibited in the unincorporated areas of Los Angeles County and there are currently no operating utility-scale wind-generating facilities operating. As such, utility-scale solar has been and will continue to be the primary pressure on focal species and other conservation elements. As described in Section 2.2.3.4, *Renewable Energy*, utility-scale solar development has expanded in the RCIS area in recent years and is expected to continue to expand as California incentivizes renewable energy development over traditional fossil fuel generation sources. Utility-scale solar is extremely area-intensive, with large arrays of photovoltaic panels occupying up to thousands of acres, resulting in extensive conversion of natural desert habitat.

## 2.3.14.1 Effects on Focal Species and Habitats

Siting, construction, decommissioning, and operational activities associated with solar array installations, as well as transmission facilities, result in loss of native vegetation and habitat for wildlife, particularly focal species such as Agassiz's desert tortoise, coast horned lizard, and Mohave ground squirrel. Focal bird species may be affected through collisions with heliostats, solar arrays, and injury or mortality from exposure to concentrated solar flux (California Energy Commission et al. 2014). Based on where wind-energy development would most likely occur, most collision and injury risk to avian and bat species would occur on the western edge of the RCIS area and along the southern border in the migratory corridor of the San Gabriel Mountains and San Andreas fault zone (commercial-scale wind energy generation has not yet occurred in the RCIS area and it is currently prohibited on unincorporated Los Angeles County lands). In addition, both large transmission lines and networks of smaller collector lines present collision and electrocution hazards to birds. In particular, lines running perpendicular to migratory corridors or close to bird refuges represent greater hazards. Utility-scale solar results in large swaths of converted habitat that adversely affects many focal species that use desert habitat, or move through these areas, such as mountain lion.

#### 2.3.14.2 Effects on Other Conservation Elements

Stressors to conservation elements such as habitat connectivity, working lands, and natural communities of conservation importance from renewable energy activities share a great deal of overlap with other described pressures. These include the loss of habitat connectivity associated with direct displacement of native plant and animal communities to site solar installations, but also include loss of habitat connectivity associated with power lines and access roads. This increased fragmentation and human traffic promotes invasion of previously intact native habitats by invasive plant species and may encourage unauthorized OHV use.

### 2.3.15 Utility and Service Lines

Utility and service lines are required to connect energy facilities such as power plants and solar fields to transfer stations and the communities that they serve. They are often installed in remote landscapes, and require periodic vegetation control to mitigate the fire risk that they pose. They can cause changes in the sediment erosion and deposition regime, the spatial distribution of habitat types, natural community structures and composition, ecosystem development and succession processes, biotic interactions, and habitat fragmentation.

Utility and service lines in the RCIS area generally follow two main corridors: from the solar fields located along northern edge of the RCIS to Palmdale and then south, and from Palmdale east to the San Bernardino County line.

#### 2.3.15.1 Effects on Focal Species and Habitats

Utility and service lines have the potential to affect focal plants in their path, as well as fauna that migrate through these corridors. These corridors overlay California grassland and meadow and Sonoran and Chihuahuan semi-desert scrub and grassland areas. Utility and service corridors within the RCIS area overlap with the Munz Ranch Road, Portal Ridge, and the Big Rock Creek Wash habitat core areas and the Portal Ridge Poppy Preserve, Barrel Springs, Little Rock Wash, Big Rock Wash, and Mescal Creek landscape linkages. Additionally, avian focal species may face increased injury and mortality caused by bird strikes to power lines.

Designated utility and service line corridors within the RCIS area overlap with areas of high conservation value for American badger, burrowing owl, California condor, coast horned lizard, desert kit fox, golden eagle, Joshua tree, Le Conte's thrasher, loggerhead shrike, long-billed curlew, mountain lion, mountain plover, prairie falcon, short-joint beavertail, Swainson's hawk, and tricolored blackbird.

### 2.3.15.2 Effects on Other Conservation Elements

Utility and service lines have the potential to affect natural communities of conservation importance, key aquatic habitats, and habitat connectivity. Construction and maintenance of utility and service lines cause disturbance and impacts on natural communities, increasing the potential for competition from invasive species and erosion where vegetation is removed. These impacts disrupt the natural communities and can also affect the species that rely on intact natural habitat to traverse multiple habitat patches or migrate through their entire range. The utility corridors in the RCIS area cross the *Populus fremontii*, *Purshia tridentata*, and *Lepidospartum squamatum* natural communities of conservation concern; key aquatic habitats such as Big Rock Creek and Little Rock Creek; and modeled wildlife corridors for both small and large species. Utility and service line corridors within the RCIS area overlap, and have the potential to affect, the Portal Ridge Poppy Preserve, Barrel Springs, Little Rock Wash, Big Rock Wash, and Mescal Creek landscape linkages.

# 2.4 Gaps in Scientific Information

The conservation strategy presented in Chapter 3, *Conservation Strategy*, is based on the best available scientific information. However, there are many gaps in that information. This section discusses information gaps that, if filled, could change the objectives, actions, and priorities in the RCIS area. Gaps may be created from either a lack of information or deficiency in how existing information is disseminated.

## 2.4.1 Focal Species Occurrence Data Gaps

The CNDDB (California Department of Fish and Wildlife 2017b) was the primary source of species occurrence data, along with a few others. While the data are considered high quality, because of the verification process used by CDFW, there are two inherent gaps. First, only positive data are presented (i.e., where an occurrence is found). While positive occurrence data are very useful, there is no way to know where surveys have been conducted for each species with negative survey results (i.e., where an occurrence was not detected). Knowing the characteristics of where species do not occur in habitat that may appear suitable is also important for informing where to prioritize conservation actions. Because that information is not available, the species habitat models typically over-predict where species may occur. With negative survey data, those models could be refined by removing areas that had been surveyed where no species were found. Second, the CNDDB does not include data for large areas of potentially suitable habitat, in part because a large amount of California, including the majority of the RCIS area, has not been surveyed.

Surveys are often driven by environmental compliance for projects. For example, many CNDDB occurrences fall along gas and electric rights-of-way or roadways—places where infrastructure projects typically happen—giving the potentially false impression that these species occur in proximity to infrastructure. As a result, conservation and mitigation projects may inadvertently focus on limited areas with suitable occurrence data, potentially at the expense of other important areas that are occupied by target species but have not been surveyed. Increasing occurrence data information for these species would allow for improved models that are able to more accurately predict habitat.

Within the RCIS area, the following species were specifically identified as needing additional survey and mapping efforts to improve knowledge of the species for planning and management activities: Mohave ground squirrel, Tehachapi pocket mouse, spreading navarretia, Bell's vireo, and loggerhead shrike. Additional occurrence data would benefit modeling and management for all focal species.

### 2.4.2 Rare Plant Distribution Data Gaps

The gaps in survey effort for fauna are discussed above in Section 2.4.1 above; however, the lack of survey data for rare plant species is an additional issue throughout the state. Plant species are under-surveyed for two reasons: (1) lack of access to private lands, and (2) plants are not state or federally listed as threatened or endangered at the same rate as wildlife, and therefore regulatory survey requirements are not in place for many species. Furthermore, when botanical surveys are done in areas with more than one plant with the potential to occur, surveys are often timed to address as many blooming periods as possible, but may miss the blooming window for any specific species in that year. So even when lands are surveyed, some species that are present may not be identified during the survey effort if they are not flowering at that time. The lack of survey data for many rare plant species consequently limits planning efforts by not accurately representing plant species occurrence and distribution. For example, the lack of occurrence data for spreading navarretia limits the identification of priority conservation areas in the RCIS. More surveys on private lands and standardized survey efforts would help fill this data gap and allow for more informed conservation priorities for focal and non-focal plant species.

### 2.4.3 Wildlife Movement Data Gaps

There have been a number of wildlife connectivity assessment and modeling efforts completed in Southern California, as described in Section 2.1.5.1, as well as the connectivity modeling done for this RCIS described in Chapter 3, *Conservation Strategy*, and Appendix G, *Modeling Methodology*, and shown on Figures 3-9 and 3-10. Surveys including wildlife tracking stations and camera stations along predicted corridors to assess actual use would be valuable to inform the actual benefit to focal species of protecting the identified linkages prior to further planning and habitat conservation efforts.

### 2.4.4 Specific Effects of Climate Change

While there are numerous models and predictions regarding how California, and the RCIS area, will respond to a changing climate, the degree of change within the RCIS area as well as the ability of ecosystems to adapt to this change are still largely speculative. It is understood that some species and habitats will likely be more susceptible or resilient to climate change based on their specific life histories, distribution, adaptability, and abundance. Some of the specific data gaps that surround climate change will be the rate, timing, and extremity of warming and extreme weather events. Each species has a range of conditions under which it can survive. It is unknown whether species will be able to migrate or adapt quickly enough to the changing climate to sustain their populations. Climate change might affect the size, distribution, and functionality of natural communities and land covers as currently mapped and described in the RCIS. Aquatic habitats are likely to become more drought stressed with increased temperatures and more frequent drought, changing the functionality of these features for species that depend on them such as spreading navarretia, western pond turtle, least Bell's vireo, willow flycatcher, and tricolored blackbird, which depend on aquatic and riparian habitats. Terrestrial habitats are also likely to shift in composition and may shift from scrub habitats to grassland habitats with increased incidence of wildfires, further reducing the available habitat for many non-aquatic focal species as well, especially the coast horned lizard, Swainson's hawk, and Joshua tree. The potential pressures and stressors associated with climate change are further described in Section 2.3.3, *Climate Change.*

## 2.4.5 Fossorial Mammal Extent Mapping

Many native species in California, and in the RCIS area specifically, rely on fossorial mammals as an important element in their life history. Burrowing owls rely on fossorial mammals to provide underground nest sites (Appendix E, *Focal Species Assessments*). Many species of raptors and mammals include ground squirrels as a food source. If the distribution of fossorial mammals in the RCIS area was better understood, it could influence where priority conservation actions should be implemented.

## 2.4.6 Peer-Reviewed Literature Gaps

Many survey efforts are completed as part of the environmental documentation for projects. While this information is useful for larger planning efforts when it provides additional data points in the CNDDB, having publicly available reviewed literature and data addressing the gaps identified earlier in this section would aid planning and modeling efforts. Furthermore, peer-reviewed literature would provide additional data and information regarding a wide variety of topics relevant to conservation and management issues including, but not limited to, species-specific aspects of required habitat quality and quantity, species behavior, reproduction, movement, genetics, population and community dynamics, and many others.

# Chapter 3
# **Conservation Strategy**

## 3.1 Overview

The conservation strategy was designed to meet the requirements of the *Regional Conservation Investment Strategies Program Guidelines*[1] (Program Guidelines) (California Department of Fish and Wildlife 2017a). This chapter describes how conservation opportunities have been identified and prioritized in the Regional Conservation Investment Strategy (RCIS) area. This Antelope Valley RCIS uses the best available science to identify conservation goals and objectives, conservation actions, and conservation priorities and aid California's declining and vulnerable species by protecting, restoring, creating, enhancing, and reconnecting their habitat. This voluntary non-regulatory conservation strategy is intended to guide conservation investments and advance mitigation in the RCIS area. Voluntary implementation of this strategy will also sustain and enhance the species and their habitats and help them adapt to climate change and other pressures and stressors, such as habitat fragmentation.

The following sections of this chapter describe how the biological data, habitat distribution models, current land use, ecological condition of the landscape, patterns of ownership and land protection, and anticipation of future stressors on the species and natural communities (e.g., future development, climate change) have been integrated through spatial modeling and analysis to identify conservation value throughout the RCIS area. Areas with higher overall conservation value are the focus of the conservation strategy (Section 3.2, *Identifying Areas of High Conservation Value*). These areas were identified by mapping areas of biological value (Section 3.2.1, *Mapping Biological Value*), intactness (Section 3.2.2, *Mapping Terrestrial Landscape Intactness*), and conservation value (Section 3.2.3, *Mapping Conservation Value*). The core areas are delineated around the areas of highest conservation value in the RCIS area. Landscape linkages are also mapped to identify the important connections between habitat core areas and allow wildlife movement and dispersal among the core areas (Section 3.2.4, *Mapping Habitat Core Areas and Landscape Linkages*). A species conservation gap analysis is used to determine where species and habitats are protected and where more protection may be needed to achieve desired levels of conservation (Section 3.3, *Gap Analysis for Focal Species*). Finally, conservation goals and objectives are identified for each focal species and natural community; these objectives drive the conservation actions and, ultimately, the conservation strategy of the RCIS area (Section 3.4, *Conservation Strategy for Focal Species and Conservation Elements*). The application of the conservation strategies (Section 3.5, *Applying Conservation Actions and Priorities*) and ongoing monitoring and adaptive management (Section 3.6, *Monitoring and Adaptive Management Framework*) are the final cornerstones of the conservation strategy for this RCIS.

[1] https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=141619&inline

# 3.2 Identifying Areas of High Conservation Value

This section describes the methods and processes by which areas of high conservation value were identified. This RCIS used several sequential steps of geographic information system (GIS) modeling and analysis to synthesize and evaluate the biological data and land use patterns (Figure 3-1). The results of each analytical step, along with substantial input from stakeholders and local conservation and biological experts, helped determine the RCIS conservation priorities.

The identification of areas of high biological value was based on the distribution of focal species, rare natural communities, wildlife movement corridors, habitat resilience to climate change, and other important considerations. Areas largely free of current and past land uses that have degraded conservation value through habitat fragmentation and habitat disturbance were used to identify areas with higher terrestrial intactness. The areas of highest conservation value (i.e., areas of high biological value and high terrestrial intactness) were thus identified and made the focus of the conservation priorities.

Conservation priorities should be focused on areas with higher conservation values as well as areas with the least potential for conflict with foreseeable land uses, such as urbanization. GIS modeling and input from local experts were used to systematically identify areas with higher conservation values across the RCIS area. The land use and project planning information was used to identify areas with foreseeable potential future urbanization. Conservation value was determined by evaluating the overall biological value and then determining the areas of greatest landscape intactness (i.e., areas with the least amount of habitat fragmentation and habitat degradation from human activity).

Areas with higher conservation value are defined as areas with moderate to high biological value *and* moderate to high landscape intactness (Table 3-1). Areas with low biological value *or* low landscape intactness are defined as having lower conservation value. The conservation priorities and conservation actions in this Antelope Valley RCIS will focus on areas of higher conservation value and lower likelihood of foreseeable future urbanization in the RCIS area.

**Table 3-1. Relationship between Landscape Intactness and Biological Value for Determining Relative Conservation Value**

| **Conservation Value Matrix** | | **Biological Value (Supporting Species, Natural Communities, and Other Conservation Elements)** | | |
|---|---|---|---|---|
| | | High | Moderate | Low |
| **Landscape Intactness (Level of Fragmentation and Degradation)** | High | H/H** | M/H** | L/H* |
| | Moderate | H/M** | M/M** | L/M* |
| | Low | H/L* | M/L* | L/L* |

*/gray = Low Value
**/green = High Conservation Value

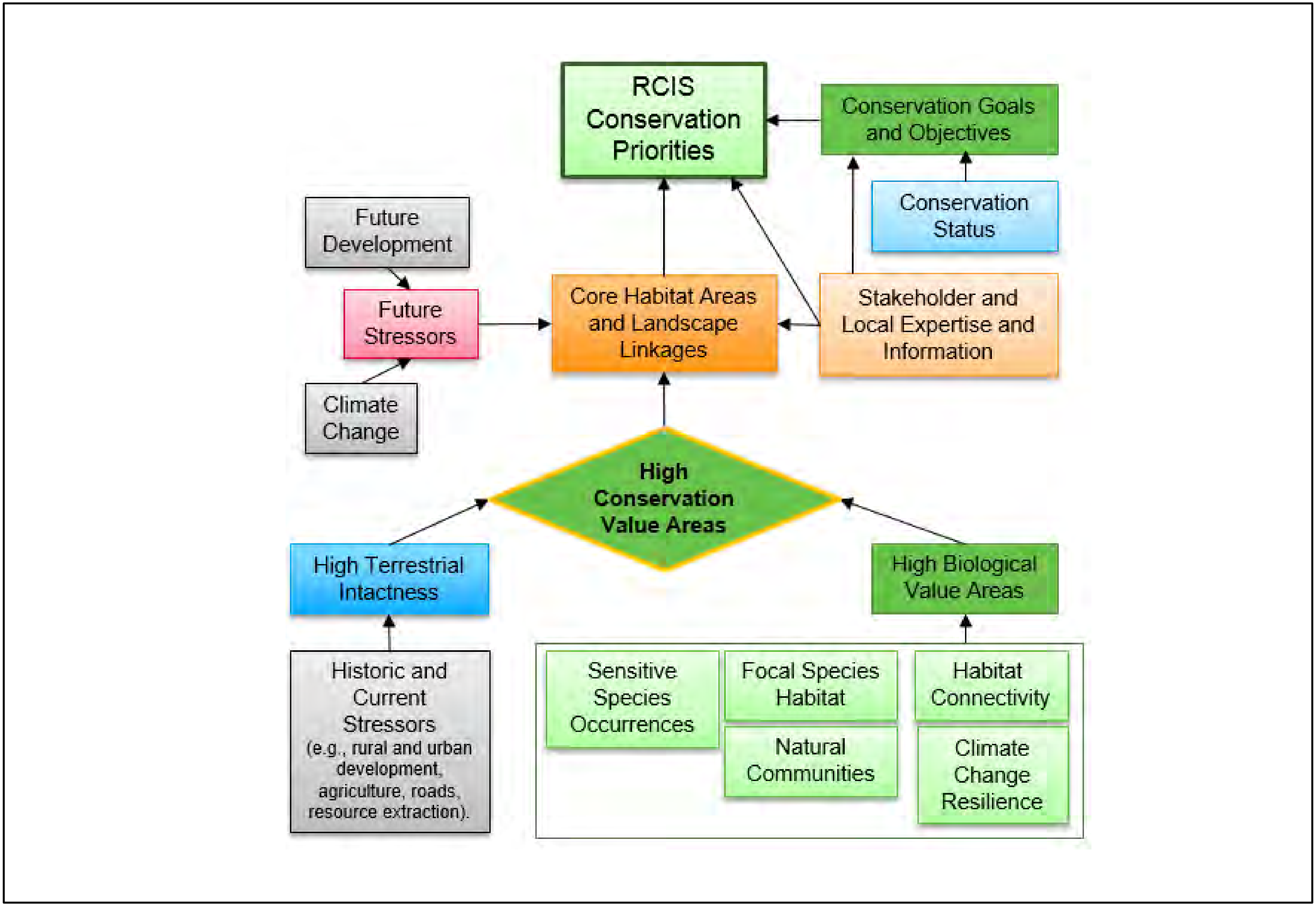


**Figure 3-1**
**Flowchart Depicting Process by Which Conservation Priorities are Identified**

## 3.2.1 Mapping Biological Value

Biological value mapping was based on four inputs: *focal species habitat groups*, *natural communities of conservation importance*, *habitat connectivity and climate change*, and *sensitive species occurrences*. Each of these components is discussed below. Modeling of *climate change resilience* was integrated into the habitat connectivity modeling (Section 3.2.1.3, *Habitat Connectivity and Climate Change*).

The map-based Environmental Evaluation Modeling System (EEMS) (Sheehan 2016) was used to generate the biological value model results. EEMS allows for the logical assembly and integration of key spatial data layers in a clear and transparent modeling interface. The biological value model was developed interactively with stakeholder involvement; input from stakeholders and local experts could be dynamically changed, resulting in a transparent and iterative modeling process (Appendix F, *Focal Species Habitat Models*, and Appendix G, *Modeling Methodology*).

The biological value modeling with EEMS addressed the following question:

> *Where are the areas of higher biological value in Antelope Valley for each of three focal species habitat groupings, agriculture/grassland species, desert species, and foothill/riparian species?*

Appendix F, *Focal Species Habitat Models*, presents details on data sources, data thresholds, and logic operators for this and the other two parallel biological value models for agriculture/grassland species and foothill/riparian species.

### 3.2.1.1 Focal Species Habitat Groups

The focal species habitat groups are the first of four inputs to the biological value model. Each of the three focal species habitat groups contains species that have similar habitat affinities and distributions in the RCIS area. Focal species were associated with habitat groups for the following reason: If all species were analyzed together in the EEMS model, rather than in habitat groups, one large set of similar species (e.g., agriculture/grassland species) could disproportionately swamp the effects of smaller sets of similar species (e.g., foothill/riparian species), thereby biasing the biological value mapping. However, grouping focal species by habitat still allowed the EEMS model to identify areas of overlapping high-quality habitat for multiple focal species as one measure of high biological value. Although most species occur primarily in one species group, three species (LeConte's thrasher, American badger, and desert kit fox) occur in two groups (Table 3-2).

The distributions of focal species were combined in each habitat group to create a "species stack" or composite overlap for each habitat group, which provides a count of how many focal species in the species group are likely to occur in a given area. Each "species stack" was used as input for a separate biological value model (one for each species group). Figure 3-2 through Figure 3-4 show the distribution and overlap of the species in each of these focal species habitat groups.

The analysis of areas of high conservation values was conducted separately for each of the three species groups, ensuring that the resulting conservation value data layers for each group accurately represent the distribution of conservation values for that group only.

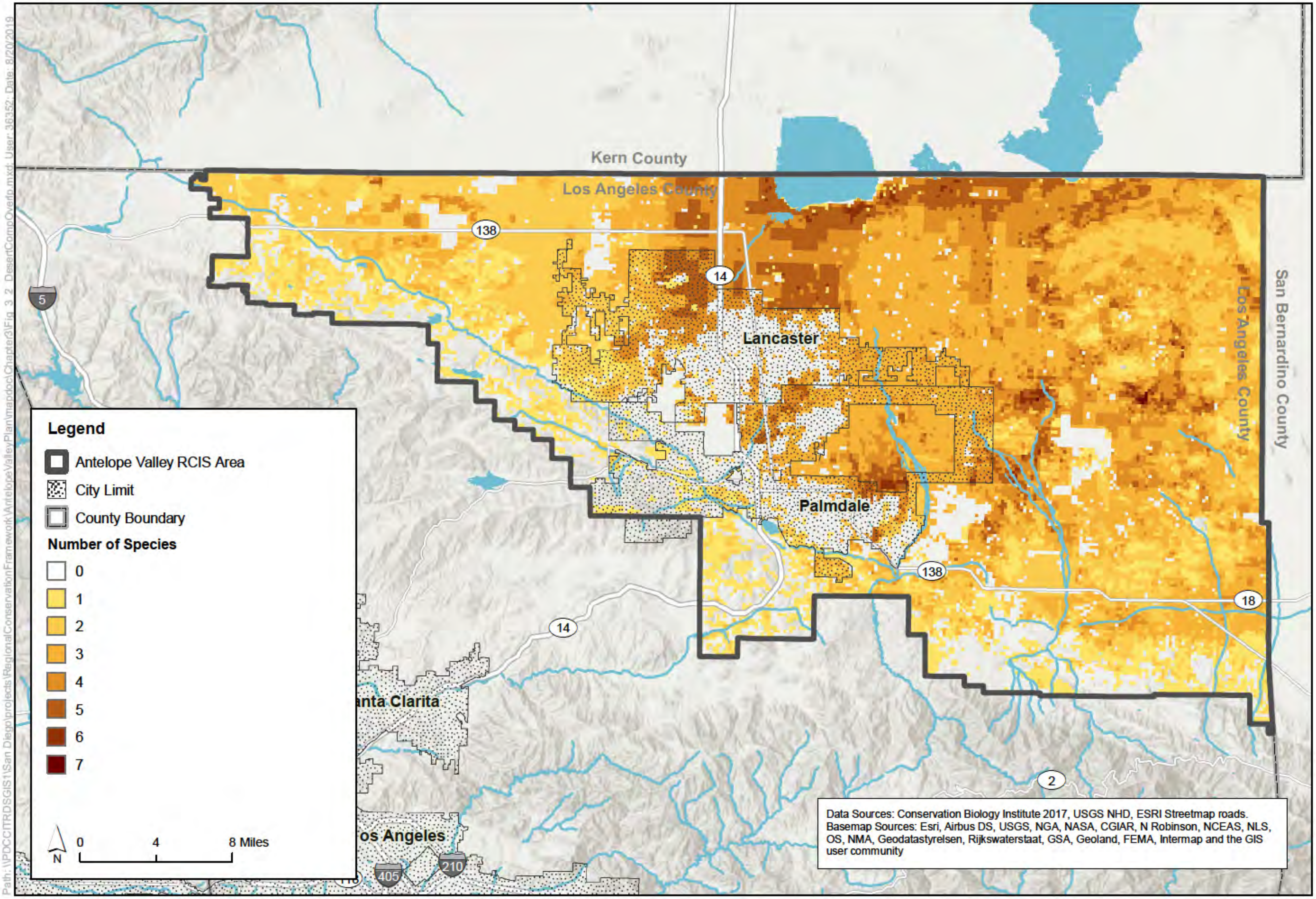


**Figure 3-2**
**Desert Species Group Composite Overlap of Distribution Models in the Antelope Valley RCIS Area**

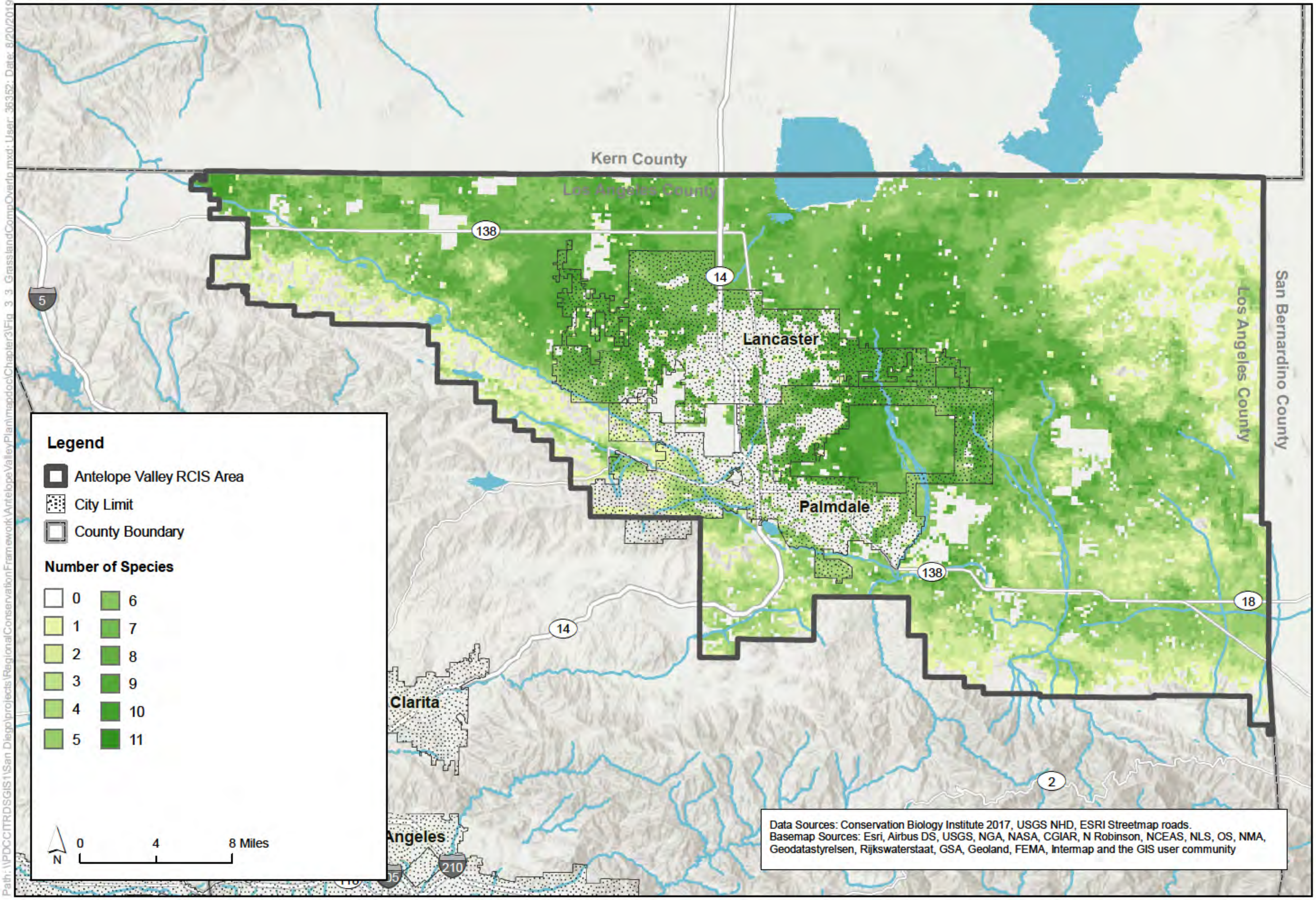


**Figure 3-3**
**Agriculture/Grassland Species Group Composite Overlap of Distribution Models in the Antelope Valley RCIS Area**

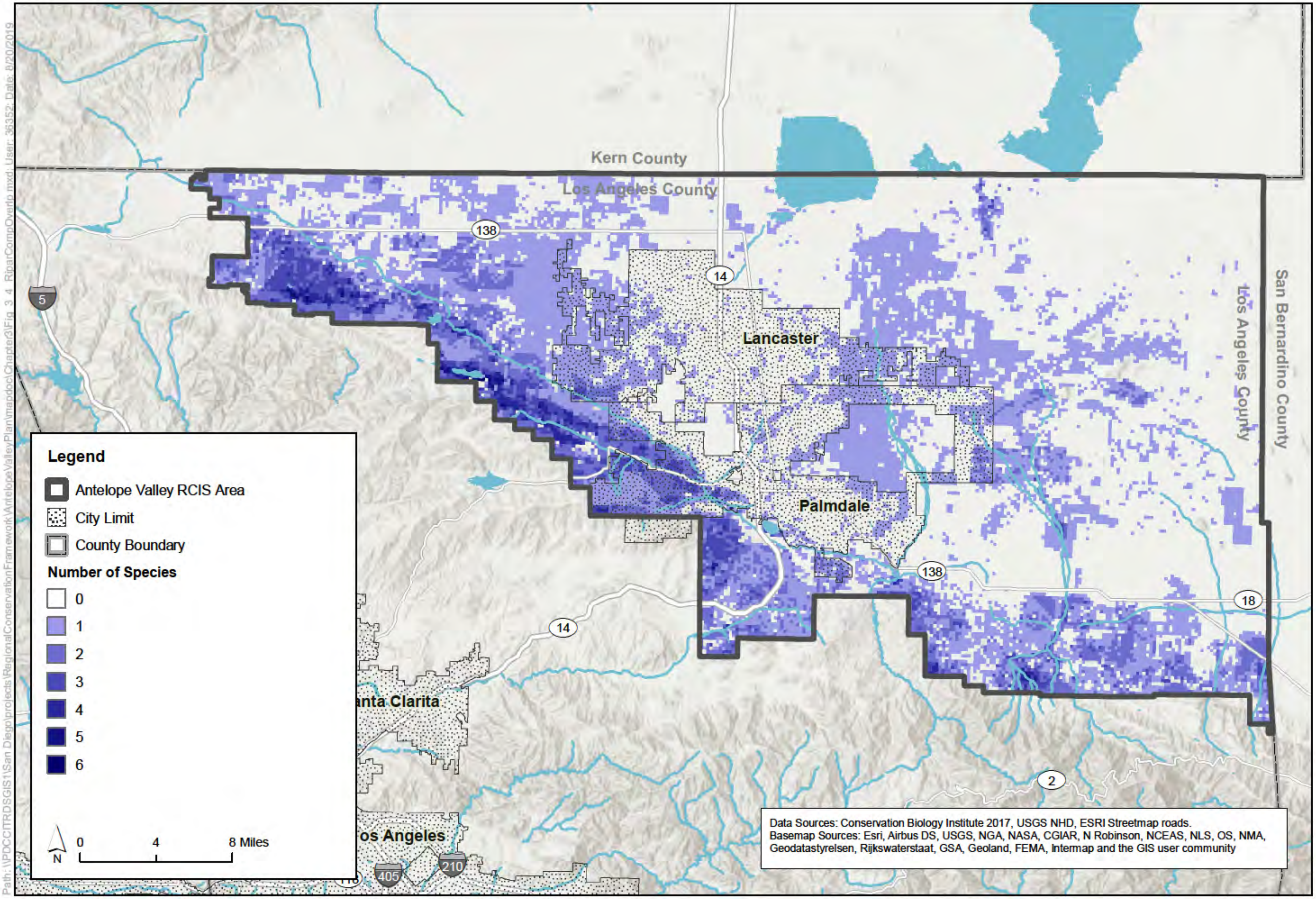


**Figure 3-4**
**Foothill/Riparian Species Group Composite Overlap of Distribution Models in the Antelope Valley RCIS Area**

**Table 3-2. Focal Species Assignments in Species Habitat Groups**

| | Species Grouping | | |
|---|---|---|---|
| **Focal Species** | **Desert** | **Agriculture/Grasslands** | **Foothills/Riparian** |
| **Plants** | | | |
| Alkali mariposa-lily | X | | |
| California juniper | | | X |
| Joshua tree | X | X | |
| Short-jointed beavertail cactus | | | X |
| **Reptiles** | | | |
| Coast horned lizard | | | X |
| Desert horned lizard | X | | |
| Desert tortoise | X | | |
| **Birds** | | | |
| Burrowing owl | | X | |
| California condor | | | X |
| Golden eagle | X | | X |
| LeConte's thrasher | X | X | |
| Least Bell's vireo | | | X |
| Loggerhead shrike | | X | |
| Long-billed curlew | | X | |
| Mountain plover | | X | |
| Northern harrier | | X | |
| Prairie falcon | | X | |
| Swainson's hawk | | X | |
| Tricolored blackbird | | X | |
| Willow flycatcher | | | X |
| **Mammals** | | | |
| American badger | X | X | |
| Desert kit fox | X | X | |
| Mohave ground squirrel | X | | |
| Mountain lion | | | X |
| Tehachapi pocket mouse | | | X |

Note: Because of lack of adequate occurrence data, spreading navarretia and western pond turtle species distribution models were not developed. Therefore, these species are not included in this table.

### 3.2.1.2 Natural Communities of Conservation Importance

Natural community conservation importance is the second input to the biological value model. Natural communities, besides focal species, are one of the other important conservation elements addressed by this Antelope Valley RCIS. Natural communities are associated with the *Division* level in the National Vegetation Classification System (NVCS) hierarchy, the broadest level of mapping of the natural landscape in this RCIS. Although some natural communities as a whole may not be at risk, some subcommunity types may be rarer or imperiled. Therefore, natural community conservation importance is based on these subcommunity types, including, in descending order, the

NVCS *Macrogroup* level (land cover type), the NVCS *Group* level, and, at the finest scale, the NVCS *Alliance* level.

To identify those natural communities that are of highest conservation importance, inclusive of all subcommunities described above, we looked at the overall sensitivity of the communities, based on the California State Rank; the distribution and abundance in the RCIS area and the surrounding ecoregion for regional context; and the current level of protection (Table 3-3). The analysis used the composite vegetation dataset assembled for this RCIS and the Antelope Valley RCIS protected-areas database, described in Section 2.2.4. *Protected Areas*. Complete summary tables pertaining to the gap analysis results for natural communities can be found in Appendix H, *Species Conservation Value Maps and Graphs*.

**Table 3-3. Natural Community (Alliances and Macrogroups) Status and Existing Level of Protection Used for Assigning Emphasis Levels**

| Natural Community and Status | Existing Level of Protection |
|---|---|
| Critically imperiled (S1, highest priority) – Only one community (below), occupying 618 acres | |
| North American warm desert dunes and sand flats (Alliance = *Achnatherum hymenoides*, Indian ricegrass) | 50% |
| Imperiled communities (S2, highest priority) – Eight S2 alliances, occupying 10,797 acres. The following imperiled communities occur almost entirely in areas with a Gap Analysis Project (GAP) status of Unassigned Public Lands: *Atriplex parryi, Isocoma acradenia, Sporobolus airoides.* | |
| *Fremontodendron californicum, Ribes quercetorum, Achnatherum speciosum, Atriplex parryi, Isocoma acradenia, Sporobolus airoides* | 0% |
| *Forestiera pubescens* | 3.5% |
| *Pleuraphis rigida* | 100% |
| Vulnerable communities (S3, very high priority) – Twenty-four S3 alliances, occupying 28,503 acres. More than 80% of the following communities occurred in areas with a GAP status of Unassigned Public Lands: *Allenrolfea occidentalis, Frankenia salina,* and *Prosopis glandulosa*. | |
| *Encelia (actoni, virginesis), Ephedra californica, Eriogonum wrightii, Frankenia salina, Prunus ilicifolia, Purshia tridentate, Sambucus nigra* | 0% |
| *Aesculus californica, Gutierrezia sarothrae, Nassella cernua* | 100% |
| *Allenrolfea occidentalis* | 4.9% |
| *Artemisia tridentata spp. Parishii* | 0.4% |
| *Ericameria linearifolia* | 57.5% |
| *Ericameria paniculata* | 90% |
| *Krascheninnikovia lanata* | 68.9% |
| *Lepidospartum squamatum* | 17.7% |
| *Lycium cooperi* | 18.2% |
| *Platanus racemosa* | 5.5% |
| *Populus fremontii* | 12.1% |
| *Prosopis glandulosa* | 0.6% |
| *Prunus fasciculata* | 0.1% |
| *Pseudotsuga macrocarpa* | 5.8% |
| *Quercus lobata, Salix laevigata* | 4.3% |

| Natural Community and Status | Existing Level of Protection |
|---|---|
| Locally rare communities (high priority) – Seven alliances or macrogroups in the RCIS area were identified as potentially locally rare, occupying 134,481 acres. More than 70% of the following two communities occur in areas with a GAP status of Unassigned Public Lands: *Sporobolus airoides,* and *Atriplex hymenelytra*. | |
| *Atriplex hymenelytra* | 25.8% |
| California annual and perennial Grassland | 9.3% |
| California annual herb/grass | 32.6% |
| *Coleogyne ramosissima* | 91.6% |
| *Ephedra nevadensis* | 0.2% |
| *Eschscholzia (californica)* | 11.3% |
| *Lasthenia californica–Plantago erecta—Vulpia microstachys* | 40.3% |
| Special interest communities (moderate priority) – Ten communities, occupying 87,237 acres. More than 70% of the following communities occur in areas with a GAP status of Unassigned Public Lands: North American warm desert alkaline scrub, herb playa, and wet flat; North American warm desert dunes and sand flats; southwestern North American alkali marsh/seep vegetation; and southwestern North American salt basin and high marsh. | |
| Arid West freshwater emergent marsh, western North American temperate grassland and meadow, southwestern North American alkali marsh/seep vegetation, southwestern North American salt basin and high marsh. | 0% |
| Californian mixed annual/perennial freshwater vernal pool/swale bottomland | 23.4% |
| North American warm desert alkaline scrub, herb playa, and wet flat | 7.6% |
| North American warm desert dunes and sand flats | 1% |
| Southwestern North American riparian, flooded, and swamp forest | 7.6% |
| Southwestern North American riparian/wash scrub | 26.8% |
| Western cordilleran montane-boreal wet meadow | 10.2% |

We then applied a conservation importance ranking to determine the level of emphasis (i.e., degree of conservation need) for each natural community and how strongly each community should be weighted with respect to influencing the resulting map of biological value (Table 3-4). To ensure that the conservation importance for each community was not artificially skewed by the RCIS area boundary and understand the regional context, we conducted this analysis within the entire ecoregion and then applied the results to the RCIS area.

**Table 3-4. Natural Community Categories and Assigned Emphasis Level in Conservation Importance**

| Category | Emphasis Level (Rank Order Model Codes) | | | | | |
|---|---|---|---|---|---|---|
| Critically Imperiled (S1) | Highest (12) | | | | | |
| Joshua tree woodland (*Yucca brevifolia*)[1] | Highest (12) | | | | | |
| Imperiled (S2) Communities | Highest (11) | | | | | |
| Vulnerable (S3) Communities (< 50% protected) | | Very High (10) | | | | |
| Vulnerable (S3) Communities (> 50% protected) | | Very High (9) | | | | |
| California juniper woodland (*Juniperus californica*)[2] (status = S4, locally rare) | | | High (8) | | | |
| Locally Rare (< 50% protected) | | | High (8) | | | |
| Locally Rare (> 50% protected) | | | High (7) | | | |
| Special Interest Communities (< 50% protected) | | | | Moderate (6) | | |
| Special Interest Communities (> 50% protected) | | | | Moderate (5) | | |
| All remaining natural communities (< 50% protected) | | | | Moderate (4) | | |
| All remaining natural communities ( > 50% protected) | | | | | Low (3) | |
| Agriculture | | | | | Low (2) | |
| Developed and Disturbed Areas | | | | | | Very Low (1) |

[1] Joshua tree woodlands is a special interest community that was elevated to the highest emphasis level because of local conservation concern as well as major threats over 90% of its range, especially with respect to the potential effects of climate change.

[2] California juniper woodland is classified separately because it is a special interest community as well as a locally rare (S4) community.

Vulnerable communities that were not well protected (i.e., less than 50 percent in designated protected areas of GAP 1 and GAP 2 lands, including conservation easements) received a very high emphasis level and score of 10. Vulnerable (S3) communities that were found to be better protected in existing designated conservation lands (i.e., more than 50 percent) received a very high emphasis level and score of 9 in this component of the model for mapping areas with high conservation values. Local rarity designations were assigned using land cover data from the Desert Renewable Energy Conservation Plan (DRECP) Draft Environmental Impact Report/Environmental Impact Statement (California Energy Commission et al. 2014). All communities with a DRECP designation of locally rare were conservatively labeled with the same designation in the updated Antelope Valley RCIS vegetation dataset. This inclusive approach ensured that updated mapped areas of vegetation with the potential to be locally rare were not excluded from the classification. Communities identified as locally rare and not well represented in existing designated protected lands (i.e., less than 50 percent) received a high emphasis level and score of 8 in the model. Locally rare communities that were better protected (i.e., more than 50 percent) received a high emphasis level and score of 7.

Artificial impoundments were included in some wetland classes because of their importance from a conservation perspective in this region. Special interest communities at the *moderate* level were scored at 6. Natural communities in the region that were less than 50 percent protected shared this *moderate* emphasis level with a score of 4. All remaining natural communities that were more than 50 percent protected in the region as well as agricultural lands, which provide potential habitat for some focal species, received a *low* emphasis level in the model, with scores of 3 and 2, respectively. Agricultural areas that provide habitat for focal species were emphasized in the species component of the logic model. To maintain complete coverage of the study site for modeling purposes, developed and disturbed areas received a *very low* emphasis level with a score of 1.

Results from the ranking of the conservation importance of natural communities are presented in Figure 3-5. The numeric representation of the data served as the input for the "natural communities of conservation importance" component of the biological values model.

#### 3.2.1.3 Habitat Connectivity and Climate Change

Habitat connectivity is the third input to the biological value model and a particularly important consideration in identifying areas of high conservation value. Habitat connectivity allows species to access all components of their habitat to reach resources for their life history requirements (e.g., foraging, breeding, dispersal). Habitat connections are easily compromised by human impacts such as urban development, the alteration of habitat through various land use practices, and human-made linear features such as roads, rail lines, and aqueducts. Geographic isolation that results from fragmented landscapes can compromise native species populations, even culminating in local extirpations or species extinctions.

Species populations that are faced with changing climatic conditions can either adjust to the changes by using local refugia where environmental conditions are stable and resilient with respect to the effects of climate change (Figure 3-6) or seeking out new environments with conditions that are similar to those to which they have adapted. Climate change has the potential to trigger significant range shifts for species. These shifts may be possible when suitable habitats are available and individuals have the ability to move to these suitable habitat areas (i.e., habitat connectivity). Therefore, habitat connectivity to local refugia with higher stability and resilience to the effects of climate change and environments with similar habitat conditions across a landscape is an important consideration when identifying areas for conservation (Figure 3-7). However, a highly disturbed and fragmented landscape makes these necessary movements difficult or even impossible. Furthermore, current highly suitable landscape linkages can be compromised by a changing climate, rendering them less suitable for certain species. The habitat connectivity modeling conducted for this Antelope Valley RCIS included important climate change modeling components to enhance the identification of viable landscape linkages and wildlife movement corridors under future forecast climate conditions for the RCIS area (Figure 3-8).

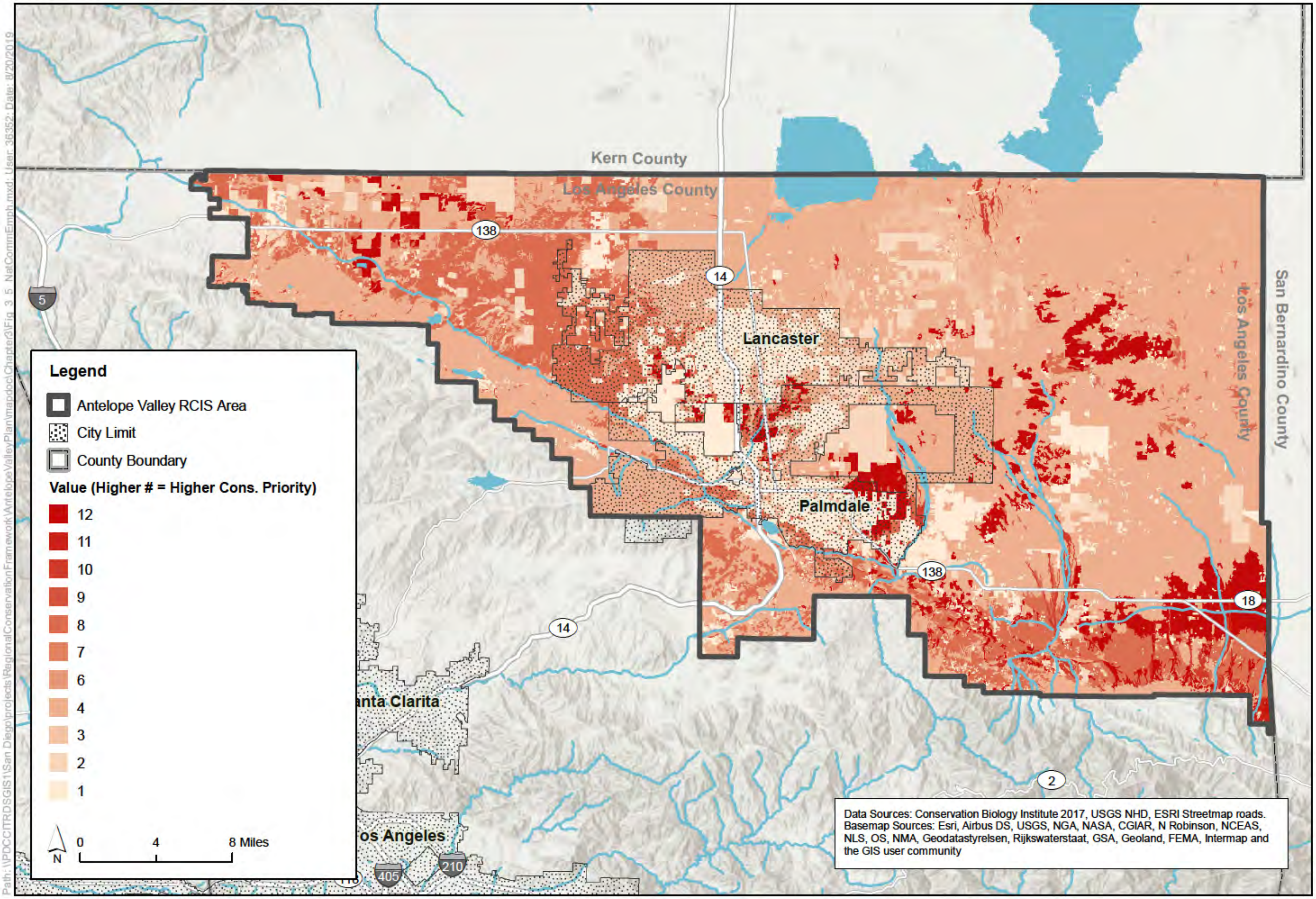


**Figure 3-5**
**Natural Communities Emphasis Levels in the Antelope Valley RCIS Area**

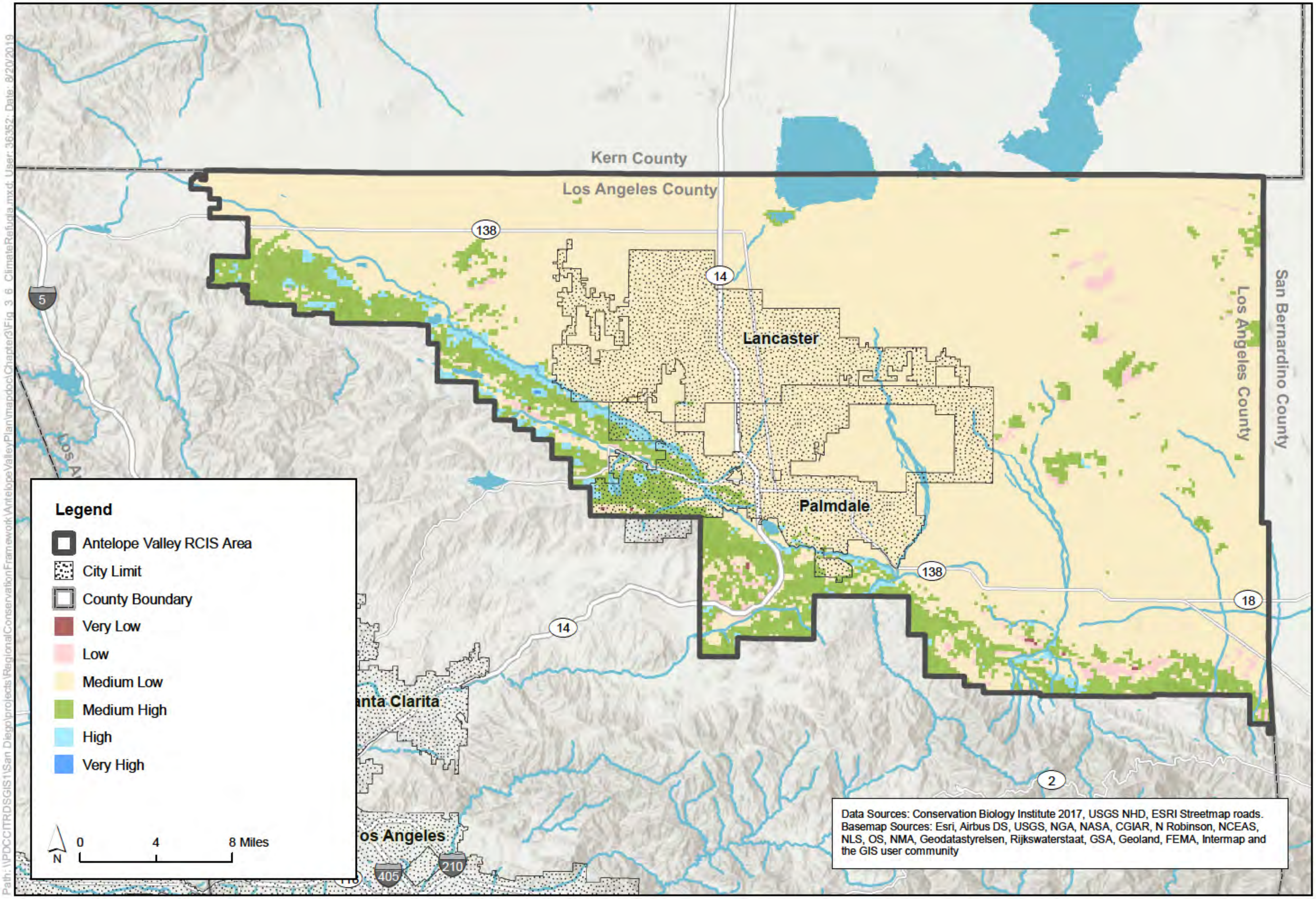


**Figure 3-6**
**Climate Physical Refugia in the Antelope Valley RCIS Area**

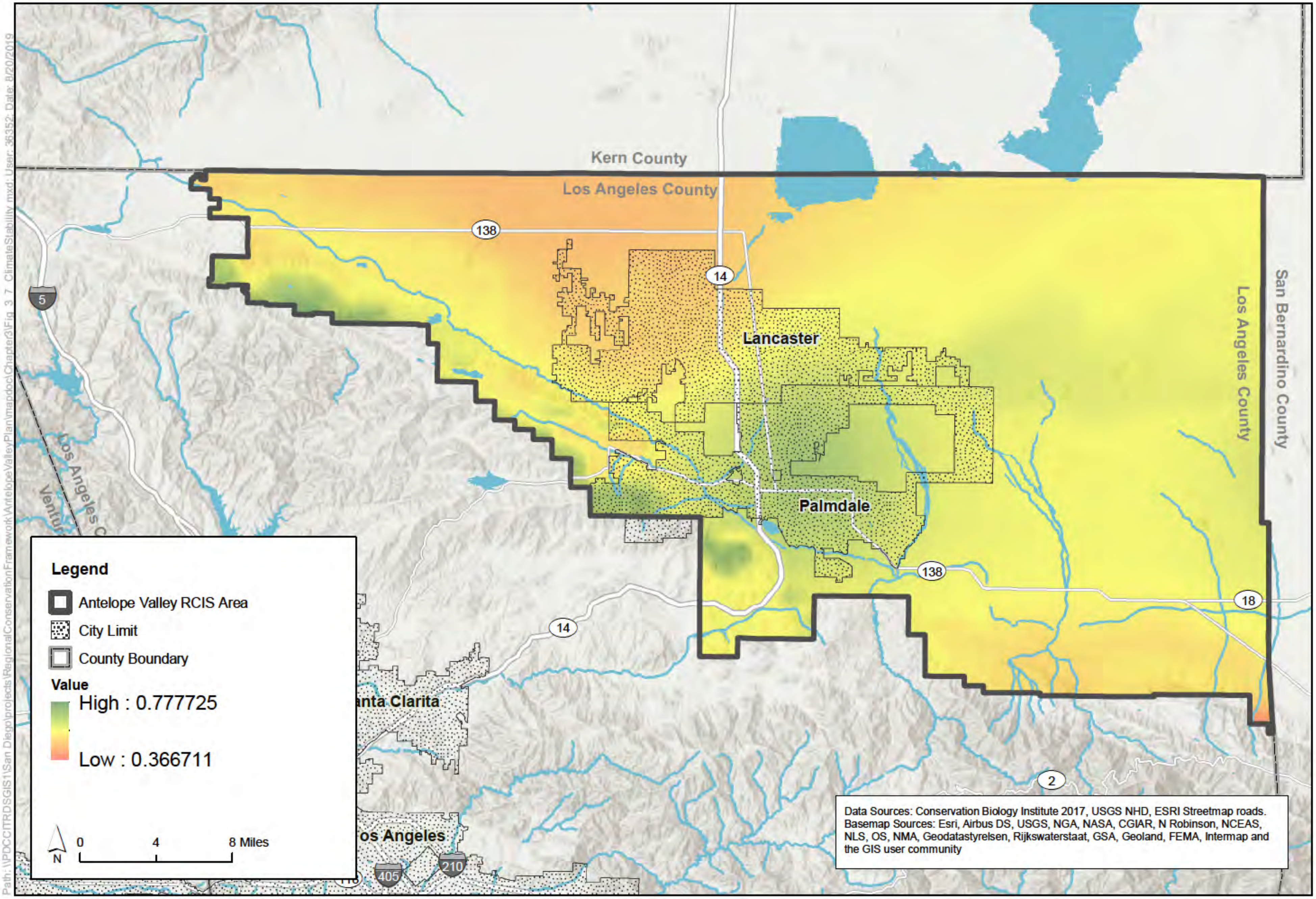


**Figure 3-7**
**Climate Stability in the Antelope Valley RCIS Area**

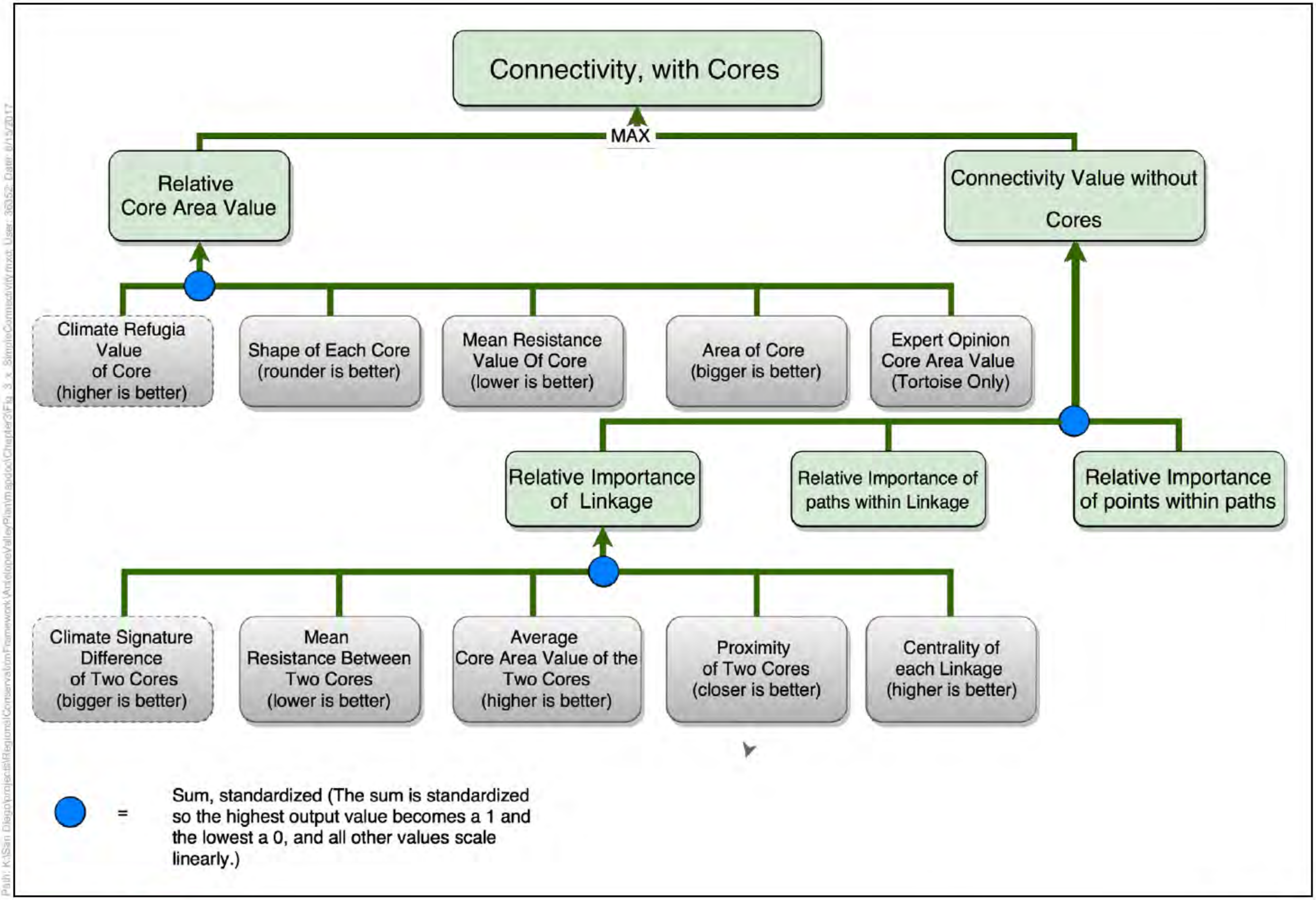


**Figure 3-8**
**Habitat Connectivity Model Flow Diagram**

A full description of the climate change modeling and integration with habitat connectivity mapping is provided in Appendix G, *Modeling Methodology.* Habitat connectivity was evaluated using a combination of modeling software packages, including Linkage Mapper, Circuitscape, and a hybridized graph theory add-on at 270-meter resolution (Appendix G, *Modeling Methodology*). These tools produce a number of important outputs that illustrate the least restrictive path (or least-cost corridor) between defined natural habitat blocks (or core areas), the relative importance of the core areas (larger, blockier core areas are more desirable than smaller, irregularly shaped areas), and the relative importance of the modeled corridors. They also identify and rank pinch points within the modeled corridors. Pinch points are narrow constrictions within a modeled corridor that are sources of corridor vulnerability. If a pinch point is compromised, an entire corridor could be rendered ineffective.

For the purposes of including habitat connectivity in the biological values model, two different types of habitat connectivity model runs were performed, one from the perspective of a large species (e.g., mountain lions), which tend to show greater tolerance to habitat fragmentation, and another from the perspective of smaller species, which could show greater sensitivity to habitat fragmentation. Modeling in both cases required close attention to three main features:

- How core areas (or natural habitat blocks) are defined,
- How the relative permeability of the landscape is defined through the creation of different resistance surfaces, and
- How projected future climate conditions affect the viability of the core areas with respect to supporting wildlife movement.

The results of the habitat connectivity modeling are shown in Figure 3-9 for large species and Figure 3-10 for small species. The connectivity analysis results were also used to delineate the landscape linkages, as described in Section 3.2.2, *Mapping Terrestrial Landscape Intactness*.

#### 3.2.1.4 Sensitive Species Occurrences

Sensitive species occurrences is the fourth input to the biological value model. It incorporates known concentrations of rare and endangered species. The data do not represent a comprehensive survey of the entire study area, but they do identify important locations where sensitive species have been found.

The California Native Diversity Database (2017) provided the core data (i.e., occurrences mapped as polygons that delineate specific occupied areas and polygons that indicate mapping accuracy). The data were augmented by point data from the U.S. Fish and Wildlife Service (2017), eBird (2016), and HerpMapper (2016). Data were weighted for each species in the biological values model, based on the California State Status ranking.

| California State Rank | Biological Values Model Weighting Score |
|---|---|
| *State Rank S1 (Critically Imperiled)*—Critically imperiled in the state because of extreme rarity (often five or fewer populations) or very steep declines, making it especially vulnerable to extirpation. | Score 1.0 |
| *State Rank S2 (Imperiled)*—Imperiled in the state because of rarity, along with a very restricted range, very few populations (often 20 or fewer), steep declines, or other factors that make it very vulnerable to extirpation. | Score 0.75 |

| California State Rank | Biological Values Model Weighting Score |
|---|---|
| *State Rank S3 (Vulnerable)*—Vulnerable in the state because of a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors that make it vulnerable to extirpation. | Score 0.50 |
| *State Rank S4 (Apparently Secure)*—Uncommon but not rare in the state; some cause for long-term concern because of declines or other factors. | Score 0.25 |

### 3.2.1.5 Biological Value Model Results

In summary, a biological value model was created for each of the three species groups (desert, agriculture/grassland, and foothill/riparian). Each model depicts a relative biological value for each group of species from the four main components of the biological values model: focal species habitat (modeled habitat distributions), natural communities, habitat connectivity (inclusive of climate change modeling), and sensitive species occurrences. The results for each group are summarized below.

**Desert Species.** The biological value model shows a concentration of the higher biological value in a number of clusters (Figure 3-11). *Note: The letters following each place name indicate locations in the figure.* The largest block of high biological value runs along the south side of Edwards Air Force Base (a), followed by a large area north of Lake Los Angeles (b). Other notable blocks occur just north of Lancaster (c), between Lancaster and Palmdale (d), north and east of Palmdale (e), and along State Route 18 near the San Bernardino county line (f).

**Agriculture/Grassland Species.** The biological value model highlighted some of the same areas as the desert model but with considerably broader extents (Figure 3-12). The additional highlighted areas cover portions of the western part of the RCIS area, including the large area northeast of Lancaster (a) and a smaller area in the far-west portion of the RCIS area north of State Route 138 (b). An extensive area is northeast of Lancaster and Palmdale (c), and a smaller area is east of Llano at the intersection of State Routes 138 and 18 (d).

**Foothill/Riparian Species.** The biological value model highlights areas along the San Gabriel Mountains, with four main concentration areas (Figure 3-13). These include the large area in the far-west portion of the RCIS area, south of Neenach (a); the area around Antelope and Fairmont Buttes (b); the area south of Palmdale and north of State Route 14 (c); and the southeast corner of the RCIS area south of State Route 138 (d).

Considered collectively, these three species group results demonstrate how each model identifies locations of biological value, which correlate with the distributions of the species in each group. All of the additional model components—natural communities of conservation importance, sensitive species occurrences, and habitat connectivity and climate change—are consistent among the three models; therefore, the differences are specifically tied to the differences of the habitat distributions among the species groups.

As noted in the introduction to this section, as well as Figure 3-1, areas of highest conservation value are those areas with higher biological value and higher landscape intactness, as discussed in the section that follows.

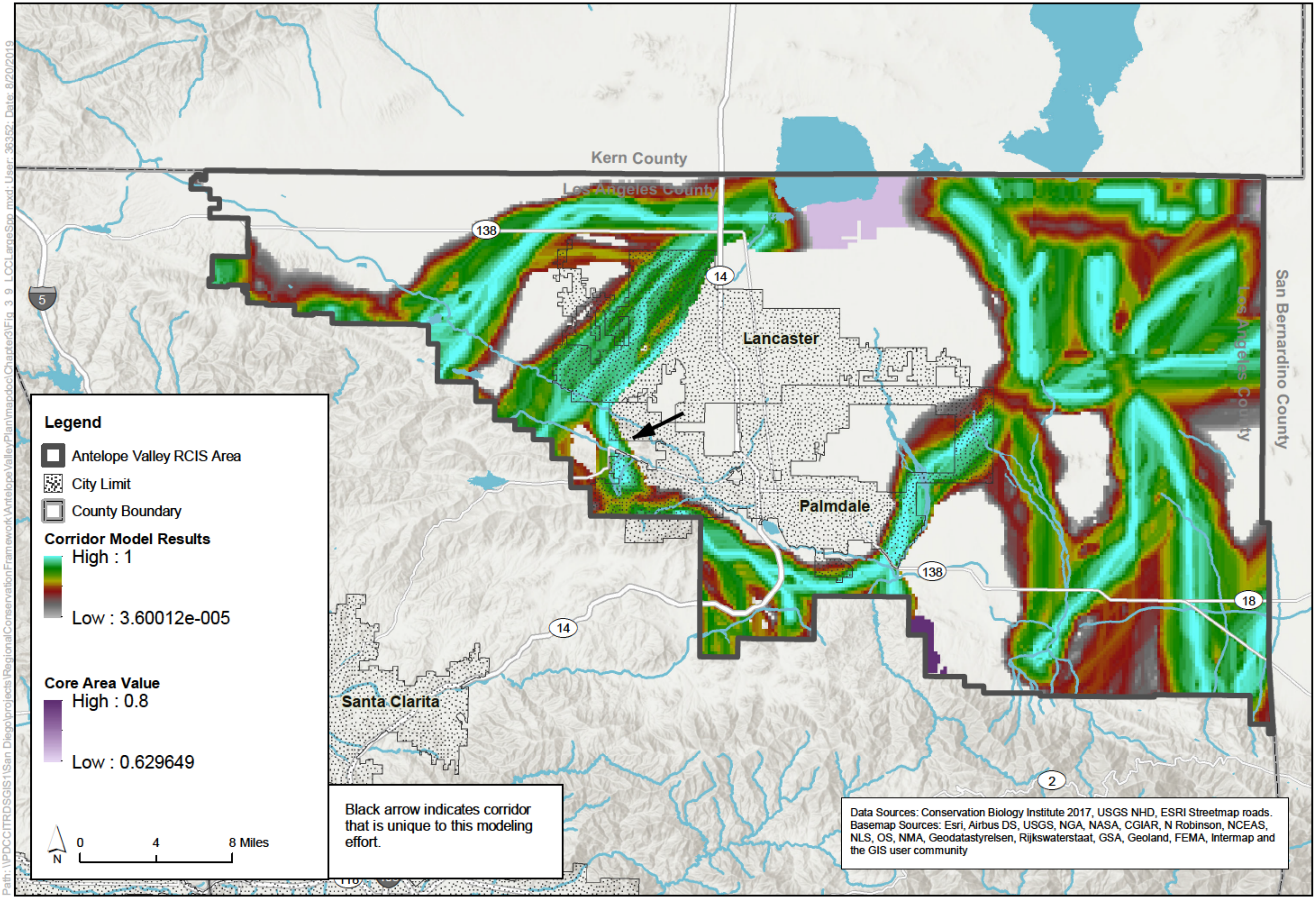


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**Figure 3-9**
**Corridor Model Results for Large Species Connectivity for the Antelope Valley RCIS Area**

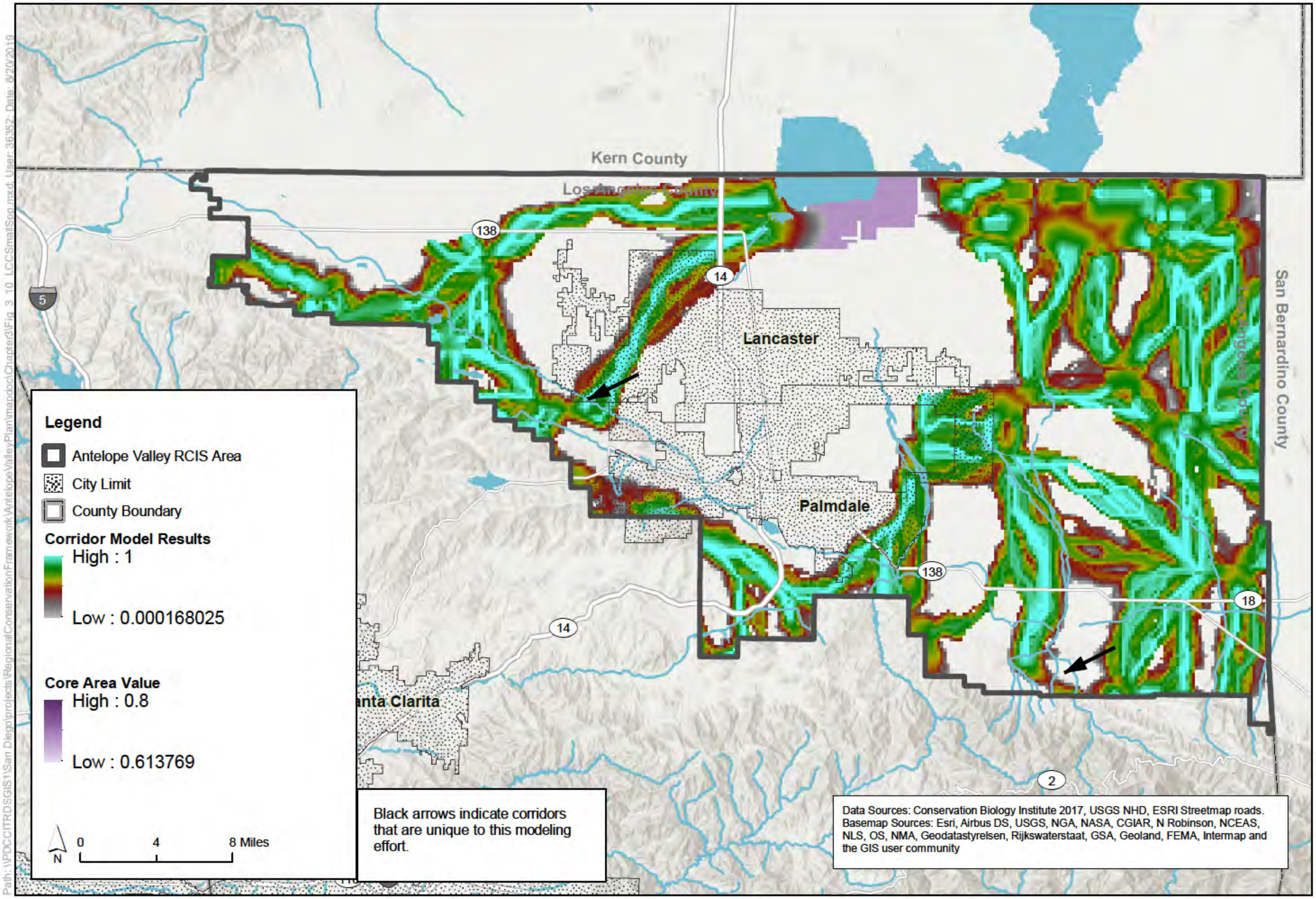


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**Figure 3-10**
**Corridor Model Results for Small Species Connectivity for the Antelope Valley RCIS Area**

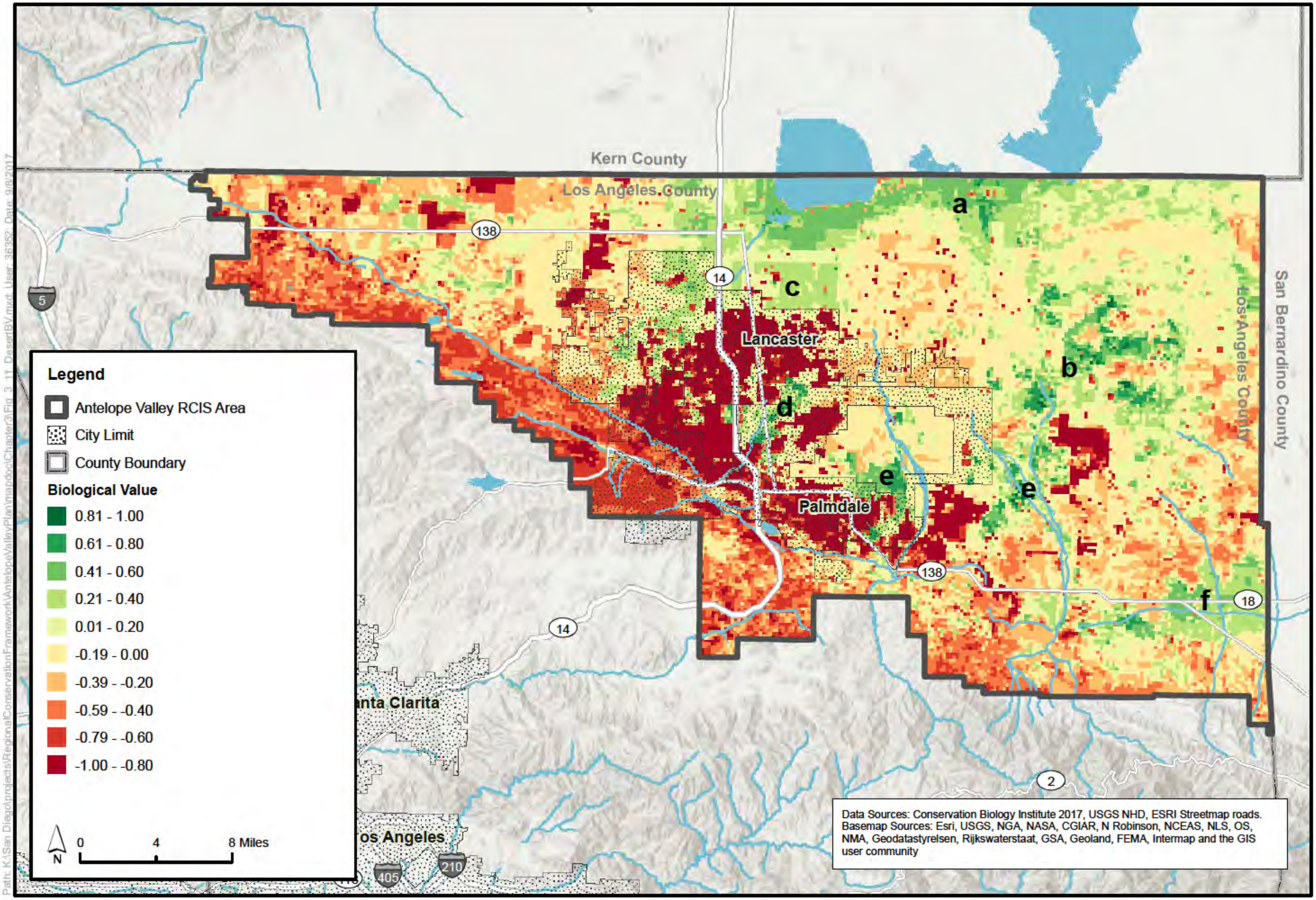


**Figure 3-11**
**Desert Biological Values Model for the Antelope Valley RCIS Area**

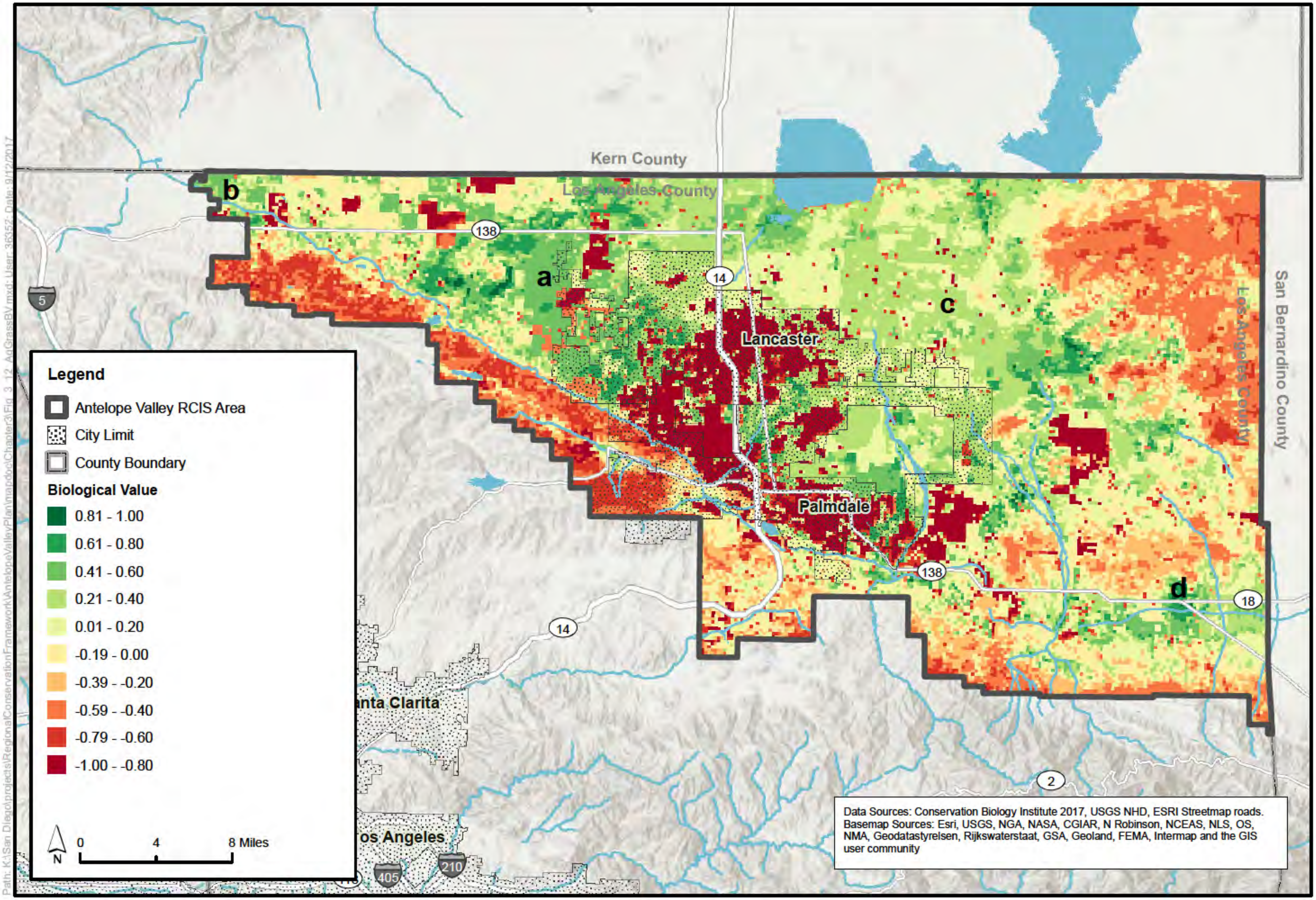


**Figure 3-12**
**Agriculture/Grassland Biological Values Model for the Antelope Valley RCIS Area**

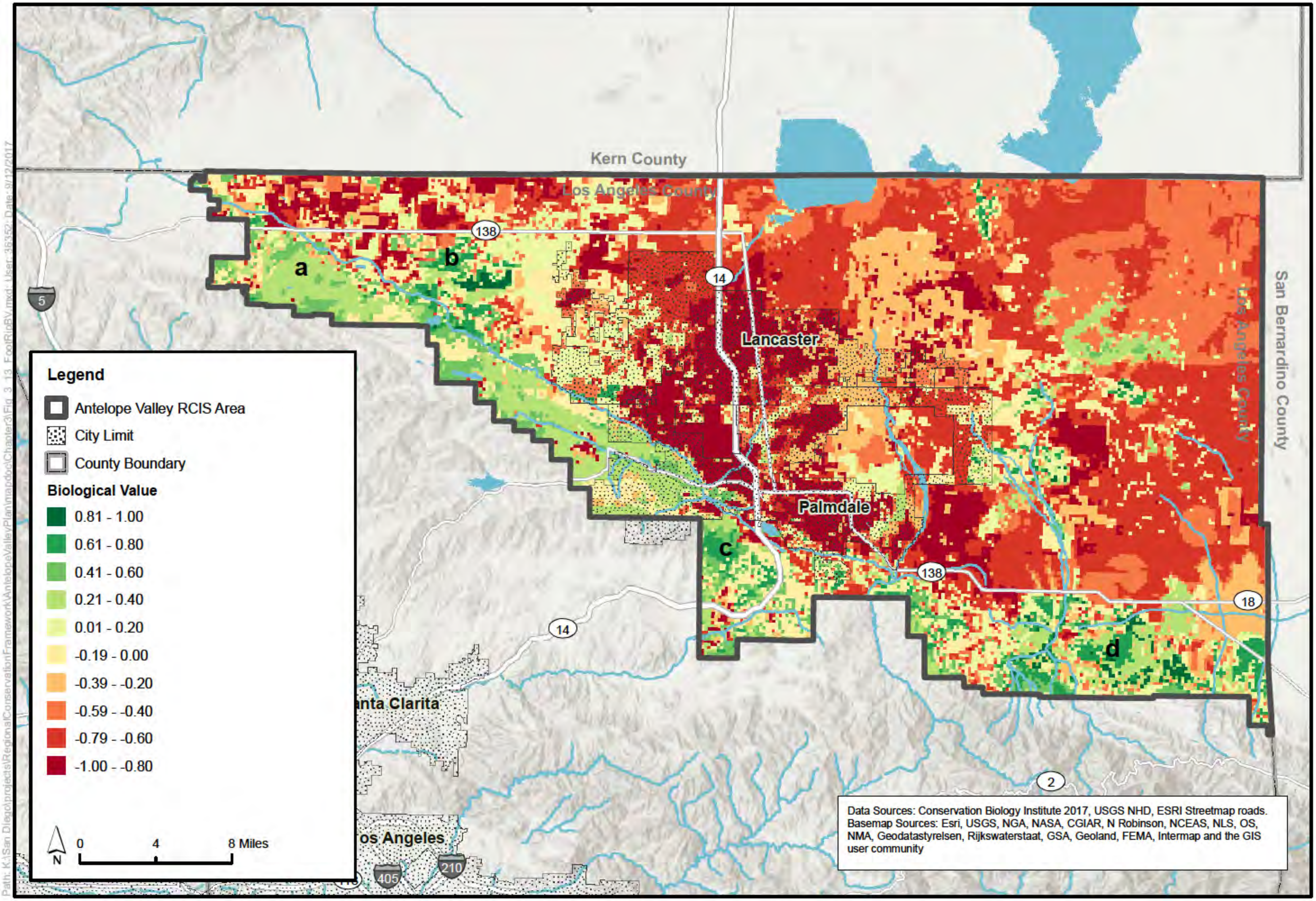


**Figure 3-13**
**Foothill/Riparian Biological Values Model for the Antelope Valley RCIS Area**

## 3.2.2 Mapping Terrestrial Landscape Intactness

One of the primary goals of this Antelope Valley RCIS is to identify areas with high conservation value. Conservation value in the RCIS area is determined by integrating the biological value model described in Section 3.2.1, *Mapping Biological Value*, with the terrestrial intactness model, described in this section.

Intactness is an estimate of naturalness and based on the level of human disturbance in an area, as quantified here through spatial analysis of available GIS data. Terrestrial intactness is high in places where anthropogenic impacts, such as urban development and natural resource extraction, which typically fragment native vegetation, are low. In the past, the term *terrestrial intactness* has been applied primarily to forested landscapes (Lee et al. 2002; Strittholt n.d.; Potapov et al. 2008). It is clear that natural assemblages of species and natural patterns and ecological processes are increasingly compromised as human influences intensify across the natural landscape. A terrestrial intactness model was developed by the California Energy Commission (Degagne et al. 2016) and adapted for use in the Antelope Valley RCIS modeling and analysis. A full description of the modeling process is provided in Appendix G, *Modeling Methodology.*

Like the biological value model, the terrestrial intactness model was constructed in the EEMS framework. The various anthropogenically themed data layers related to land use, development, roads, and landscape fragmentation are integrated through a complex set of modeling interactions, as displayed in Figures 3-14 and 3-15. The model relies solely on these spatial data layers, arranged in a hierarchical fashion to answer a primary question: *What is the level of terrestrial landscape intactness across the RCIS area?* Data and analysis flow from the bottom up in these figures.

A team of local conservation experts and stakeholders (including many Antelope Valley RCIS stakeholders) participated in the parameterization of the model. All data inputs (regardless of the type—ordinal, nominal, or continuous) were assigned relative values between -1 (totally false) and +1 (totally true), using up to six decimal places. For each of the data layers representing potential sources of fragmentation and habitat degradation, the team determined how to assign the range of values along a true/false continuum. For example, when mapping the most suitable habitat from the standpoint of road density for wildlife, a greater road density was determined to have a greater risk to wildlife through habitat degradation and direct mortality. In this example, road density ranges from 0 kilometer per square kilometer (km/km$^2$) to 24.5 km/km$^2$. One could assign a -1 to the high value (this value is totally harmful for wildlife, or false) and a +1 to the lowest value (this value is totally beneficial for wildlife, or true). However, mountain lion research has shown that mountain lion populations have a low probability of persistence in areas with road densities of more than 0.6 km/km$^2$ (Van Dyke et al. 1986). A more meaningful threshold for this parameter would be that a road density of more than 0.6 km/km$^2$ is totally false (-1). Of course, not all wildlife species have the same sensitivity to roads, but this example illustrates how the parameters in the model can be altered for known thresholds.

Once the parameters rating the potential effects of the anthropogenic data layers have been set, the relative effects of each source of fragmentation and habitat degradation are integrated in the terrestrial intactness model to generate the final intactness model results.

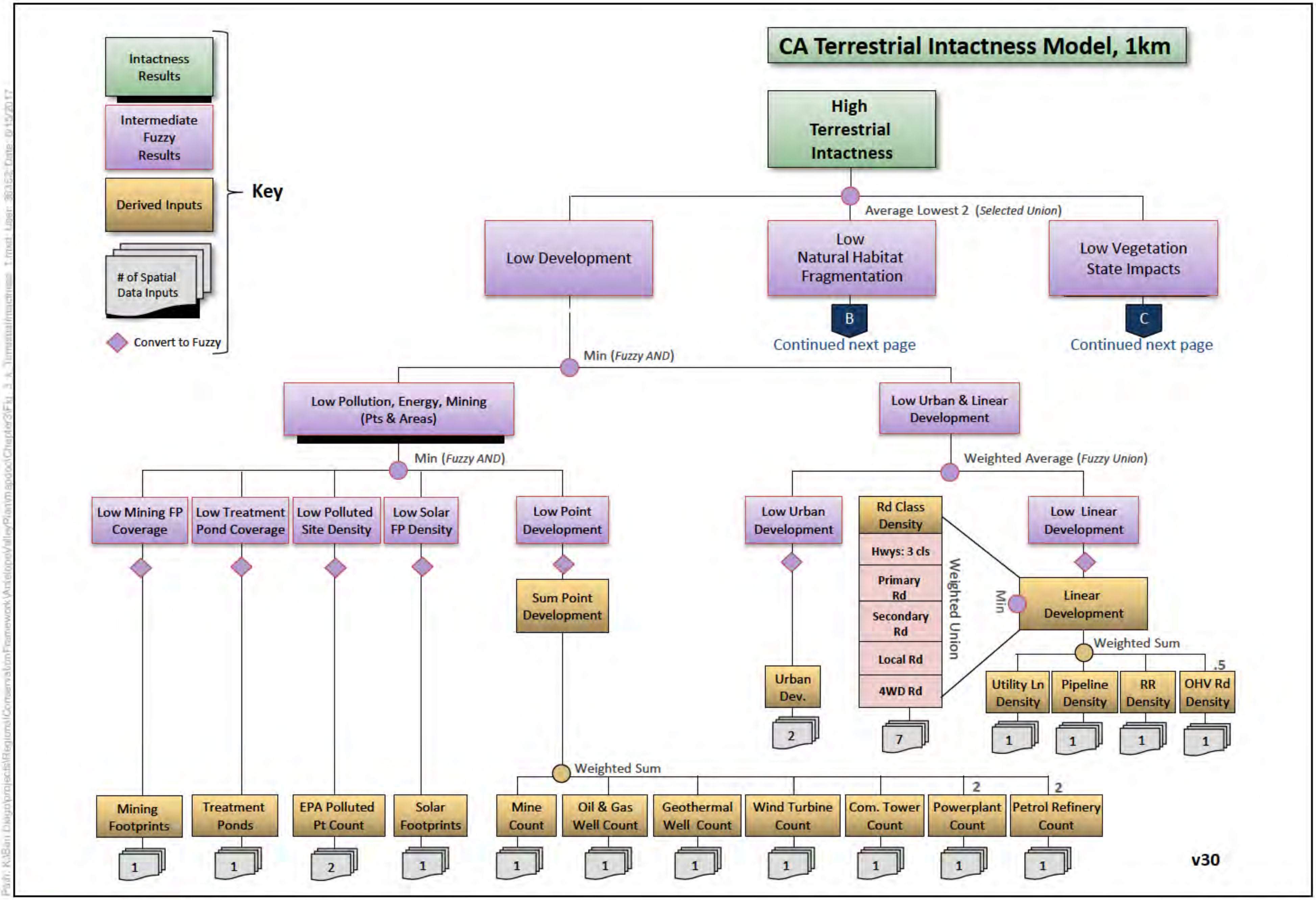


**Figure 3-14**
**Terrestrial Intactness Model Flow Diagram (1 of 2)**

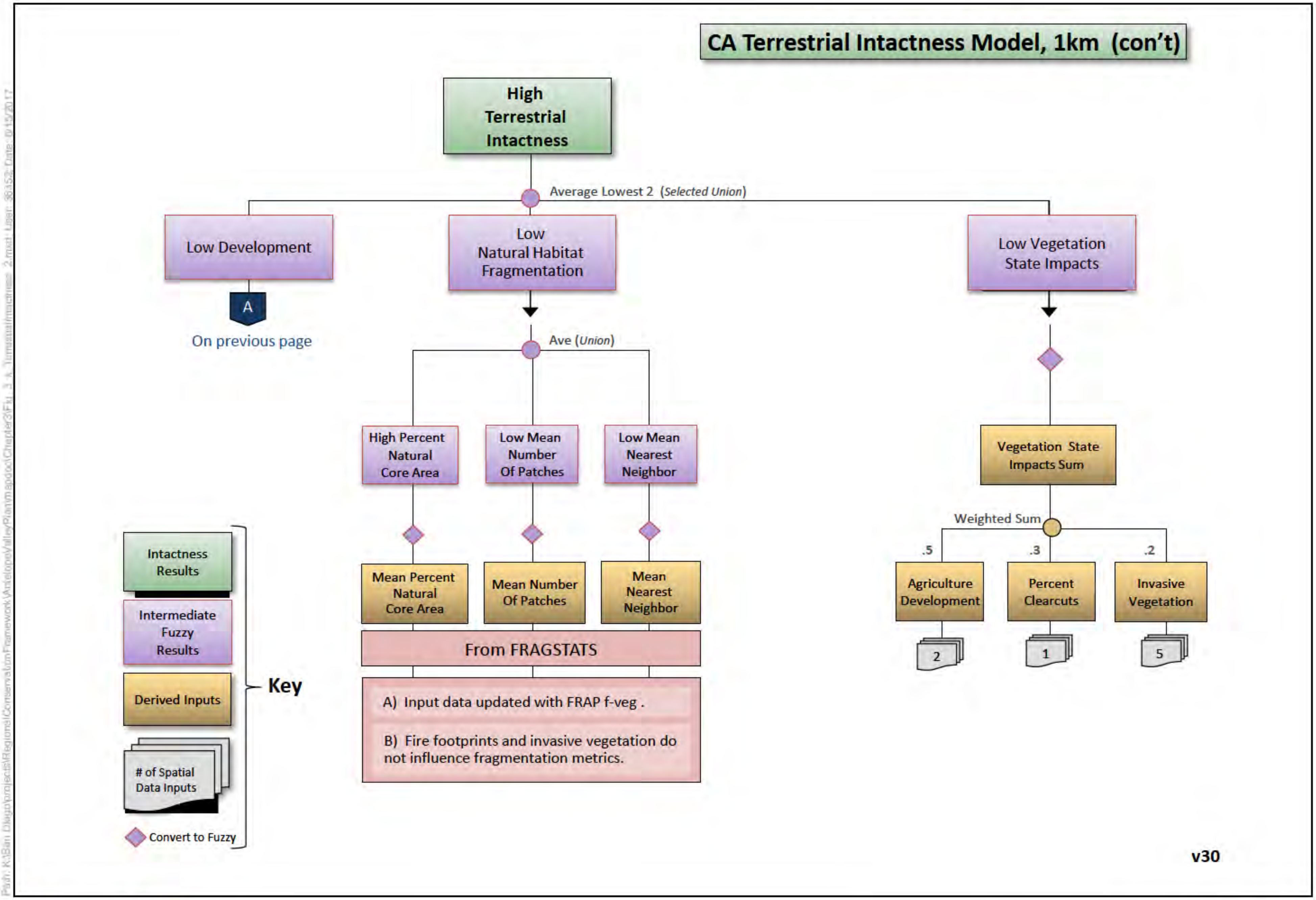


**Figure 3-15**
**Terrestrial Intactness Model Flow Diagram (2 of 2)**

The model results for each 1-square-kilometer cell range from -1.000000 (totally false) to +1.000000 (totally true), which were reclassified to characterize intactness at six levels—very low, low, moderately low, moderately high, high, and very high (Figure 3-16). This way, the degree of intactness can be evaluated against multiple conservation values and easily compared to potential future conditions, based on updated raw inputs (e.g., new urban development projections), using the same scale. The final terrestrial intactness model results are shown in Figure 3-16.

### 3.2.3 Mapping Conservation Value

Areas with higher conservation value are defined as the areas with moderate to high biological value *and* moderate to high landscape intactness (Figure 3-16). Areas of lower conservation value are defined as having low biological value *or* low landscape intactness. Combining the results of each of the three biological value models (one for each species group) with the results of the landscape intactness model results in three outputs of the distribution of conservation value across the RCIS area.

Areas with high conservation value were mapped by classifying the results for each model into three basic categories of high, moderate, and low biological value and high, moderate, and low intactness (based on natural breaks in the data distribution). The combination of the three categories of biological value and the three categories of landscape intactness resulted in nine combination classes. The highest four combinations represent higher conservation value, and the remaining five represent lower conservation value. Note that the modeled biological value and intactness may differ from site-specific evaluations in the field. Therefore, any areas known to have high conservation value should be considered and evaluated during RCIS implementation, regardless of modeled conservation value.

**Desert species.** Table 3-5 and Figure 3-17 show the conservation values mapping for the desert focal species. Class combinations of high biological value and high intactness, moderate biological value and high intactness, high biological value and moderate intactness, and moderate biological value and moderate intactness were determined to be of high conservation value and the most desirable from the standpoint of identifying the most important core habitat areas and landscape linkages for the focal species.

Approximately 388,762 acres (57 percent of the RCIS area) qualified as areas of high conservation value, while 48,142 acres (7 percent) account for the highest biological value and highest intactness.

**Table 3-5. Conservation Value Acreages for the Desert Species Group**

<table>
<tr><th colspan="2" rowspan="2">Desert Species Group<br>Acres and Percent of RCIS Area</th><th colspan="3">Biological Value</th></tr>
<tr><th>High</th><th>Moderate</th><th>Low</th></tr>
<tr><td rowspan="3">Landscape Intactness</td><td>High</td><td>48,142**<br>7%</td><td>105,595**<br>15%</td><td>51,248*<br>8%</td></tr>
<tr><td>Moderate</td><td>40,552**<br>6%</td><td>200,573**<br>28%</td><td>167,611*<br>25%</td></tr>
<tr><td>Low</td><td>1,873*<br><1%</td><td>26,339*<br>4%</td><td>46,928*<br>7%</td></tr>
</table>

**/green = High Conservation Value
*/grey = Low Conservation Value

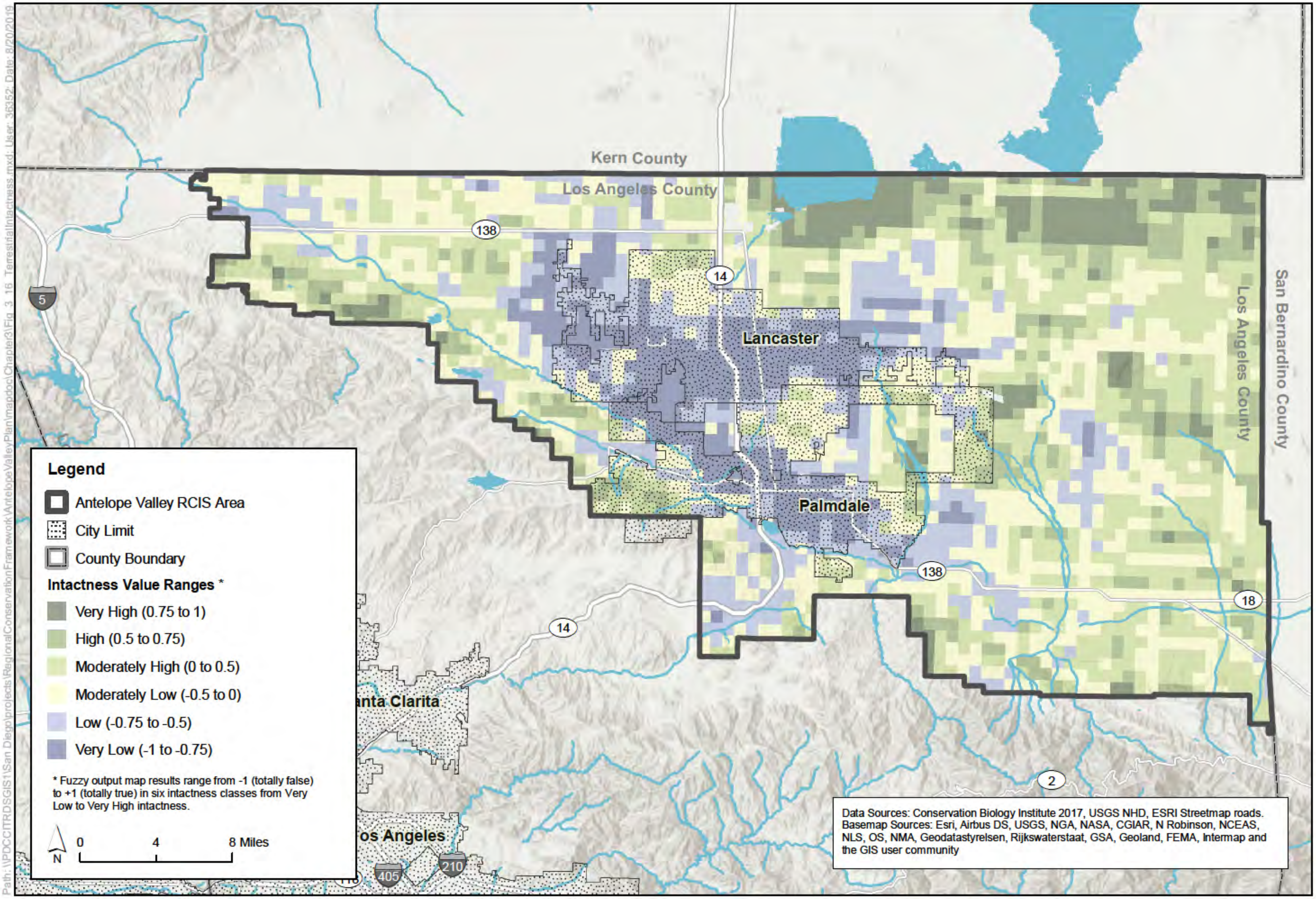


**Figure 3-16**
**Terrestrial Intactness Model Results for the Antelope Valley RCIS Area**

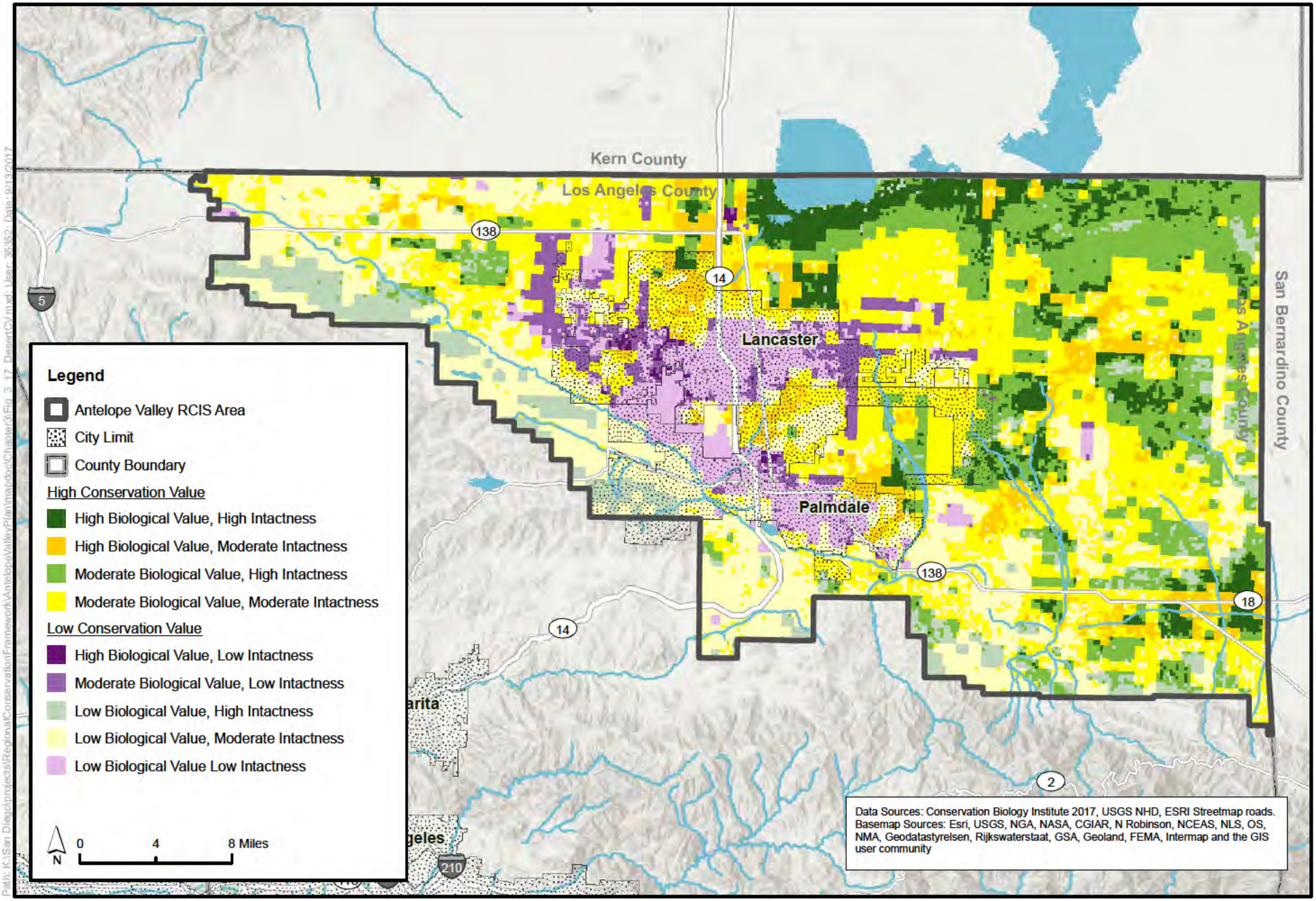


**Figure 3-17**
**Conservation Values Mapping for the Desert Species Group in the Antelope Valley RCIS Area**

**Agriculture/grassland species.** Table 3-6 and Figure 3-18 show the conservation values mapping for the agriculture/grassland species. Approximately 407,057 acres (60 percent) qualified as areas of high conservation value, while 46,493 acres (7 percent) account for the very best conservation value for agriculture/grassland focal species.

**Table 3-6. Conservation Value Acreages for the Agriculture/Grassland Species Group**

| Agriculture/Grassland Species Group Acres and Percent of RCIS Area | | Biological Value | | |
|---|---|---|---|---|
| | | High | Moderate | Low |
| Landscape Intactness | High | 46,493**<br>7% | 72,927**<br>11% | 89,566*<br>13% |
| | Moderate | 120,574**<br>18% | 167,063**<br>24% | 114,998*<br>17% |
| | Low | 22,960*<br>3% | 10,841*<br>2% | 41,339*<br>6% |

**/green = High Conservation Value
*/grey = Low Conservation Value

**Foothill/riparian species.** Table 3-7 and Figure 3-19 show the conservation values mapping for the foothill/riparian species. Approximately 232,932 acres (34 percent) qualified as areas of high conservation value, while 34,169 acres (5 percent) account for the best conservation value for foothill/riparian focal species.

**Table 3-7. Conservation Value Acreages for the Foothill/Riparian Species Group**

| Foothill/Riparian Species Group Acres and Percent of RCIS Area | | Biological Value | | |
|---|---|---|---|---|
| | | High | Moderate | Low |
| Landscape Intactness | High | 34,169**<br>5% | 36,920**<br>5% | 133,897*<br>20% |
| | Moderate | 59,461**<br>9% | 102,383**<br>15% | 240,792*<br>35% |
| | Low | 830*<br><1% | 18,819*<br>3% | 55,490*<br>8% |

**/green = High Conservation Value
*/grey = Low Conservation Value

These three conservation value maps were used to identify large habitat core areas and the higher conservation value linkages between them. Some areas have high conservation value for both desert and agriculture/grassland species groups; other areas are clearly important for individual species, such as those in the foothill/riparian group.

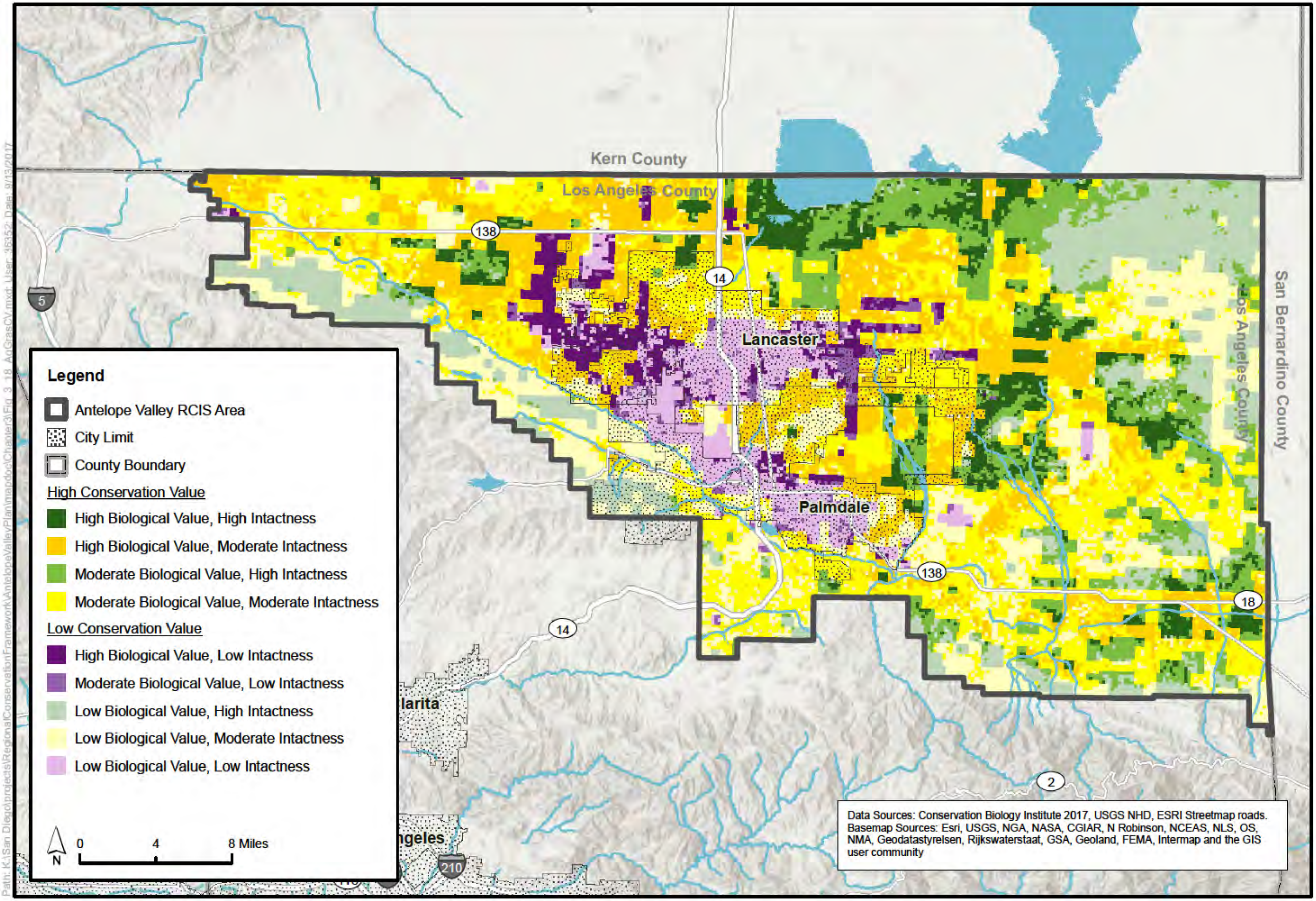


**Figure 3-18**
**Conservation Values Mapping for the Agriculture/Grasslands Species Group in the Antelope Valley RCIS Area**

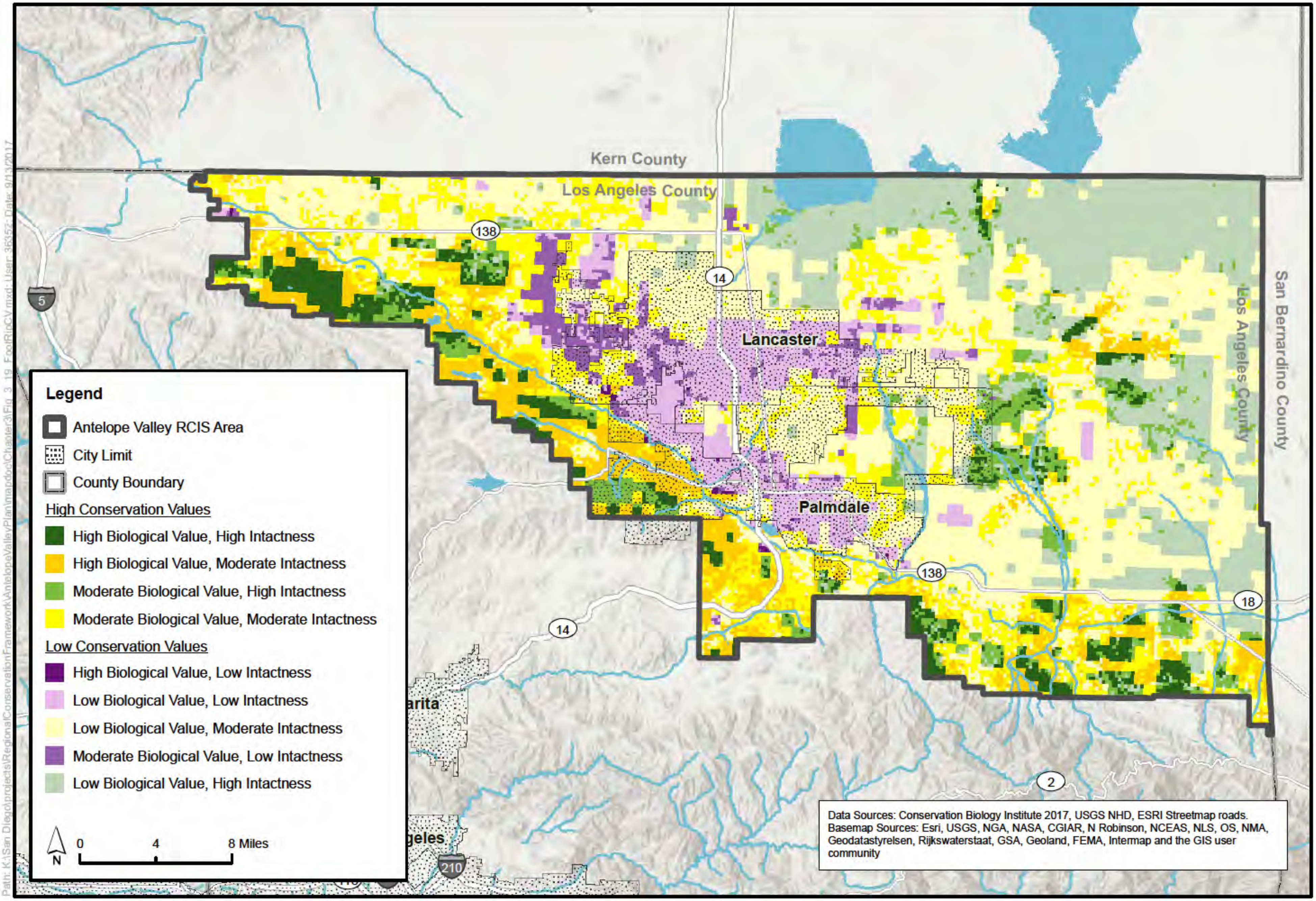


**Figure 3-19**
**Conservation Values Mapping for the Foothill/Riparian Species Group in the Antelope Valley RCIS Area**

### 3.2.4 Mapping Habitat Core Areas and Landscape Linkages

The RCIS area was divided into 15 core habitat areas and 18 landscape linkages for connecting the habitat core areas (or connecting to habitat outside the RCIS area). The habitat core areas and landscape linkages were identified using the conservation values maps from each of the three species groups, the habitat connectivity maps for large and small species, the landscape intactness map, the protected lands map, and the climate stability and climate refugia maps. The core habitat areas (cores) are large, contiguous patches of habitat with higher conservation value, and the linkages are important swaths of habitat that link the cores together to allow species to move and disperse between the habitat core areas and to areas outside of the RCIS area.

Other important considerations in determining the boundaries of the cores and linkages were the location of existing protected areas, natural and human-made features visible on aerial imagery, and the location of foreseeable potential future urbanization such as major transportation projects, subdivisions, and renewable energy projects. Boundaries of cores were delineated to capture the largest concentrations of areas with high conservation value in the RCIS area while limiting the overlap with foreseeable future development. The delineation of landscape linkages was based on modeled connectivity pathways (Section 3.2.1.3, *Habitat Connectivity and Climate Change*) and an examination of aerial imagery to avoid defining linkages in areas with obvious barriers to movement. In many instances, linkages were delineated across major roadways if alternative paths for connecting core areas were unavailable.

The delineation and naming of these habitat core areas and landscape linkages provides a means for spatially describing and naming the general locations of high conservation value at a landscape scale. This approach of spatially subdividing the RCIS area helps focus the planning of conservation actions in a spatially explicit manner. The scale of the habitat core areas and landscape linkages also allows the flexibility to select a variety of sites or parcels where conservation actions can be implemented to meet the conservation goals and objectives.

The cores and linkages are intended to offer guidance to those using the RCIS as to where conservation actions may have the greatest benefit to focal species and other conservation elements. They are not intended to rule out conservation actions occurring outside of the cores and linkages or to preclude development within them. Conservations actions occurring outside cores and linkages should still be considered if they meet the conservation goals and objectives of the RCIS. Future development planned to occur inside the cores and linkages should carefully consider the potential effects on habitat connectivity and fragmentation in these areas of higher conservation value in light of the conservation goals and objectives for all focal species and other conservation elements.

Finally, it should be noted that the boundaries of the cores and linkages are not intended to be permanent. As habitat conservation value changes as a result of restoration, enhancement, and acquisition, and as new information and data are available, the boundaries of the cores and linkages should be updated to reflect future conditions and the state of knowledge. The update of the cores and linkages should be considered with each update to the RCIS itself. The cores and linkages are listed in Table 3-8 and shown in Figure 3-20 through Figure 3-22 for each of the species groups.

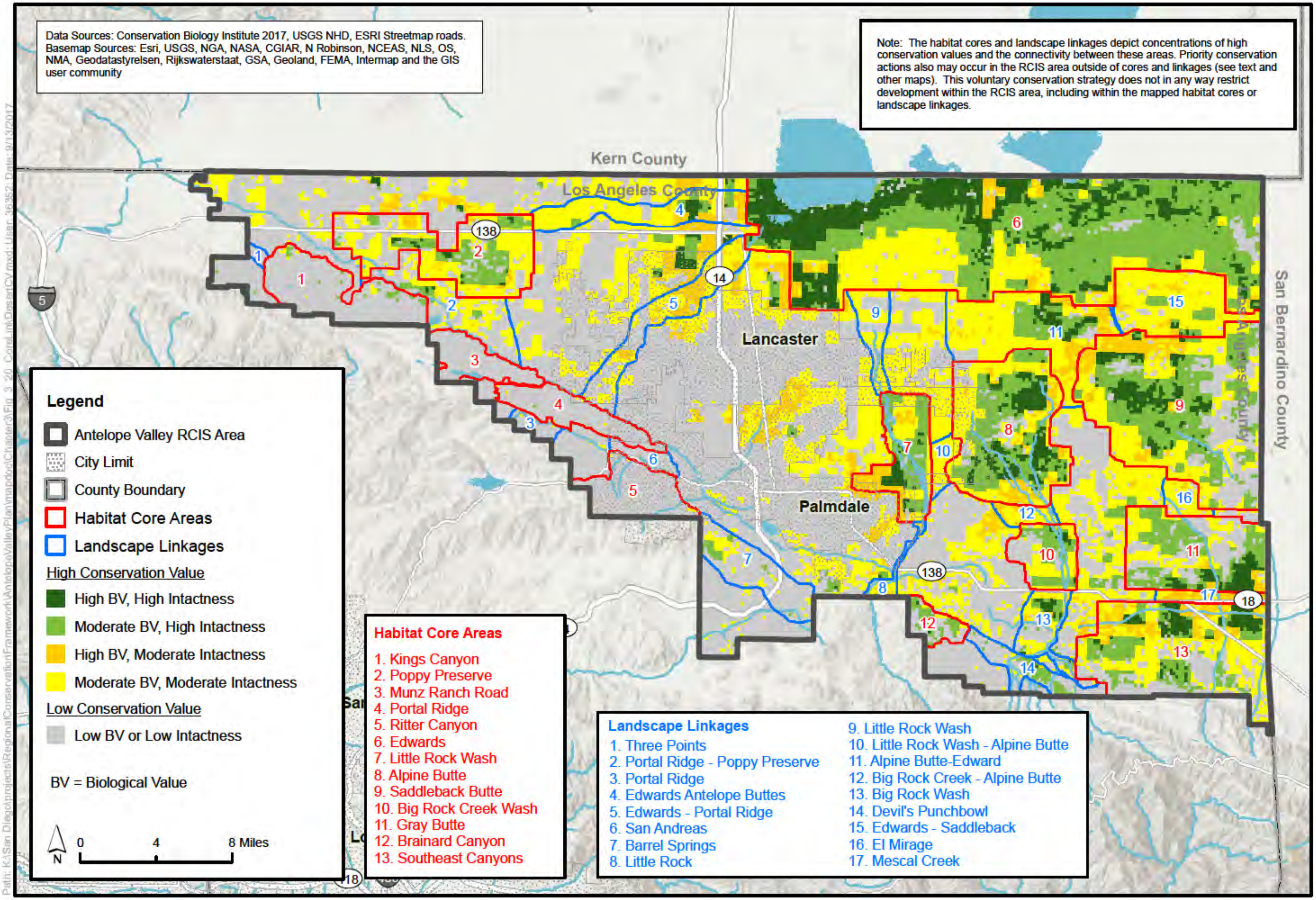


**Figure 3-20**
**Habitat Core Areas and Landscape Linkages with Desert Species Group for the Antelope RCIS**

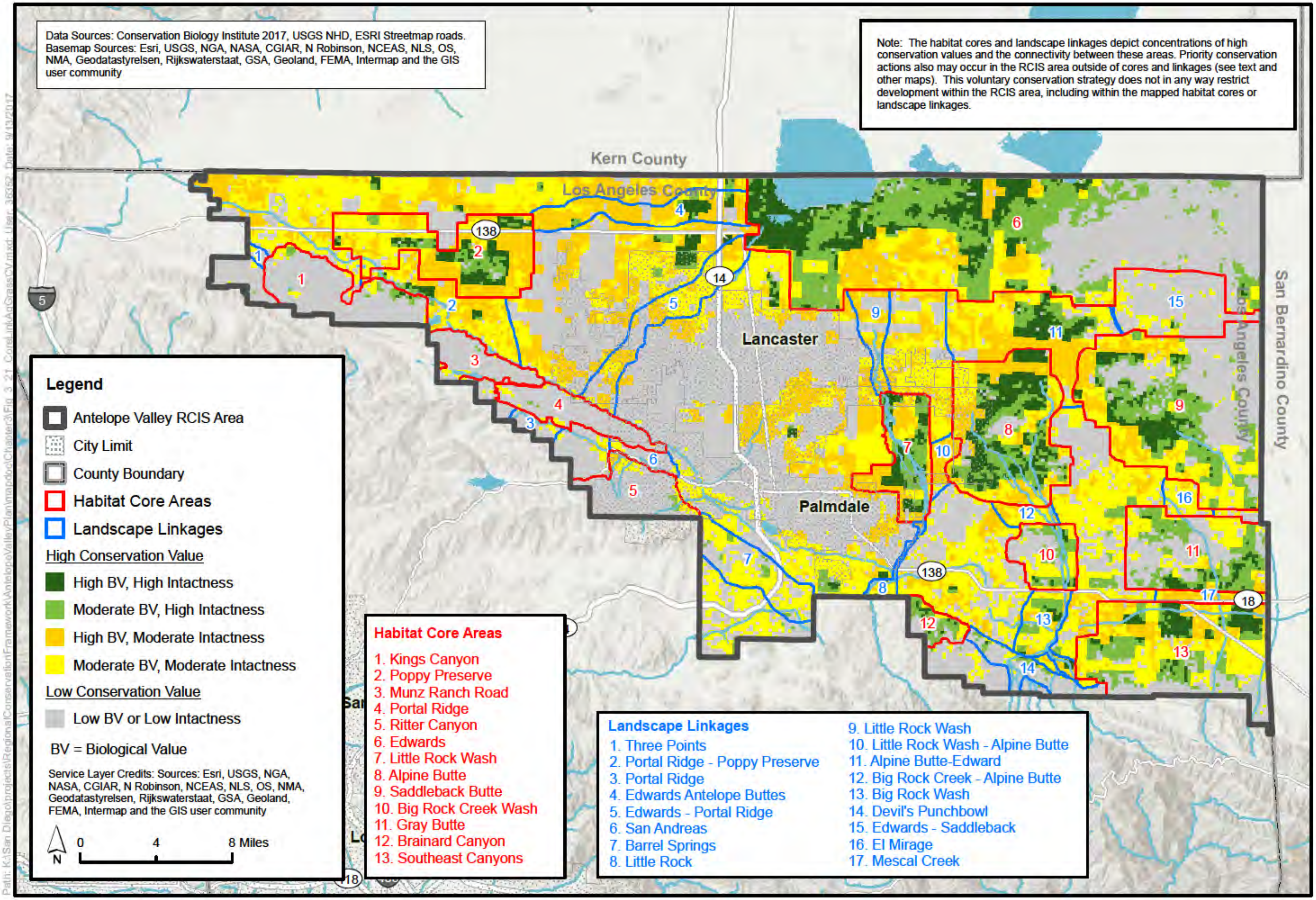


**Figure 3-21**

**Habitat Core Areas and Landscape Linkages with Agriculture/Grassland Species Group for the Antelope RCIS**

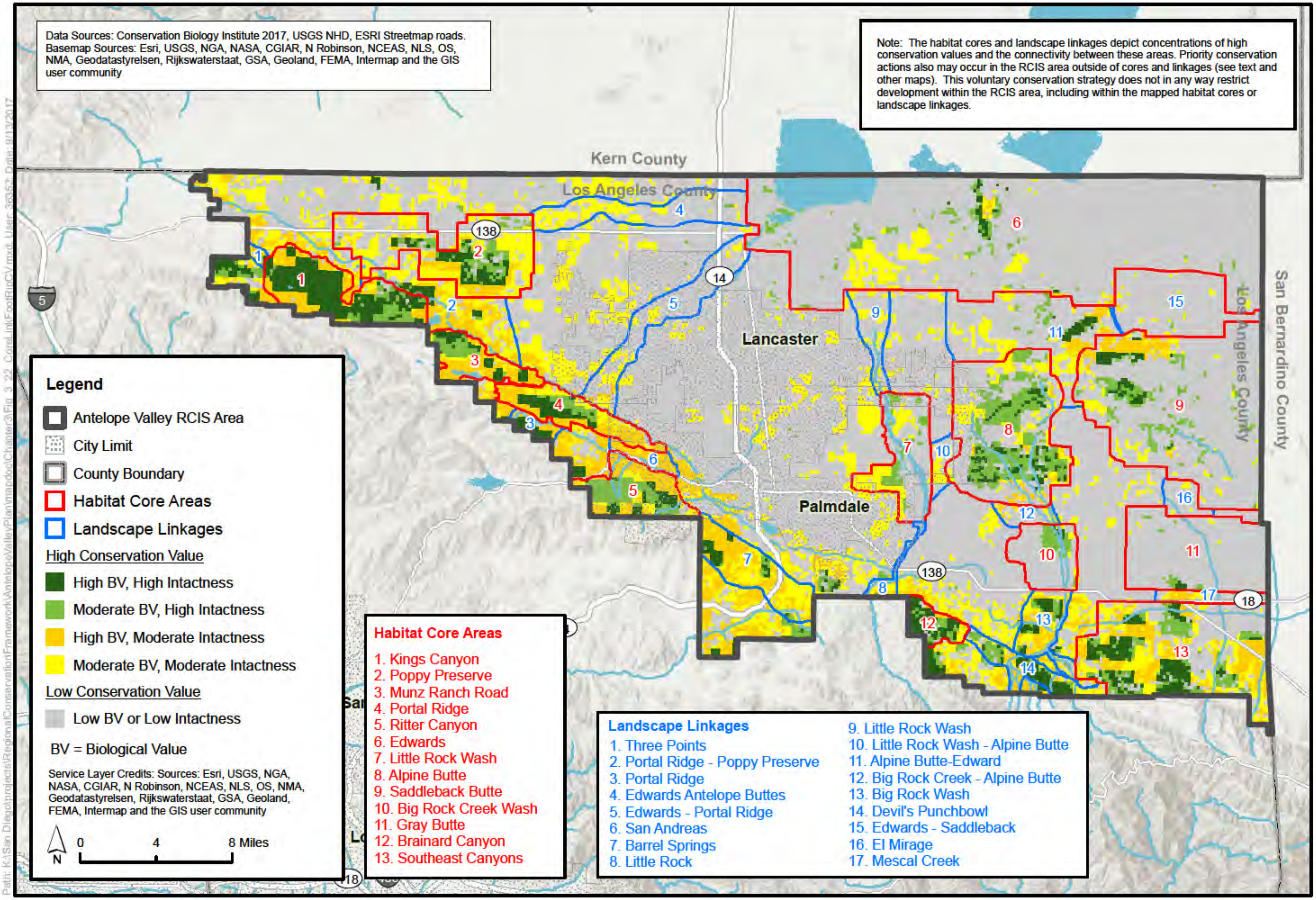


**Figure 3-22**
**Habitat Core Areas and Landscape Linkages with Foothill/Riparian Species Group for the Antelope RCIS**

**Table 3-8. Antelope Valley RCIS Habitat Core Areas and Landscape Linkages (numbers do not indicate priorities but, rather, locations in figures, generally numbered west to east)**

| | Habitat Core Areas | | Landscape Linkages |
|---|---|---|---|
| 1 | Kings Canyon | 1 | Three Points |
| 2 | Poppy Preserve | 2 | Portal Ridge – Poppy Preserve |
| 3 | Munz Ranch Road | 3 | Portal Ridge |
| 4 | Portal Ridge | 4 | Edwards Antelope Buttes |
| 5 | Ritter Canyon | 5 | Edwards – Portal Ridge |
| 6 | Edwards | 6 | San Andreas |
| 7 | Little Rock Wash | 7 | Barrel Springs |
| 8 | Alpine Butte | 8 | Little Rock |
| 9 | Saddleback Butte | 9 | Little Rock Wash |
| 10 | Big Rock Creek Wash | 10 | Little Rock Wash – Alpine Butte |
| 11 | Gray Butte | 11 | Alpine Butte-Edward |
| 12 | Brainard Canyon | 12 | Big Rock Creek – Alpine Butte |
| 13 | Southeast Canyons | 13 | Big Rock Wash |
| | | 14 | Devil's Punchbowl |
| | | 15 | Edwards – Saddleback |
| | | 16 | El Mirage |
| | | 17 | Mescal Creek |

# 3.3 Gap Analysis for Focal Species

A key step in the identification of priorities for the conservation strategy is to determine a desired long-term level of protection and preservation for each focal species. The desired level of protection and preservation is expressed as a target amount of suitable habitat for each species (in acres) that occurs in the areas of high conservation value. The target acreages for each focal species were based on factors such as the species' conservation status, abundance, and distribution of habitat in the RCIS area as well as the species' general life history type (e.g., rare and narrow endemic species with limited distribution or habitat generalist species with relatively wide distribution).

Sensitive or listed species with limited distribution in the RCIS area were given the highest conservation priority level and a conservation target that calls for protecting 90 percent of the habitat of high conservation value in the habitat core areas and landscape linkage areas. Listed species and some sensitive species with a wide distribution in the RCIS area, as well as special-interest species, were given a high conservation priority level and a conservation target of 75 percent. Two exceptions were the golden eagle and California condor, both of which were placed in the moderate conservation priority category because they use the RCIS area primarily for foraging and the RCIS area has a large amount of suitable foraging habitat for both species. The remaining sensitive species, as well as the eagle and condor, have a wide distribution area and generally a larger amount of total acreage with suitable habitat in the RCIS area. These species were placed in the moderate conservation priority category, with a conservation target of 50 percent. The conservation priority ranking and conservation target assignments for the species are shown in Table 3-9.

**Table 3-9. Species Conservation Priority Ranking and Conservation Targets for Focal Species**

| Common Name | Scientific Name | Status (Federal/State /Global Rank) | Species Conservation Priority | Conservation Target | Rationale |
|---|---|---|---|---|---|
| **Plants** | | | | | |
| Alkali mariposa-lily | *Calochortus striatus* | -/ S2.2; G2/G2S2 | Highest | 90% | Sensitive, limited distribution |
| California juniper | *Juniperus californica* | -/-/G5S5 | High | 75% | Special Interest |
| Joshua tree | *Yucca brevifolia* | -/-/G4G5 SNR | High | 75% | Special Interest |
| Spreading navarretia | *Navarretia fossalis* | T/-/G2S2 | Highest | 90% | Listed, limited distribution |
| Short-joint beaver tail | *Opuntia basilaris var. brachyclada* | -/-/G553 S3 | High | 75% | Special Interest |
| **Reptiles** | | | | | |
| Coast horned lizard | *Phrynosoma coronatum blainvillei* | -/SSC/G3G4 S3S4 | Moderate | 50% | Sensitive, wide distribution |
| Desert horned lizard | *Phrynosoma platyrhinos calidiarum* | -/-/- | High | 75% | Sensitive, wide distribution |
| Desert tortoise | *Gopherus agassizii* | T/T/G4S2 | High | 75% | Listed, wide distribution |
| Western pond turtle | *Actinemys marmorata* | UR/-/G3G4 S3 | Highest | 90% | Sensitive, limited distribution |
| **Birds** | | | | | |
| Burrowing owl | *Athene cunicularia hypugea* | -/SSC/G4S2 | High | 75% | Sensitive, wide distribution |
| California condor | *Gymnogyps californianus* | E/E,FP/G1S1 | Moderate | 50% | Listed, wide distribution |
| Golden eagle | *Aquila chrysaetos* | FP/FP/G5S3 | Moderate | 50% | Listed, wide distribution |
| LeConte's thrasher | *Toxostoma lecontei* | -/SSC/G3 S3 | Moderate | 50% | Sensitive, wide distribution |
| Least Bell's vireo | *Vireo bellii pusillus* | E/E/G5T2S2 | Highest | 90% | Listed, limited distribution |
| Loggerhead shrike | *Lanius ludovicianus* | -/SSC/G4 S4 | Moderate | 50% | Sensitive, wide distribution |
| Long-billed curlew | *Numenius americanus* | -/-/G5 S2 | Moderate | 50% | Sensitive, wide distribution |
| Mountain plover | *Charadrius montanus* | -/SSC/G2S2 | Moderate | 50% | Sensitive, wide distribution |
| Northern harrier | *Circus cyaneus* | -/SSC/G5 S3 | Moderate | 50% | Sensitive, wide distribution |

| Common Name | Scientific Name | Status (Federal/State /Global Rank) | Species Conservation Priority | Conservation Target | Rationale |
|---|---|---|---|---|---|
| Prairie falcon | *Falco mexicanus* | -/-/G5 S3 | Moderate | 50% | Sensitive, wide distribution |
| Swainson's hawk | *Buteo swainsoni* | -/T/G5S2 | High | 75% | Listed, wide distribution |
| Tricolored blackbird | *Agelaius tricolor* | -/T/G2G3 S2 | High | 75% | Sensitive, limited distribution |
| Willow flycatcher | *Empidonax traillii* | -/E/G5S1S2 | Highest | 90% | Listed, limited distribution |
| **Mammals** | | | | | |
| American badger | *Taxidea taxus* | -/SSC/G5 S4 | Moderate | 50% | Sensitive, wide distribution |
| Desert kit fox | *Vulpes macrotis arsipus* | -/-/G4 S3S4 | Moderate | 50% | Sensitive, wide distribution |
| Mohave ground squirrel | *Spermophilus [Xerospermophilus] mohavensis* | -/T/G2G3S2S3 | High | 75% | Listed, wide distribution |
| Mountain lion | *Felis concolor californica* | -/-/- | Moderate | 50% | Sensitive, wide distribution |
| Tehachapi pocket mouse | *Perognathus alticolus inexpectatus* | -/SSC/G1G2T1T2 S1S2 | Moderate | 50% | Sensitive, wide distribution |

**Federal**
T = Threatened
E = Endangered
UR = Under Review
**State**
T = Threatened
E = Endangered
SC = State Candidate
SSC = Listed as a California Species of Special Concern by the California Department of Fish and Wildlife

**Global**
G1/S1 = Critically Imperiled: At high risk of extinction, extremely rare
G2/S2 = Imperiled: At high risk of extinction, restricted range, very few populations
G3/S3 = Vulnerable: Moderate risk of extinction, restricted range, few populations
G4/S4 = Apparently Secure: Uncommon, not rare, possible long-term declines

The purpose of this gap analysis is to evaluate the current level of protection of the habitat of high conservation value for each species that occurs within the habitat core areas and landscape linkages. The gap analysis was conducted through a GIS exercise that involved overlaying the currently protected areas in GAP 1–GAP 3 (as described in Section 2.2.4, *Protected Areas*) with the habitat of high conservation value distributions for each species within the habitat core areas and landscape linkages. The gap analysis results summarize the suitable habitat for each species at multiple hierarchically nested levels.

Figure 3-23 shows a conceptual nested view of the habitat in the RCIS area and illustrates how it is evaluated and how it informs the gap analysis and quantitative conservation goals for focal species. Table 3-10 shows the gap analysis results for each focal species. The color coding for each level in Figure 3-23 corresponds to the color coding of the data columns in Table 3-10. Note that the three species that were included in both the desert and the agriculture/grassland species groups have two sets of gap analysis results and conservation targets, one for each conservation values model.

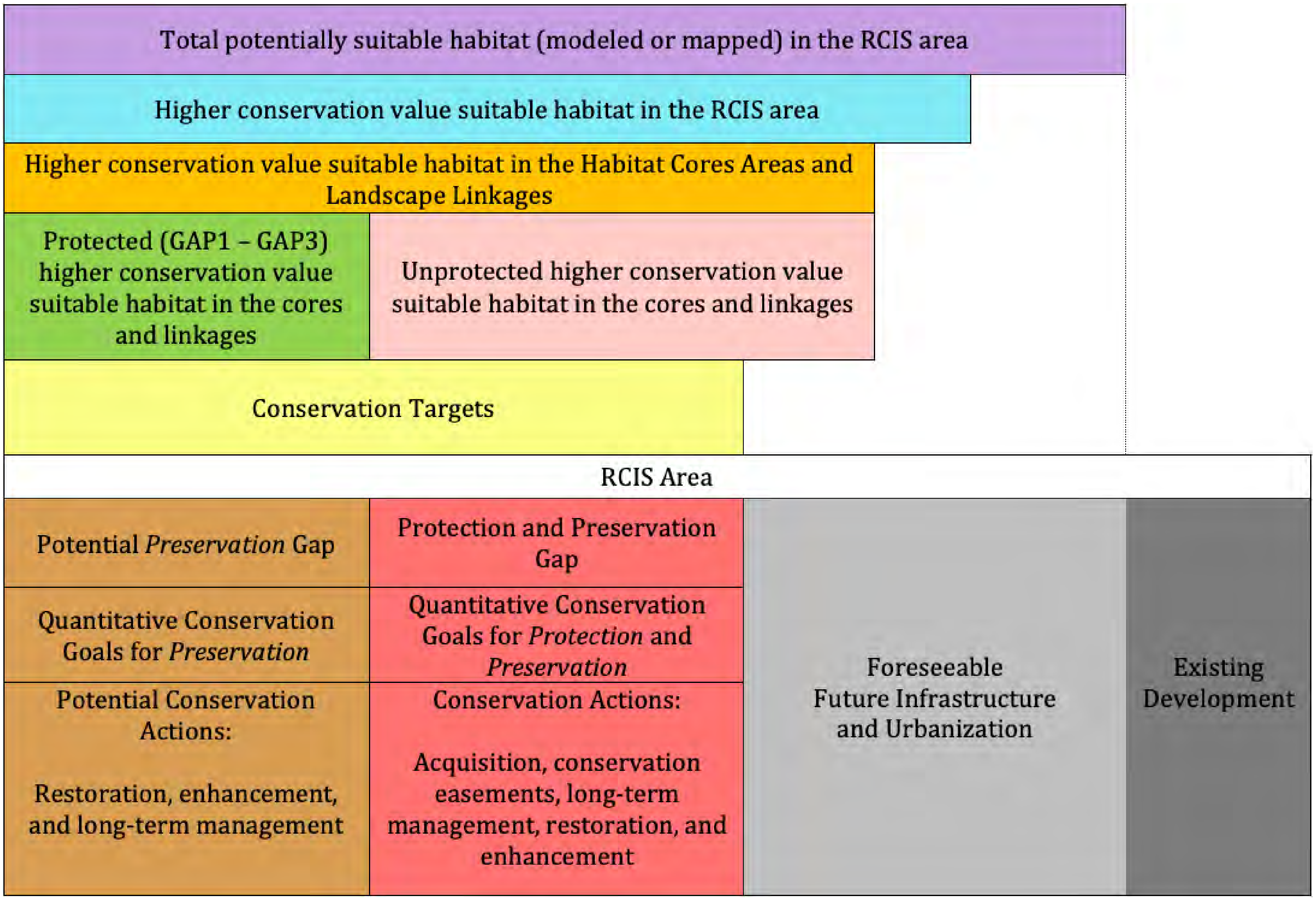


**Figure 3-23**

**Nested View of Gap Analysis Results, and Conservation Targets for Habitat Protection (permanent protection from conversion of natural habitats through acquisition and/or conservation or agriculture easement) and Preservation (long-term management and monitoring, potentially including restoration and enhancement)**

**Table 3-10. Gap Analysis Results and Quantitative Conservation Goals**

| | In RCIS Area | | | Higher Conservation Value Habitat in Cores and Linkages | | | | | | Quantitative Conservation Goals | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Focal Species** | **All Predicted Habitat [a]** | **Higher Conservation Value Habitat [b]** | | **Total [c]** | | **Protected [d]** | | **Unprotected [e]** | | **Species Priority Level [f]** | **Conservation Target [g]** | | **Protection and Preservation Gap [h]** | | **Possible Preservation Gap [i]** | |
| **Plants** | | | | | | | | | | | | | | | | |
| Alkali mariposa-lily | 52,098 | 49,148 | 94% | 33,761 | 69% | 18,025 | 53% | 15,736 | 47% | Highest | 90% | 30,385 | 12,360 | 41% | 18,025 | 59% |
| California juniper | 31,607 | 27,316 | 86% | 18,183 | 67% | 256 | 1% | 17,927 | 99% | High | 75% | 13,637 | 13,381 | 98% | 256 | 2% |
| Joshua tree | 43,738 | 40,601 | 93% | 31,868 | 78% | 4,849 | 15% | 27,019 | 85% | High | 75% | 23,901 | 19,052 | 80% | 4,849 | 20% |
| Spreading navarretia* | | | | | | | | | | | | | | | | |
| Short-joint beavertail cactus | 20,526 | 19,181 | 93% | 12,806 | 67% | 1,103 | 9% | 11,703 | 91% | High | 75% | 9,605 | 8,502 | 89% | 1,103 | 11% |
| **Reptiles** | | | | | | | | | | | | | | | | |
| Coast horned lizard | 17,449 | 17,062 | 98% | 13,940 | 82% | 3,915 | 28% | 10,025 | 72% | Moderate | 50% | 6,970 | 3,055 | 44% | 3,915 | 56% |
| Desert horned lizard | 25,323 | 23,435 | 93% | 15,811 | 67% | 1,964 | 12% | 13,848 | 88% | High | 75% | 11,858 | 9,894 | 83% | 1,964 | 17% |
| Desert tortoise | 80,678 | 74,337 | 92% | 73,898 | 99% | 40,235 | 54% | 33,663 | 46% | High | 75% | 55,424 | 15,189 | 27% | 40,235 | 73% |
| Western pond turtle* | | | | | | | | | | | | | | | | |
| **Birds** | | | | | | | | | | | | | | | | |
| Burrowing owl | 358,440 | 299,730 | 84% | 184,301 | 61% | 36,531 | 20% | 147,770 | 80% | Moderate | 50% | 92,151 | 55,620 | 60% | 36,531 | 40% |
| California condor | 33,320 | 31,236 | 94% | 16,905 | 54% | 4,640 | 27% | 12,265 | 73% | Moderate | 50% | 8,453 | 3,813 | 45% | 4,640 | 55% |
| Golden eagle (Desert) | 50,961 | 34,083 | 67% | 30,135 | 88% | 3,017 | 10% | 27,118 | 90% | Moderate | 50% | 15,068 | 12,051 | 80% | 3,017 | 20% |
| Golden eagle (Ag/Grassland) | 50,961 | 47,248 | 93% | 40,477 | 86% | 4,665 | 12% | 35,811 | 88% | Moderate | 50% | 20,239 | 15,574 | 77% | 4,665 | 23% |
| LeConte’s thrasher (Desert) | 344,725 | 295,697 | 86% | 222,949 | 75% | 61,730 | 28% | 161,219 | 72% | Moderate | 50% | 111,475 | 49,745 | 45% | 61,730 | 55% |
| LeConte’s thrasher (Ag/Grassland) | 344,725 | 279,666 | 81% | 195,772 | 70% | 44,633 | 23% | 151,139 | 77% | Moderate | 50% | 97,886 | 53,253 | 54% | 44,633 | 46% |
| Least Bell's vireo | 6,047 | 5,662 | 94% | 4,845 | 86% | 2,009 | 41% | 2,836 | 59% | Highest | 90% | 4,361 | 2,352 | 54% | 2,009 | 46% |
| Loggerhead shrike | 405,252 | 340,709 | 84% | 211,094 | 62% | 37,563 | 18% | 173,531 | 82% | Moderate | 50% | 105,547 | 67,984 | 64% | 37,563 | 36% |
| Long-billed curlew | 168,715 | 139,633 | 83% | 76,445 | 55% | 15,162 | 20% | 61,284 | 80% | Moderate | 50% | 38,223 | 23,061 | 60% | 15,162 | 40% |
| Mountain plover | 130,218 | 99,681 | 77% | 53,477 | 54% | 3,755 | 7% | 49,721 | 93% | Moderate | 50% | 26,739 | 22,984 | 86% | 3,755 | 14% |
| Northern harrier | 9,817 | 7,491 | 76% | 4,295 | 57% | 1,912 | 45% | 2,383 | 55% | Moderate | 50% | 2,148 | 236 | 11% | 1,912 | 89% |
| Prairie falcon | 395,207 | 336,484 | 85% | 204,254 | 61% | 31,750 | 16% | 172,504 | 84% | Moderate | 50% | 102,127 | 70,377 | 69% | 31,750 | 31% |
| Swainson's hawk | 181,803 | 141,685 | 78% | 84,234 | 59% | 10,431 | 12% | 73,802 | 88% | High | 75% | 63,176 | 52,745 | 83% | 10,431 | 17% |
| Tricolored blackbird | 249,142 | 200,322 | 80% | 110,128 | 55% | 10,634 | 10% | 99,493 | 90% | High | 75% | 82,596 | 71,962 | 87% | 10,634 | 13% |
| Willow flycatcher | 2,190 | 2,058 | 94% | 1,540 | 75% | 221 | 14% | 1,319 | 86% | Highest | 90% | 1,386 | 1,165 | 84% | 221 | 16% |
| **Mammals** | | | | | | | | | | | | | | | | |
| American badger (Desert) | 382,678 | 293,253 | 77% | 208,834 | 71% | 44,813 | 21% | 164,021 | 79% | Moderate | 50% | 104,417 | 59,604 | 57% | 44,813 | 43% |
| American badger (Ag/Grassland) | 382,678 | 322,076 | 84% | 210,346 | 65% | 40,445 | 19% | 169,901 | 81% | Moderate | 50% | 105,173 | 64,728 | 62% | 40,445 | 38% |
| Desert kit fox (Desert) | 347,901 | 255,337 | 73% | 171,749 | 67% | 40,994 | 24% | 130,755 | 76% | Moderate | 50% | 85,875 | 44,881 | 52% | 40,994 | 48% |
| Desert kit fox (Ag/Grassland) | 347,901 | 287,658 | 83% | 174,780 | 61% | 37,633 | 22% | 137,146 | 78% | Moderate | 50% | 87,390 | 49,757 | 57% | 37,633 | 43% |
| Mohave ground squirrel | 121,592 | 115,748 | 95% | 107,962 | 93% | 62,088 | 58% | 45,875 | 42% | High | 75% | 80,972 | 18,884 | 23% | 62,088 | 77% |
| Mountain lion | 69,755 | 66,758 | 96% | 48,486 | 73% | 9,522 | 20% | 38,964 | 80% | Moderate | 50% | 24,243 | 14,721 | 61% | 9,522 | 39% |
| Tehachapi pocket mouse | 1,960 | 1,876 | 96% | 850 | 45% | 202 | 24% | 649 | 76% | Moderate | 50% | 425 | 223 | 52% | 202 | 48% |

*Because of few documented occurrences, modeled habitat distribution was not created for this species.

[a] Total acreage predicted habitat for each species within the RCIS area.

[b] Acreage and percentage of total of higher conservation value habitat within the RCIS area.

[c] Total acreage and percentage of the higher conservation value habitat that is also within habitat core and linkage areas

[d] Acreage and percentage of the total lands of higher conservation value habitat within core and linkage areas that are also protected.

[e] Acreage and percentage of the total lands of higher conservation value habitat within core and linkage areas that are unprotected.

[f] Identified conservation priority level for each focal species. Priorities listed range from Moderate to Highest.

[g] Conservation goal represented as a percentage, based on the identified conservation priority level. Conservation goal represented as acreage. This acreage is determined by calculating the amount Habitat of Higher Conservation Value present within the RCIS area needed to meet the conservation goal percentage.

[h] This represented the portion of the conservation goal that can be met through preservation actions on lands that are already under protection. These actions include: restoration, enhancement, and long-term management

[i] This represents the portion of the conservation goal that can be met through protection and preservation actions. These actions include: acquisition, conservation easements, long-term management, restoration, and enhancement.

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The mapping and modeling of suitable habitat in the RCIS area for each species is shown in purple in Figure 3-23 and Table 3-10. The higher conservation value habitat is shown in blue as a subset of the total predicted habitat in the RCIS area for a given species. The amount of the habitat of high conservation value that occurs in the habitat core areas and landscape linkages is shown in orange. The calculations of GAP analysis and conservation targets are based on this habitat shown in orange. Green represents the amount of that habitat that is already protected (GAP 1–GAP 3), and pink represents the amount of that habitat that is unprotected. Recall that protection, as defined in this RCIS, means land that is acquired in fee title or in a conservation easement (see Section 2.2.4.1, *Definition of Protection, Preservation, and Permanently Protect*). Additional preservation may be needed on protected lands to fully achieve the conservation goals and objectives for some species. Therefore, a potential preservation gap may exist on protected lands, which are identified here and shown in brown. A portion of the unprotected (pink) habitat of high conservation value will require additional protection and preservation to meet the conservation goals and objectives, as shown in red. Finally, a portion of the habitat is expected to be lost because of foreseeable future infrastructure and urbanization, including some habitat of high conservation value within the habitat core areas and landscape linkages, or was previously lost when the existing development was built, as shown in light and dark gray, respectively.

# 3.4 Conservation Strategy for Focal Species and Conservation Elements

The conservation strategy includes conservation goals, objectives, and actions. The conservation priorities are determined by identifying where the conservation actions should be implemented for each focal species or other conservation element. These conservation priority areas are generally the areas of highest conservation value, predominantly within the habitat core areas and landscape linkages, but with the least amount of foreseeable future urbanization pressure. All four components of the conservation strategy (goals, objectives, actions, and priorities) are presented in this section for each focal species. The Antelope Valley RCIS conservation strategy has been designed to be generally consistent with previously approved plans and policies in the RCIS area. These plans and policies, described in Section 1.6, *Relevant Conservation Plans and Policies*, were reviewed and considered during development of the conservation strategy to ensure as much consistency as possible.

## 3.4.1 Conservation Goals and Objectives

The *conservation goals* of this Antelope Valley RCIS reflect the broad desired outcome for the focal species and other conservation elements in the RCIS area and address the pressures on focal species and important conservation elements identified in Section 2.3, *Pressures and Stressors on Focal Species and on Other Conservation Elements*. Each conservation goal is supported by several conservation objectives. *Conservation objectives* are intended to be concise, measurable statements of the target outcome for each focal species and other conservation elements. The conservation objectives focus on protecting unprotected land (Section 3.3, *Gap Analysis for Focal Species*) and enhancing land that is already protected in the RCIS area. In some cases, conservation objectives focus on enhancement of other conservation elements, such as protection of wildlife corridors or removal of movement barriers. Conservation objectives are established such that, if implemented, they accomplish the conservation goals as written. All conservation goals and objectives will be achieved through the implementation of the conservation actions.[2]

Most of the conservation goals and objectives are designed to maintain current populations of focal species and retain the other conservation elements. The conservation goals and objectives also provide for the long-term persistence of focal species and other conservation elements through habitat protection and enhancement. In some cases, populations of focal species are expected to increase because of land preservation, management, habitat enhancement, and habitat restoration.

All conservation goals and objectives are given unique two-digit codes so that they can be easily identified and tracked by those who implement the conservation actions, including through mitigation credit agreements (MCAs).

### 3.4.2 Conservation Actions and Conservation Priorities

The *conservation actions* and *conservation priorities* of this Antelope Valley RCIS are part of the conservation strategy that will be applied to accomplish the conservation goals and objectives. Conservation actions are defined by the Program Guidelines as “actions to preserve or restore ecological resources, including habitat, natural communities, ecological processes, and wildlife corridors,” in order to protect the resources permanently and “provide for their perpetual management.” Conservation priorities are defined by the Program Guidelines as areas that are ranked according to their “importance for contributing to the conservation and recovery of focal species and their habitats or other conservation elements” (California Department of Fish and Wildlife 2017a).

Conservation priorities are determined by identifying where conservation actions should be implemented for each focal species or other conservation element. The conservation priority areas are generally the areas of highest conservation value, predominantly within the habitat core areas and landscape linkages, but without foreseeable future urbanization pressure.

Conservation priorities for each focal species or other conservation element are determined by evaluating the distribution of conservation value (generally within the habitat core areas and landscape linkages) relative to the conservation goals and objectives as well as the foreseeable potential future urbanization. Conservation priorities identified outside areas of foreseeable future urbanization pressure are less likely to be affected by the effects of habitat fragmentation, edge effects, and other general habitat degradation associated with urbanization pressure that could make achieving the long-term conservation goals and objectives more difficult and costly. Areas within the Los Angeles County Economic Opportunity Areas and the vicinity of other major foreseeable infrastructure and development projects are more likely to have higher future urbanization pressure; therefore, conservation priorities should not be identified in these areas when possible (see Section 2.3.7, *Housing and Urban Areas, Roads, and Railroads,* Figure 2-22). For some species, important conservation opportunities for achieving the conservation goals and objectives might be available only outside the habitat core areas and landscape linkages or may exist only in or near areas with higher future urbanization pressure. In these cases, conservation actions

[2] The Program Guidelines recommend that conservation objectives be achievable within the 10-year lifespan of initial approval of the RCIS. The conservation objectives in this Antelope Valley RCIS, however, do not have a deadline because of the uncertainty in the pace of implementation. Instead, conservation priorities are designed to be implemented within an approximately 10-year timeframe.

for these conservation priorities will need to be developed such that the long-term success of conservation actions can be achieved within the context of the surrounding future urbanization. Similarly, potential future development in these areas could be designed to minimize the effects of development on the conservation priority areas.

The location of conservation priorities will vary, depending on the conservation and mitigation needs and interests of the entities using the RCIS (e.g., which focal species and which conservation actions). The determination of the location will be based on a number of factors, including the availability of willing land owners, the presence of habitat of high conservation value and/or with conservation potential (in the case of restoration or enhancement), and the avoidance of foreseeable future urbanization pressure. Because these factors are highly variable and dynamic over time, conservation priority areas are not specifically mapped in the RCIS. Instead, the conservation goals, objectives, and actions are intended to be used in concert with the mapping of conservation value for each species, identification of cores areas and landscape linkages, and the mapping of foreseeable future urbanization to identify priority conservation areas that meet the needs of each user of the RCIS.

The detailed modeling and mapping of areas of conservation value (Section 3.2, *Identifying Areas of High Conservation Value*) for the three species groups are further refined by intersecting the conservation values maps with the habitat distribution for each individual focal species. The result is a detailed map of habitat of high conservation value for each focal species. These maps are described and quantified in the conservation strategy for each focal species (Section 3.4.4, *Conservation Strategy for Focal Species*).

Note that the conservation actions and priorities are not limited to those identified in this section. Additional actions and new priorities will most likely become apparent with new information and a changing future environment. In addition, conservation actions and priorities are not necessarily limited to areas within the habitat core areas and landscape linkages. Other opportunities to implement conservation actions that contribute to meeting the conservation goals and objectives of this Antelope Valley RCIS should be considered and may be implemented if the expected outcome of the conservation actions will benefit the long-term viability of the species in the RCIS area.

### 3.4.3 Adaptation to the Effects of Climate Change

California Fish and Game Code Section 1852(c)(13) states that an RCIS shall include "a description of how the strategy's conservation goals and objectives provide for adaptation opportunities against the effects of climate change for the strategy's focal species." Climate change is expected to increase the frequency of extreme events, such as floods and fires, as well as temperatures, drying, and changes in precipitation patterns. Climate change refugia and areas of climate change stability (Figures 3-6 and 3-7, respectively) were explicitly incorporated into the biological value modeling for this RCIS (see Section 3.2.1.3, *Habitat Connectivity and Climate Change*). This, in turn, led to higher conservation values being designated in areas where climate change adaptation opportunities are greatest. In addition, the conservation goals and objectives are designed to provide adaptation opportunities against the effects of climate change for the focal species. The conservation strategy targets the protection of large blocks of habitat in habitat core areas that support occurrences of focal species in and near protected areas to reduce habitat fragmentation and preserve interconnected habitats. Increasing the amount of protected areas in the RCIS area and retaining landscape linkages and wildlife corridors will facilitate movement by focal species to future shifting habitats. The conservation goals and objectives also target the enhancement of existing protected areas to improve the quality of habitat along a range of environmental gradients (e.g., east to west, north to south, along elevational gradients) in the RCIS area. Diverse native plant and animal communities that retain important ecological functions have a greater chance for persistence and change in response to climate shifts, In turn, these persistent communities increase the potential for focal species to move to areas containing favorable habitat conditions if their current locations become unsuitable (Beller et al. 2015).

Finally, climate change is addressed briefly for each focal species in Section 3.4.4, *Conservation Strategy for Focal Species*, below, along with a link to additional climate-specific information for each species or taxonomic group, which can be found on the California Department of Fish and Wildlife (CDFW) Climate Science Program website.[3] The various climate change resources cited each focal species can be found on this CDFW website.

## 3.4.4 Conservation Strategy for Focal Species

The conservation strategy for each focal species is to protect, connect, and enhance suitable habitat in a site-specific and species-specific manner within the RCIS area. A suite of species-specific conservation actions has been developed for each focal species to achieve the conservation goals and objectives, which includes acquisition and non-acquisition actions.

Although the conservation goals, objectives, and actions are specific to focal species, they are also developed for other conservation elements, such as imperiled communities, areas critical for habitat connectivity, and areas necessary to protect ecological processes. In all situations, when applying conservation actions, the general principles of conservation biology should be used to inform and prioritize conservation actions (e.g., Primack and Sher 2019; Sodhi and Ehrlich 2010; Groom et al. 2006; Margules and Pressey 2000; Noss et al. 1997; Soule 1986; Soule and Wilcox 1980). Specifically, conservation priorities and conservation actions should seek to accomplish one or more of the following goals:

- Protect occurrences of focal species and other conservation elements,
- Preserve large intact blocks of habitat,
- Focus protection in areas that expand existing protected areas and/or connect existing protected areas within the RCIS area and to existing protected areas adjacent to the RCIS area, and
- Protect wildlife corridors and linkages.

### 3.4.4.1 Alkali Mariposa-Lily

#### Conservation Goals and Objectives

**Goal 1:** Sustain the alkali mariposa-lily population in the RCIS area through protection of known extant populations and habitat and maintaining or enhancing habitat and ecological processes to support the species.

- **Objective 1.1:** Increase the number of protected and preserved known alkali mariposa-lily populations in the RCIS area. Measure progress toward achieving this objective in the number of populations protected.

[3] https://www.wildlife.ca.gov/Conservation/Climate-Science/Resources/Vulnerability

- **Objective 1.2**. Reduce the threat of habitat loss by protecting and preserving an additional 12,360 acres of potential alkali mariposa-lily habitat (indicated by habitat model and site conditions determined from surveys) to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 1.3:** Increase habitat preservation on protected lands by enhancing degraded saltbush scrub habitat and targeting areas suitable for alkali mariposa-lily, including areas with claypans and sand dunes, especially along drainages. Measure progress toward achieving this objective in the number of acres of enhanced saltbush scrub habitat.
- **Objective 1.4:** Maintain hydrological and sand-transport processes to support suitable habitat conditions for alkali mariposa-lily by protecting and enhancing the ecological function of Little Rock Wash. Measure progress toward achieving this objective in the number of bioswales or other method of positive filtration to control runoff to Little Rock Wash.

## Conservation Actions and Priorities

Implementing the conservation actions in Table 3-11 will support achieving the conservation goal and objectives for this species.

**Table 3-11. Conservation Actions for Alkali Mariposa-lily**

| Cons. Action ID | Cons. Obj. | Conservation Action |
|---|---|---|
| AMLI-1 | 1.1, 1.2 | Fund surveys of alkali mariposa-lily potential habitat during suitable flower periods to identify previously undocumented populations in the RCIS area. |
| AMLI-2 | 1.1, 1.2 | Acquire parcels with known occurrences of alkali mariposa-lily and potentially suitable habitat through fee title purchase or conservation easement. |
| AMLI-3 | 1.3 | Develop and implement management plans to guide maintaining or enhancing alkali desert scrub habitat on protected lands to benefit alkali mariposa-lily. |
| AMLI-4 | 1.4 | Develop and implement management plans to guide maintaining or restoring desert wash woodland scrub habitat on protected lands to benefit alkali mariposa-lily. |
| AMLI-5 | 1.1, 1.2 | Fence known populations of alkali mariposa-lily to exclude recreational vehicle entry. |
| AMLI-6 | 1.3 | Assemble known information on propagating the saltgrass meadow and desert wash vegetation community and conduct trials to determine if habitat expansion and/or additional alkali mariposa-lily plantings are feasible. |
| AMLI-7 | 1.4 | Control runoff to Little Rock Wash with bioswale filtration and other methods of positive filtration. |

The priority conservation areas for implementing conservation actions for alkali mariposa-lily in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 33,761 acres of potential habitat of high conservation value for alkali mariposa-lily occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs,* for a map of habitat of high conservation value for Alkali mariposa-lily and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

Alkali mariposa-lily is dependent on seasonally moist alkaline habitats, which are likely to be threatened by a warming climate. Conservation of this species will require active monitoring of environmental conditions where known populations exist. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions; however, proactive conservation actions may be required in the future given the species' limited distribution in the RCIS area, limited habitat availability, and dispersal capabilities.

Additional resources for conservation and management of rare plants in the face of climate change can be found on the CDFW Climate Science Program website, including the *Climate Change Vulnerability Assessment of Rare Plants in California* (Anacker et al. 2012).

## 3.4.4.2 California Juniper

### Conservation Goals and Objectives

**Goal 2:** Sustain California juniper in the RCIS area through protection of existing stands and implementing management to address stressors and pressures, including the effects of climate change.

- **Objective 2.1:** Reduce the threat of habitat loss by protecting and preserving an additional 13,381 acres of mapped California juniper to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10). An emphasis should be placed on prioritizing the acquisition of large woodland patches (greater than 100 acres) in predicted highest climate stability areas, which have connectivity to climate refugia.
- **Objective 2.2**: Increase habitat preservation on protected lands by managing California juniper habitat for restoration and rehabilitation to increase the long-term sustainability of varying age classes of California juniper stands. Measure progress toward achieving this objective in the acres of restored or rehabilitated California juniper stands on protected lands.

### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-12 will support achieving the conservation goal and objectives for this species.

**Table 3-12. Conservation Actions for California Juniper**

| Cons. Action ID | Cons. Obj. | Conservation Action |
|---|---|---|
| CAJU-1 | 2.1 | Acquire parcels with known California juniper stands through fee title purchase or conservation easement. |
| CAJU-2 | 2.2 | Identify old-growth California juniper stands to prioritize for protection from fire risk. |
| CAJU-3 | 2.2 | Conduct mechanical thinning treatments in California juniper stands identified as needing fuel load reduction. Thinning treatments should be conducted according to a habitat management plan and based on biological principles that retains a mosaic of higher and lower canopy cover and enhances or maintains wildlife habitat value. The timing of thinning treatments should be planned to minimize impacts on sensitive species, including avian nesting periods. Thinned vegetation should be placed in brush-pile fashion and away from fuel loads to provide wildlife habitat and maintain the former carbon capture represented by piled cut brush. |

The priority conservation areas for implementing conservation actions for California juniper in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 18,183 acres of mapped habitat of high conservation value for California juniper occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs,* for a map of habitat of high conservation value for California juniper and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

Although California juniper is adapted to very dry habitat conditions and locally abundant in the southern portions of the RCIS area, it is likely to undergo some shifts in distribution in response to climate change (e.g., shifts to higher elevations). Conservation of this species will require active monitoring of environmental conditions. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of natural communities in the face of climate change can be found on the CDFW Climate Science Program website, including the *Climate Vulnerability Analysis of Natural Vegetation Community Types Statewide in California* (Thorne et al. 2016).

## 3.4.4.3 Joshua Tree

### Conservation Goals and Objectives

**Goal 3:** Sustain and enhance the quality of Joshua tree woodland in the RCIS area by protecting and preserving existing stands and implementing conservation actions to address present and future pressures on the species, including climate change.

- **Objective 3.1:** Reduce the threat of habitat loss by preserving an additional 19,052 acres of mapped Joshua tree woodlands to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 3.2:** Enhance Joshua tree woodland in protected areas, targeting areas of low or moderate terrestrial intactness in cores and linkages with proximity to Joshua tree woodland habitat of high intactness. Measure progress toward achieving this objective in the acres of enhanced habitat.
- **Objective 3.3:** Manage Joshua tree woodland habitat adaptively to address climate change effects, incorporating best available science as a basis for management actions. Measure progress toward achieving this objective in acres of Joshua tree under adaptive management plans.

## Conservation Actions and Priorities

Implementing the conservation actions in Table 3-13 will support achieving the conservation goal and objectives for this species.

**Table 3-13. Conservation Actions for Joshua Tree**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| JOTR-1 | 3.1 | Acquire parcels with known Joshua tree stands through fee title purchase or conservation easement, prioritizing large patches of continuous Joshua tree woodlands or areas adjacent to already-protected lands. |
| JOTR-2 | 3.2 | Restore burned areas by planting young Joshua trees (caged to prevent herbivory), native shrubs, and perennial grasses to restrict invasion by annual invasive species. Burned Joshua trees should not be removed because they can resprout on occasion and provide habitat for wildlife. |
| JOTR-3 | 3.2 | Fence preserved Joshua tree woodlands, excluding vehicle access that can increase human-caused ignitions of wildfire and garbage dumping. |
| JOTR-4 | 3.2 | Periodically patrol preserved Joshua tree woodlands to monitor human uses. |
| JOTR-5 | 3.2 | Prepare wildfire suppression plans for preserved Joshua tree woodlands to minimize resource impacts from fire suppression tactics. |
| JOTR-6 | 3.1 | Conduct a fine-scale regional assessment to determine the most intact, largest extent of the oldest Joshua tree stands remaining in the RCIS area. |
| JOTR-7 | 3.3 | Conduct monitoring and aid in research of Joshua tree populations—including, but not limited to, flowering timing and frequency, seed germination, sprout dispersal, and Yucca moth activity—to better understand effects of climate change on these populations and identify actions to facilitate adaptation to these effects. |

The priority conservation areas for implementing conservation actions for Joshua tree in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 31,868 acres of mapped habitat of high conservation value for Joshua tree occurs within the habitat core areas and landscape linkages. Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for Joshua tree and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

Joshua tree is currently distributed broadly throughout the RCIS area; however, it is likely to undergo some shifts in distribution in response to climate change (e.g., shifts to higher elevations). Conservation of this species will require active monitoring of environmental conditions. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of natural communities in the face of climate change can be found on the CDFW Climate Science Program website, including the *Climate Vulnerability Analysis of Natural Vegetation Community Types Statewide in California* (Thorne et al. 2016).

## 3.4.4.4 Spreading Navarretia

### Conservation Goals and Objectives

**Goal 4**: Preserve existing populations and maintain and enhance suitable habitat for spreading navarretia within the RCIS area.

- **Objective 4.1**: Reduce the threat of habitat loss by protecting and preserving known extant occurrences of spreading navarretia in the RCIS area. Measure progress toward achieving this objective in the number of occurrences protected.
- **Objective 4.2**: Enhance suitable habitat for spreading navarretia in the RCIS area. Measure progress toward achieving this objective in the acres of habitat enhanced.
- **Objective 4.3**: Expand spreading navarretia populations to additional habitat locations if suitable habitat is determined to occur in the RCIS area and successful transplantation/revegetation techniques are available to improve conservation of the species within the RCIS area. Measure progress toward achieving this objective in the number of transplantation efforts.

### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-14 will support achieving the conservation goal and objectives for this species.

**Table 3-14. Conservation Actions for Spreading Navarretia**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| SPNA-1 | 4.1 | Acquire parcels with known occurrences of spreading navarretia through fee title purchase or conservation easement. |
| SPNA-2 | 4.1 | Conduct surveys for spreading navarretia to determine its distribution in the RCIS area. Scrutinize aerial photos in likely areas for wet and dry years as a first step in finding locations to check. |
| SPNA-3 | 4.2 | Conduct targeted studies to determine the species' management and micro-site needs. |
| SPNA-4 | 4.2 | Conduct invasive species removal in suitable habitat, as determined by the targeted studies. |
| SPNA-5 | 4.3 | Attempt experimental spreading navarretia transplantation in suitable habitat identified through proposed conservation action SPNA-3. |
| SPNA-6 | 4.2 | Protect spreading navarretia habitat from domestic livestock with fencing that still permits common animal vector access to the pools. |
| SPNA-7 | 4.2 | Protected water sources and drainages supporting ephemeral surface water and spreading navarretia habitat. |

Occurrences of spreading navarretia are not well documented in the RCIS area; only a single occurrence is documented in the Poppy Preserve Core Area. Therefore, more studies and surveys are needed to determine where implementing conservation actions for the species will provide the greatest conservation benefit. Vernal pools and alkali playa habitat should be surveyed for the species. These habitat types exist in these habitat core areas (i.e., Kings Canyon, Poppy Preserve, Munz Ranch Road, Portal Ridge, Brainard Canyon, Devil's Punchbowl). The Portal Ridge – Poppy Preserve linkage may also contain vernal pool and alkali playa habitat that provides suitable conditions for spreading navarretia and warrants protection, pending surveys and confirmation of species presence.

## Climate Change Issues and Considerations

Spreading navarretia occurs on vernal pools and alkali playa habitats, which are likely to be threatened by a warming climate. Conservation of this species will require active monitoring of environmental conditions where known populations exist. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions; however, proactive conservation actions may be required in the future, given the species' limited distribution in the RCIS area, limited habitat availability, and dispersal capabilities.

Additional resources for conservation and management of rare plants in the face of climate change can be found on the CDFW Climate Science Program website, including the *Climate Change Vulnerability Assessment of Rare Plants in California* (Anacker et al. 2012).

### 3.4.4.5 Short-Joint Beavertail Cactus

#### Conservation Goals and Objectives

**Goal 5:** Sustain short-joint beavertail cactus in the RCIS area through protection and preservation of existing occurrences and implementing management to address stressors and pressures, including the effects of climate change.

- **Objective 5.1:** Reduce the threat of habitat loss by protecting and preserving 8,502 acres of potential habitat for short-joint beavertail cactus to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 5.2:** Increase habitat preservation on protected lands by enhancing potential habitat for short-joint beavertail cactus in the RCIS area. Measure progress toward achieving this objective in the acres of enhanced habitat.
- **Objective 5.3**: Manage short-joint beavertail cactus habitat for restoration and rehabilitation to lower or eliminate fire risk, including reducing fuels strategically to reduce risk of fire within potential habitat. Measure progress toward achieving this objective in the acres of managed habitat.
- **Objective 5.4:** Maintain the short-joint beavertail cactus population in the RCIS area by minimizing destruction of individuals through education and transplantation. Measure progress toward achieving this objective in the number of education programs and transplant efforts.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-15 will support achieving the conservation goal and objectives for this species.

**Table 3-15. Conservation Actions for Short-joint Beavertail Cactus**

| Cons. Action ID | Cons. Obj. | Conservation Action |
|---|---|---|
| SBTC-1 | 5.1 | Acquire parcels with known occurrences of short-joint beavertail cactus and potentially suitable habitat through fee title purchase or conservation easement. |
| SBTC-2 | 5.2 | Enhance habitat for short-joint beavertail cactus by planting native shrubs and perennial grasses to restrict invasion by annual invasive species as well as salvaging and transplanting the species from affected areas to protected areas. |
| SBTC-3 | 5.3 | Remove invasive vegetation species by manual methods, preferably before maturation of invasive seeds. Do not use herbicides or other chemicals. |
| SBTC-4 | 5.4 | Identify suitable habitat within preserved areas to transplant short-joint beavertail cacti that are salvaged from authorized disturbance actions. |
| SBTC-5 | 5.4 | Prepare educational materials for private landowners within the range of short-joint beavertail cactus to become informed about the ease and necessity of short-joint beavertail cactus salvage. Provide such information to local community/county building permit issuance entities. |

| Cons. Action ID | Cons. Obj. | Conservation Action |
|---|---|---|
| SBTC-6 | 5.1 | Conduct a step-wise inventory using existing California Natural Diversity Database (CNDDB) entries to determine northernmost and westernmost populations of the species and inform land preservation and management actions. |

The priority conservation areas for implementing conservation actions for short-joint beavertail cactus in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 12,806 acres of potential habitat of high conservation value for short-joint beavertail cactus occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for short-joint beavertail cactus and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

Short-joint beavertail cactus occurs in scattered patches in dry scrub and woodlands (Joshua tree and California juniper) in the RCIS area. Conservation of this species will require active monitoring of environmental conditions where known populations exist. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions; however, proactive conservation actions may be required in the future, including potential translocation of cactus to areas of more suitable habitat (salvage translocations need to consider future climate conditions).

Additional resources for conservation and management of rare plants in the face of climate change can be found on the CDFW Climate Science Program website, including the *Climate Change Vulnerability Assessment of Rare Plants in California* (Anacker et al. 2012) and *Climate Vulnerability Analysis of Natural Vegetation Community Types Statewide in California* (Thorne et al. 2016).

## 3.4.4.6 Coast Horned Lizard

### Conservation Goals and Objectives

**Goal 6:** Sustain the coast horned lizard population in the RCIS area through habitat protection and preservation.

- **Objective 6.1:** Reduce the threat of habitat loss by protecting and preserving 3,055 acres of habitat for coast horned lizard to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 6.2:** Increase habitat preservation on protected lands by enhancing habitat for coast horned lizard (e.g., reducing invasive vegetation and animal species and re-establishing native grass species to support harvester ant populations). Measure progress toward achieving this objective in the acres of enhanced habitat.
- **Objective 6.3:** For residential developments within or adjacent to occupied habitat for coast horned lizard, develop an information program about the significance of impacts on coast horned lizards from collecting, driving off road, and bringing uncontrolled pets to the area.

Measure progress toward achieving this objective in the number of information programs implemented.

## Conservation Actions and Priorities

Implementing the conservation actions in Table 3-16 will support achieving the conservation goal and objectives for this species.

**Table 3-16. Conservation Actions for Coast Horned Lizard**

| Cons. Action ID | Cons. Obj. | Conservation Action |
|---|---|---|
| CHL-1 | 6.1 | Acquire parcels with potential habitat for coast horned lizard through fee title purchase or conservation easement. |
| CHL-2 | 6.2 | Implement an invasive species management program to re-establish shrublands with scattered patches of native grassland and sand and encourage harvester ant colonization. |
| CHL-3 | 6.2 | Monitor for and control non-native invasive ant species (e.g., Argentine ant) on preserved habitat for coast horned lizard. Assess irrigation practices on these lands and curtail if feasible (if irrigation is correlated with the presence of Argentine ants). |
| CHL-4 | 6.3 | Develop educational programs for land managers and private landowners within or adjacent to habitat for coast horned lizard regarding management strategies to minimize impacts on the species. |

The priority conservation areas for implementing conservation actions for coast horned lizard in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 13,940 acres of mapped habitat of high conservation value for coast horned lizard occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for coast horned lizard and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

## Climate Change Issues and Considerations

Coast horned lizard generally occurs along the southern toeslopes in the RCIS area. The species is closely associated with the distribution of its primary prey base (harvester ants). Conservation of this species will require active monitoring of environmental conditions where known populations exist. Protection and preservation of large, interconnected blocks of habitat will give this species and its prey base the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of reptiles in the face of climate change can be found on the CDFW Climate Science Program website, including *California Amphibian and Reptile Species of Future Concern: Conservation and Climate Change* (Wright et al. 2013).

### 3.4.4.7 Desert Horned Lizard

#### Conservation Goals and Objectives

**Goal 7:** Sustain the desert horned lizard population in the RCIS area through habitat protection and preservation.

- **Objective 7.1:** Reduce the threat of habitat loss by protecting and preserving 9,894 acres of modeled habitat for desert horned lizard to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 7.2**: Increase habitat preservation on protected lands by enhancing habitat for desert horned lizard (e.g., reducing invasive vegetation and animal species and re-establishing native grass species to support harvester ant populations). Measure progress toward achieving this objective in the acres of enhanced habitat.
- **Objective 7.3:** For residential developments within or adjacent to occupied habitat for desert horned lizard, develop an information program about the significance of impacts on desert horned lizards from collecting, driving off road, and bringing uncontrolled pets to the area. Measure progress toward achieving this objective in the number of information programs implemented.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-17 will support achieving the conservation goal and objectives for this species.

**Table 3-17. Conservation Actions of Desert Horned Lizard**

| Cons. Action ID | Cons. Obj. | Conservation Action |
|---|---|---|
| DHL-1 | 7.1 | Acquire desert horned lizard potential habitat through fee title purchase or conservation easement. |
| DHL-2 | 7.2 | Implement an invasive species management program to re-establish native shrubland and grassland and encourage harvester ant colonization. |
| DHL-3 | 7.2 | Monitor for and control non-native invasive ant species (e.g., Argentine ant) on preserved habitat for desert horned lizard. Assess irrigation practices on these lands and curtail if feasible (if irrigation is correlated with the presence of Argentine ants). |
| DHL-4 | 7.4 | Develop educational program for land managers and private landowners within or adjacent to habitat for desert horned lizard regarding management strategies to minimize impacts on the species. |
| DHL-5 | 7.1 | Fence representative high-density populations on preserved lands to exclude vehicle use, native plant community disturbance, pet collection, garbage dumping, and grading. |

The priority conservation areas for implementing conservation actions for desert horned lizard in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 15,811 acres of mapped habitat of high conservation value for desert horned lizard occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for desert horned lizard and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

Desert horned lizard generally are found throughout the desert habitats in the RCIS area, primarily in the eastern portions where patches of sand are generally present. Conservation of this species will require active monitoring of environmental conditions where known populations exist. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of reptiles in the face of climate change can be found on the CDFW Climate Science Program website, including C*alifornia Amphibian and Reptile Species of Future Concern: Conservation and Climate Change* (Wright et al. 2013).

## 3.4.4.8 Agassiz's Desert Tortoise

### Conservation Goals and Objectives

**Goal 8**: Sustain and enhance Agassiz's desert tortoise habitat in the RCIS area to maintain or increase the population and allow future range shifts due to climate change effects.

- **Objective 8.1:** Reduce the threat of habitat loss by protecting and preserving 15,189 acres of potential habitat for Agassiz's desert tortoise to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 8.2:** Increase habitat preservation on protected lands by enhancing habitat for Agassiz's desert tortoise in protected areas, targeting areas of low or moderate terrestrial intactness with proximity to modeled habitat areas with high intactness. Measure progress toward achieving this objective in the acres of enhanced habitat in protected areas.
- **Objective 8.3.** Increase habitat connectivity for Agassiz's desert tortoise in the RCIS area to provide for population and range changes on the landscape in response to biophysical changes due to climate change, shifting vegetation communities, and Agassiz's desert tortoise populations. Measure progress toward achieving this objective in the number of Agassiz's desert tortoise connectivity projects.

### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-18 will support achieving the conservation goal and objectives for this species.

**Table 3-18. Conservation Actions for Agassiz's Desert Tortoise**

| Cons. Action ID | Cons. Obj. | Conservation Action |
|---|---|---|
| DETO-1 | 8.1 | Acquire known suitable habitat in the northeastern corner of the RCIS planning area that connects tortoise populations on the Edwards Air Force Base to the southwestern portion of the Fremont-Kramer critical habitat unit and the Fremont-Kramer Area of Critical Environmental Concern on public lands to the northeast. |
| DETO-2 | 8.2 | Control non-native invasive annual grasses by mechanical means in targeted areas. |
| DETO-3 | 8.2 | Clean up dumps and trash piles and reduce human waste and trash that attracts tortoise predators such as coyotes and ravens. |
| DETO-4 | 8.1, 8.2 | Fence preserved lands with Agassiz's desert tortoise populations to exclude trespassers, domestic sheep, and recreational vehicles. |
| DETO-5 | 8.1, 8.2 | Provide periodic patrols of preserved lands with Agassiz's desert tortoise populations. |
| DETO-6 | 8.1, 8.2, 8.3 | Inventory lands with potential to support suitable Agassiz's desert tortoise habitat to assess relative population density and prioritize lands having higher densities for protection and preservation. |
| DETO-7 | 8.2 | Create an education program about desert wildlife, including Agassiz's desert tortoise. Educate the public about the damage that subsidizing ravens does to the desert ecosystem by creating abnormally high raven populations. Subsidy includes unguarded, excessive pet food; uncovered trash; and pools of standing water. |

The priority conservation areas for implementing conservation actions for Agassiz's desert tortoise in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 73,898 acres of mapped habitat of high conservation value for Agassiz's desert tortoise occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for Agassiz's desert tortoise and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

## Climate Change Issues and Considerations

Agassiz's desert tortoise are found in a wide variety of habitats, such as alluvial fans, washes, canyons, and saltbush plains; however, in the RCIS area, the species is limited to a relatively small area of suitable habitat in the northeast portion of the RCIS area. This species has been shown to be sensitive to extended drought (Lovich et al. 2014), which is expected to increase in frequency with climate change. Conservation of this species will require active monitoring of environmental conditions where known populations exist. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of reptiles in the face of climate change can be found on the CDFW Climate Science Program website, including *California Amphibian and Reptile Species of Future Concern: Conservation and Climate Change* (Wright et al. 2013).

### 3.4.4.9 Western Pond Turtle

#### Conservation Goals and Objectives

**Goal 9**: Sustain the western pond turtle populations in the RCIS area by protecting and preserving key aquatic habitats with suitable adjacent upland habitat.

- **Objective 9.1:** Identify areas with high potential for supporting western pond turtles, including sag ponds along the San Andreas fault. Conduct surveys for western pond turtle in those areas where access is permissible to determine where western pond turtles occur. To reduce the threat of habitat loss, protect and preserve areas that currently have western pond turtles or that have high potential for supporting western pond turtles. Measure progress toward achieving this objective in acres of occupied habitat or habitat with high potential for occurrence.
- **Objective 9.2:** Protect and preserve terrestrial habitat that is adjacent to permanently protected aquatic resources with western pond turtle populations or with high potential for supporting western pond turtle. Measure progress toward achieving this objective in the acres of adjacent upland habitat protected.
- **Objective 9.3:** Increase habitat preservation on protected lands by enhancing aquatic habitat for western pond turtle at ponds, wetlands, and streams in the RCIS area. Measure progress toward achieving this objective in the acres of enhanced aquatic habitat.
- **Objective 9.4:** Increase connectivity to aquatic habitat, and enhance terrestrial habitat for western pond turtle adjacent to aquatic habitat with known western pond turtle occurrences. Measure progress toward achieving this objective in the number of connections to upland habitat and enhanced acres of upland habitat.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-19 will support achieving the conservation goal and objectives for this species.

**Table 3-19. Conservation Actions for Western Pond Turtle**

| Cons. Action ID | Cons. Obj. | Conservation Action |
|---|---|---|
| WPTU-1 | 9.1 | Conduct periodic surveys of protected areas to estimate western pond turtle occupancy and/or populations in the RCIS area. |
| WPTU -2 | 9.1, 9.2 | Acquire parcels within or adjacent to aquatic habitat supporting western pond turtles through fee title purchase and easement. Along the length of the San Andreas fault, purchase sag ponds or acquire conservation easements on them to enable institution of whatever methods are needed to ensure water quality. |
| WPTU-3 | 9.3 | Coordinate with private landowners, water agencies, and wildlife agencies to implement bullfrog eradication, remove red-eared sliders, and control non-native predators in occupied habitat for western pond turtle. |
| WPTU-4 | 9.3, 9.4 | Remove obstructions and clear out culverts as needed to retain streamflow and reduce sedimentation. Periodically remove garbage from occupied aquatic habitat for western pond turtle. |

| Cons. Action ID | Cons. Obj. | Conservation Action |
|---|---|---|
| WPTU-5 | 9.3 | Install woody debris around the perimeter and in submerged banks of ponds and wetlands to create basking habitat and cover for juvenile turtles. |
| WPTU-6 | 9.4 | Annually identify and maintain upland breeding sites for western pond turtles because of the high fidelity of use from year to year. |
| WPTU-7 | 9.3 | Excavate sections of ponds to provide deeper pools for use by western pond turtles while maintaining shallow areas that provide rearing habitat for their hatchlings. |
| WPTU-8 | 9.2 | Post signs at protected areas with information regarding prohibitions on reptile (not specifically turtles) collection, the release of pet animals into native habitat, and disposal of garbage. |
| WPTU-9 | 9.2 | Monitor water levels/size of pools known to be occupied by western pond turtles in tandem with actions to ensure that levels do not drop below a certain level (by providing supplemental water in times of severe drought). |
| WPTU-10 | 9.2 | Ensure that flood control and transportation agencies have been alerted to the presence of western pond turtles residing on protected lands. |
| WPTU-11 | 9.2 | Upon discovery of occupied habitat, coordinate with all relevant land managers to ensure that water flow/maintenance activities take into account the presence of western pond turtle. |
| WPTU-12 | 9.2 | Reduce adverse effects from urban runoff on occupied habitat for western pond turtle by filtering with use of bioswales or other means. |

Occurrences of western pond turtle are not well documented in the RCIS area, although they are able to use a variety of open-water aquatic habitat types, including streams, rivers, marshes, and ponds. Therefore, more studies and surveys are needed to determine the areas where implementing conservation actions for the species will provide the greatest conservation benefit. Refer to Figure F-9 in Appendix F, *Focal Species Habitat Models*, for a map of known occurrences and aquatic habitats for western pond turtle in the RCIS area.

## Climate Change Issues and Considerations

Western pond turtles are dependent on aquatic habitats and have occurred historically within the Amargosa Creek, Big Rock Wash, and Little Rock Creek watersheds in the RCIS area. There was an unconfirmed observation of western pond turtle at Una Lake in 2017 (Kohn pers. comm.). The persistence of perennial water sources is adversely affected by extended drought, which is expected to increase in frequency with climate change. Therefore, the amount and distribution of potentially suitable aquatic habitat for this species are likely to decrease with a warming climate. Furthermore, western pond turtles have temperature-determined sex ratios (i.e., more turtles develop as females in warmer conditions), which is another concern with a warming climate (Christie and Geist 2016). Conservation of this species will require active monitoring of environmental conditions where known populations exist. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions; however, translocation and reintroduction into suitable habitats may be needed where opportunities for movement to suitable habitats are not available.

Additional resources for conservation and management of reptiles in the face of climate change can be found on the CDFW Climate Science Program website, including *California Amphibian and Reptile Species of Future Concern: Conservation and Climate Change* (Wright et al. 2013).

### 3.4.4.10 Burrowing Owl

#### Conservation Goals and Objectives

**Goal 10:** Sustain the burrowing owl population within the RCIS area by protecting and preserving natural and agricultural habitats that support burrowing owls at a landscape scale.

- **Objective 10.1:** Protect and preserve all burrowing owl nest sites, including surrounding foraging habitat (extending approximately 1 kilometer from burrows) (Figure F-10, Appendix F, *Focal Species Habitat Models*), in the RCIS area. Measure progress toward achieving this objective in the number of nest sites protected.
- **Objective 10.2:** Reduce the threat of habitat loss by protecting and preserving 55,620 acres of potential habitat for burrowing owl. Prioritize areas around concentrated burrowing owl occurrences within the RCIS area with the size and configuration needed to maintain and expand burrowing owl populations. Known population concentrations are found in the following areas:
    - Residential and agricultural areas north of Lancaster Road,
    - Residential and agricultural areas east of the Antelope Valley Poppy Reserve,
    - Residential and agricultural areas west and east of Lancaster,
    - Residential and agricultural areas south of Edwards Air Force Base,
    - Residential and agricultural areas south of Palmdale, and
    - Agricultural areas west of the Palmdale Reservoir area and Big Rock Creek Wildlife Sanctuary.
- **Objective 3:** Increase habitat preservation on protected lands by enhancing and restoring occupied nesting habitat for western burrowing owl on protected or preserved lands with suitable habitat for burrowing owl, including grasslands or grasslands with shrub cover amounting to less than 30 percent. Measure progress toward achieving this objective in the number of acres preserved or restored occupied habitat.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-20 will support achieving the conservation goal and objectives for this species.

**Table 3-20. Conservation Actions for Burrowing Owl**

| Cons. Action ID | Cons. Obj. | Conservation Action |
|---|---|---|
| BUOW-1 | 10.1 | Permanently protect occupied nest sites for burrowing owl and adjacent suitable foraging habitat through acquisition and easements. |
| BUOW-2 | 10.2 | Acquire, through fee title purchase or conservation easement, parcels with documented burrowing owl nests in the subset of the RCIS area. |

| Cons. Action ID | Cons. Obj. | Conservation Action |
|---|---|---|
| BUOW-3 | 10.2 | Acquire, through fee title purchase or conservation easement, parcels with historical burrowing owl nesting habitat in the subset of the RCIS area. |
| BUOW-4 | 10.2 | Implement an annual monitoring program for burrowing owl in coordination with local conservation groups. |
| BUOW-5 | 10.3 | Adopt and implement all applicable conservation management practices from the CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012b). |
| BUOW-6 | 10.3 | Include species-specific measures in management plans that prohibit rodenticides and emphasize the conservation and expansion of ground squirrel colonies. |
| BUOW-7 | 10.3 | Prepare an educational pamphlet about burrowing owl, outlining what the public can do to avoid affecting this focal species. Distribute as needed to landowners living proximal to lands protected for the burrowing owl. |
| BUOW-8 | 10.2 | Prepare an assessment of habitat within the RCIS area to inform the land acquisition identified in BUOW-1 to BUOW-3. |
| BUOW-9 | 10.3 | Reduce the density and/or use frequency of recreational vehicle routes proximal to burrowing owl use areas. Fence high-density burrow areas that support nesting to exclude recreational vehicle use. |
| BUOW-10 | 10.3 | Work with agricultural land operators on agricultural easements to minimize potential impacts on burrowing owls that may occupy these areas, including use of poisons, herbicides, and rodenticides with anticoagulant. |
| BUOW-11 | 10.3 | Enhance the carrying capacity of preserved or protected lands through careful placement of artificial nesting burrow systems in appropriate habitat. |
| BUOW-12 | 10.3 | Protect and conserve fossorial mammal populations on suitable habitat for burrowing owl that is not within agricultural fields. |

The priority conservation areas for implementing conservation actions for burrowing owl in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 184,301 acres of mapped habitat of high conservation value for burrowing owl occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for burrowing owl and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

## Climate Change Issues and Considerations

Burrowing owls occupy grasslands, deserts, sagebrush scrub, and agricultural areas, which are widely available throughout the RCIS area. Burrowing owls rely on other species, including ground squirrels, American badger, and desert tortoise, to excavate burrows that they eventually use for shelter and nesting. As climate change affects the distribution of these other fossorial animals, it will also affect the distribution of burrowing owls. Furthermore, burrowing owls generally forage near their burrow locations; therefore, any climate change effects on their prey base distribution will also affect the suitability and distribution of habitat. Conservation of this species will require active monitoring of environmental conditions where known populations exist. Protection and preservation of large, interconnected blocks of habitat will give this species, and the fossorial animals and prey upon which it depends, the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO] 2011).

### 3.4.4.11 California Condor

#### Conservation Goals and Objectives

**Goal 11:** Contribute to recovery of the California condor by maintaining suitable foraging habitat and protecting and preserving nesting and roosting habitat in the RCIS area as it is identified through monitoring.

- **Objective 11.1:** To reduce the threat of loss of foraging habitat, protect and preserve 3,813 acres of potential habitat for California condor foraging to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 11.2**: Increase habitat preservation on protected lands by enhancing habitat for California condor foraging and roosting in the RCIS area. Measure progress toward achieving this objective in the acreage of enhanced roosting habitat.
- **Objective 11.3:** Remove or reduce potential threats and environmental stressors that negatively affect California condor populations within the RCIS area. Measure progress toward achieving this objective in the number of threats removed.
- **Objective 11.4**: Use monitoring and adaptive management to inform areas of conservation emphasis. Measure progress toward achieving this objective in acres of land under California condor monitoring and adaptive management plans.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-21 will support achieving the conservation goal and objectives for this species.

**Table 3-21. Conservation Actions for California Condor**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| CACO-1 | 11.1 | Acquire parcels with potential foraging habitat for California condor through fee title purchase or conservation easement. |
| CACO-2 | 11.2 | Establish conservation easements on large parcels of rangeland to preserve foraging habitat for California condor in the RCIS area. |
| CACO-3 | 11.4 | Fund monitoring programs for California condor to increase understanding of breeding, roosting, and foraging behavior in the RCIS area. |
| CACO-4 | 11.3 | Reduce mortality risk associated with exposure to microtrash ingestion by patrolling for and curtailing illegal dumping and cleaning dispersed campsites of microtrash in the RCIS area. |

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| CACO-5 | 11.3 | Develop and promote public information programs that foster public awareness of and compliance with California condor conservation, management, and research efforts. |
| CACO-6 | 11.3 | Assess California condor use within RCIS area every 3 years or more frequently to inform land acquisition conservation action CACO-1. |
| CACO-7 | 11.1 | Maintain wind-rows adjacent to agricultural fields and other structures observed to be used as perches by California condors in and adjacent to protected lands. |
| CACO-8 | 11.2 | Investigate the possibility of re-introduction of pronghorn to maintain grazing on preserved grasslands in the RCIS area. |
| CACO-9 | 11.2 | Implement management plans to protect and conserve fossorial mammal populations on suitable foraging habitat for California condor that is not within agricultural fields. |
| CACO-10 | 11.2 | Include species-specific measures in management plans that prohibit the use of poisons, herbicides, and rodenticides with anticoagulant. |

The priority conservation areas for implementing conservation actions for California condor in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 16,905 acres of potential foraging habitat of high conservation value for California condor occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for California condor and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

Within the RCIS area, habitat for California condor is concentrated along the foothills of the San Gabriel Mountains and the northern expression of the Castaic Ranges. Potential effects of climate change on this species are unclear; however, the shifting habitat distributions of its prey base in response to climate change will change the distribution and abundance of its foraging resources. Protection and preservation of large, interconnected blocks of habitat will give this species, and its prey, the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO] 2011).

## 3.4.4.12 Golden Eagle

### Conservation Goals and Objectives

**Goal 12:** Maintain a robust and resilient population of golden eagles in the RCIS area that is adaptive to changing conditions.

- **Objective 12.1:** To reduce the threat of loss of foraging habitat, protect and preserve 15,574 acres[4] of potential foraging habitat for golden eagle to meet the conservation target for the species.
- **Objective 12.2:** Preserve and protect known nest sites for golden eagle in the RCIS area. Measure progress toward achieving this objective in the number of nests protected.
- **Objective 12.3**: Increase habitat preservation on protected lands by enhancing foraging and roosting habitat for golden eagle in the RCIS area. Measure progress toward achieving this objective in the acres preserved on currently protected lands.
- **Objective 12.4:** Remove or reduce potential threats and environmental stressors that negatively affect golden eagles within the RCIS area. Measure progress toward achieving this objective in the number of environmental stresses removed or reduced.
- **Objective 12.5**: Use monitoring and adaptive management to inform areas of conservation emphasis. Measure progress toward achieving this objective in the number of acres under monitoring and adaptive management plans for golden eagle.

## Conservation Actions and Priorities

Implementing the conservation actions in Table 3-22 will support achieving the conservation goal and objectives for this species.

**Table 3-22. Conservation Actions for Golden Eagle**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| GOEA-1 | 12.1, 12.2 | Acquire property with known foraging habitat or nest sites for golden eagle through fee title purchase or conservation easement. |
| GOEA-2 | 12.3 | Coordinate with agricultural landowners to review land management practices on working agricultural lands. Identify and promote practices that enhance and increase golden eagle foraging, including beneficial crop harvest timing and cropping patterns. |
| GOEA-3 | 12.4 | Fund golden eagle monitoring programs to increase understanding of breeding, roosting, and foraging behavior in the RCIS area. |
| GOEA-4 | 12.5 | Reduce the mortality risk associated with exposure to lead by (a) implementing a lead reduction program within the RCIS area and (b) maintaining and enforcing a permanent ban on the use of lead ammunition, per the Ridley-Tree Condor Preservation Act, in appropriate portions of the RCIS area (primarily deer hunt zones D-9 and 10). |
| GOEA-5 | 12.5 | Develop and promote public information programs that foster public awareness of and compliance with condor conservation, management, and research efforts. |
| GOEA-6 | 12.5 | Retrofit power lines in known foraging habitat for golden eagle to prevent electrocutions. |
| GOEA-7 | 12.3 | Reduce the density of recreational vehicle routes in areas of foraging habitat for golden eagle. |

[4] This target is based on the golden eagle habitat with high conservation value from the agriculture/grassland species group. The golden eagle is also in the desert species group. Based on that group, 12,051 acres of golden eagle habitat has high conservation value. The greater of these two acreage targets was selected for the conservation target for the species.

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| GOEA-8 | 12.3 | Investigate the possibility of re-introduction of pronghorn to maintain grazing on preserved grasslands in the RCIS area. |
| GOEA-9 | 12.3 | Implement management plans to protect and conserve fossorial mammal populations on suitable foraging habitat for golden eagle that is not within agricultural fields. |
| GOEA-10 | 12.3 | Include species-specific measures in management plans that prohibit the use of poisons, herbicides, and rodenticides with anticoagulant. |

The priority conservation areas for implementing conservation actions for golden eagle in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Because golden eagle may forage in agricultural/grassland and desert habitats, this species was included in both species groups for mapping high biological values areas (Section 3.2.1.1*, Focal Species Habitat Groups*). Based on the agriculture/grassland group, the golden eagle has 40,477 acres of potential foraging habitat of high conservation value within the habitat core areas and landscape linkages. Based on the desert group, it has 30,135 acres of potential foraging habitat of high conservation value in the habitat core areas and landscape linkages. (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs,* for a map of habitat of high conservation value for golden eagle and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

Much of the golden eagle habitat in the RCIS area is situated to the west and south in the foothills of the San Gabriel Mountains and Castaic Ranges. Potential effects of climate change on this species are unclear; however, the shifting habitat distributions of its prey base in response to climate change will change the distribution and abundance of its foraging resources. Protection and preservation of large, interconnected blocks of habitat will give this species, and its prey, the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO], 2011).

## 3.4.4.13 LeConte's Thrasher

### Conservation Goals and Objectives

**Goal 13:** Sustain or increase the LeConte's thrasher population and the amount of suitable habitat protected and preserved in the RCIS area.

- **Objective 13.1:** Reduce the threat of habitat loss by protecting and preserving 53,253 acres[5] of potential habitat for LeConte's thrasher to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 13.2:** Improve nesting and foraging habitat for LeConte's thrasher on protected or preserved lands by excluding recreational vehicle use in wash areas of dense or robust creosote bush (*Larrea tridentata*) and saltbush (*Atriplex* spp.) growth. Measure progress toward achieving this objective in the acres of habitat excluded from recreational vehicle use.

## Conservation Actions and Priorities

**Table 3-23. Conservation Actions for LeConte's Thrasher**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| LECT-1 | 13.1 | Acquire parcels of potentially suitable habitat for LeConte's thrasher through fee title purchase or conservation easement. |
| LECT-2 | 13.2 | Implement best management practices to reduce the density and threat of invasive species by removing livestock grazing and controlling unauthorized off-highway vehicle use within habitat for LeConte's thrasher in preserved areas. |
| LECT-3 | 13.2 | Fence occupied wash habitat for LeConte's thrasher with channel-entrance boulders, which are necessary in some flow areas to exclude vehicle entry. |
| LECT-4 | 13.2 | Perform a fine-scale surveys of known nesting locales for LeConte's thrasher to confirm occupancy and inform conservation action LECT-1. |

The priority conservation areas for implementing conservation actions for LeConte's thrasher in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Because LeConte's thrashers occur in agricultural/grassland and desert habitats, this species was included in both species groups for mapping high biological values areas (see Section 3.2.1.1, *Focal Species Habitat Groups*). Based on the agriculture/grassland group, LeConte's thrasher has 195,772 acres of potential foraging habitat of high conservation value within the habitat core areas and landscape linkages. Based on the desert group, it has 222,949 acres of potential foraging habitat of high conservation value in the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for LeConte's thrasher and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

## Climate Change Issues and Considerations

LeConte's thrasher is typically found in desert wash woodland and scrub, as well as sparsely vegetated desert dune habitats, and distributed predominantly throughout the valley floor in the eastern portion of the RCIS area. Although this species is adapted to dry desert-habitat conditions, it is likely to undergo some shifts in distribution (e.g., shifts to higher elevations) as the natural

[5] This target is based on LeConte's thrasher habitat with high conservation value from the agriculture/grassland species group. LeConte's thrasher is also in the desert species group. Based on that group, 49,745 acres of LeConte's thrasher habitat has high conservation value. The greater of these two acreage targets was selected for the conservation target for the species.

communities in which it occurs change their distribution in response to climate change. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO] 2011).

### 3.4.4.14 Least Bell's Vireo

#### Conservation Goals and Objectives

**Goal 14:** Sustain or increase the least Bell's vireo population and the amount of suitable habitat protected and preserved in the RCIS area.

- **Objective 14.1:** Reduce the threat of habitat loss by protecting and preserving 2,352 acres of potential habitat for least Bell's vireo to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 14.2:** Increase habitat preservation on protected lands by enhancing suitable habitat for least Bell's vireo on protected lands (e.g., by carefully managing allowed uses, removing non-native plants/planting native vegetation, controlling nest parasitism by brown-headed cowbird). Measure progress toward achieving this objective in acres of enhanced habitat.
- **Objective 14.3:** Preserve habitat for least Bell's vireo by assessing uses occurring on protected lands that support suitable habitat for least bell's vireo and managing uses, including livestock and equestrian use, recreational vehicle travel, and hiking, to eliminate or minimize impacts and contribute to the conservation of this species. Measure progress toward achieving this objective in the number of eliminated or minimized impacts.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-24 will support achieving the conservation goal and objectives for this species.

**Table 3-24. Least Bell's Vireo Conservation Actions**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| LBVI-1 | 14.1 | Acquire parcels with known breeding occurrences of least Bell's vireo, or within the same watershed, through fee title purchase or conservation easement in priority conservation areas. Properties with current/perennial water flow and extensive willow growth should be prioritized for preservation. |
| LBVI-2 | 14.2, 14.3 | If non-native plant invasion is found within protected lands that support suitable habitat for least Bell's vireo, initiate a control program with non-native plant removal and native plant revegetation components. Monitor this removal effort for efficacy and adaptive management purposes. |
| LBVI-3 | 14.2, 14.3 | If cowbirds are determined to be adversely affecting least Bell's vireo populations on protected lands through nest parasitism, a cowbird trapping control program will be initiated by qualified permitted individuals. This |

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| | | removal effort will be monitored for efficacy and adaptive management purposes. |
| LBVI-4 | 14.2 | Manage livestock grazing in habitat for least Bell's vireo to eliminate adverse impacts. |
| LBVI-5 | 14.2 | Route all hiking and equestrian trails, as well as recreational use infrastructure, on protected lands that support habitat for least Bell's vireo away from potentially suitable nesting habitat for least Bell's vireo. |
| LBVI-6 | 14.2 | Restrict water diversions that affect riparian habitat used by least Bell's vireo. |

The priority conservation areas for implementing conservation actions for least Bell's vireo in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 4,845 acres of potential foraging habitat of high conservation value for least Bell's vireo occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for least Bell's vireo and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

Least Bell's vireo is a riparian bird species that is generally restricted to small patches of riparian habitat in the western foothills of the RCIS area as well as some small patches of habitat east of the RCIS area along the valley floor. The persistence of riparian habitat is adversely affected by extended drought, which is expected to increase in frequency with climate change. Therefore, the amount and distribution of potentially suitable riparian habitat for this species are likely to decrease with a warming climate. Protection and preservation of large, interconnected blocks of habitat and protection of groundwater and surface water sources that support riparian habitats will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO] 2011).

## 3.4.4.15 Loggerhead Shrike

### Conservation Goals and Objectives

**Goal 15:** Sustain the loggerhead shrike population in the RCIS area by protecting, preserving, and enhancing high-quality native habitat for loggerhead shrike and enhancing non-native grasslands.

- **Objective 15.1**: Reduce the threat of habitat loss by protecting and preserving 67,984 acres of potential habitat for loggerhead shrike to meet the conservation target for this species.
- **Objective 15.2**: Increase the size and connectivity of grassland and desert habitat patches in the RCIS area that are within or in proximity to potentially suitable habitat for loggerhead shrike.

Measure progress toward achieving this objective in the increased acreage of habitat patches and number of connections made between patches.

- **Objective 15.3**: Increase habitat preservation on protected lands by enhancing potentially suitable habitat for loggerhead shrike in protected lands and on working lands (i.e., rangelands, pastures) in the RCIS area, targeting areas of moderate terrestrial intactness with proximity to potentially suitable habitat of high intactness, including desert scrub and grassland, Joshua tree woodland, and southwest riparian forest. Measure progress toward achieving this objective in the acres of enhancement of suitable habitat.

## Conservation Actions and Priorities

Implementing the conservation actions in Table 3-25 will support achieving the conservation goal and objectives for this species.

**Table 3-25. Conservation Priorities for Loggerhead Shrike**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| LGHS-1 | 15.1 | Acquire suitable habitat in the RCIS areas (both desert and adjacent grassland habitat). Consider the establishment of agricultural easements for working agricultural landscapes that support both nesting and foraging habitat. |
| LGHS-2 | 15.3 | Plant and/or maintain wind-rows of trees adjacent to working agricultural landscapes. |
| LGHS-3 | 15.2 | Coordinate with agricultural land operators in reviewing agricultural chemical/pesticide use in the region to determine if such use adversely affects loggerhead shrike on protected lands. |
| LGHS-4 | | Reduce the number of recreational vehicle routes on protected lands that support suitable foraging and nesting habitat for loggerhead shrike. |

The priority conservation areas for implementing conservation actions for loggerhead shrike in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 211,094 acres of potential foraging habitat of high conservation value for loggerhead shrike occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for loggerhead shrike and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

## Climate Change Issues and Considerations

Loggerhead shrike is typically found in desert woodland and scrub habitats throughout the valley floor of the RCIS area. Although this species is adapted to dry desert-habitat conditions, it is likely to undergo some shifts in distribution (e.g., shifts to higher elevations) as the natural communities in which it occurs change their distribution in response to climate change. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability*

*Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO], 2011).

## 3.4.4.16 Long-Billed Curlew

### Conservation Goals and Objectives

**Goal 16:** Sustain the long-billed curlew population within the RCIS area; protect and preserve natural and agricultural habitats that support long-billed curlew at a landscape scale.

- **Objective 16.1:** Reduce the threat of habitat loss by protecting and preserving 23,061 acres of potential habitat for long-billed curlew to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 16.2**: Increase the number of protected and preserved known wintering grounds for long-billed curlew. Measure progress toward achieving this objective in the number of wintering grounds protected.
- **Objective 16.3:** Support land management and water use practices that maintain habitat for the long-billed curlew in the RCIS area. Measure progress toward achieving this objective in acres of land and water with improved management practices.

### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-26 will support achieving the conservation goal and objectives for this species.

**Table 3-26. Conservation Priorities for Long-Billed Curlew**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| LBCU-1 | 16.1 | Acquire, through fee title purchase or conservation agricultural easements, parcels with documented overwintering habitat for long-billed curlew. |
| LBCU-2 | 16.2, 16.3 | Implement an annual monitoring program for long-billed curlew in coordination with local conservation groups. |
| LBCU-3 | 16.3 | Work with private landowners on agricultural lands (e.g., alfalfa, sod) to help them determine whether long-billed curlew are using their fields during breeding season and develop land management strategies to enhance and increase overwintering habitat. |
| LBCU-4 | 16.3 | Protect and conserve fossorial mammal populations on suitable foraging habitat for long-bill curlew that is not within agricultural fields. |
| LBCU-5 | 16.3 | Include species-specific measures in management plans that prohibit use of poisons, herbicides, and rodenticides with anticoagulant. |

The priority conservation areas for implementing conservation actions for long-billed curlew in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 76,445 acres of potential habitat of high conservation value for long-billed curlew occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs,* for a map of habitat of high conservation value for long-billed curlew and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

Habitat for long-billed curlew is mostly distributed throughout the wetland and agricultural areas north and east of Lancaster. Changes in agriculture practices in response to climate change will very likely affect the distribution of available wintering and migratory habitat for this species. Consideration of this species when developing conservation actions on working landscapes that promote agricultural practices that support suitable habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO] 2011).

## 3.4.4.17 Mountain Plover

### Conservation Goals and Objectives

**Goal 17:** Protect and preserve agricultural habitat in the RCIS area to provide enough suitable habitat for mountain plovers and maintain and expand the population wintering in the RCIS area.

- **Objective 17.1:** Reduce the threat of habitat loss by protecting and preserving 22,984 acres of potential habitat for mountain plover to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 17.2:** Protect and preserve all wintering habitat where mountain plover have been identified. Measure progress toward achieving this objective in the number of acres of wintering habitat protected.
- **Objective 17.3:** Eliminate or alleviate threats to mountain plovers that could further reduce the size of the population or constrain recovery of the species' population in the study area, including identifying lands with detrimental range management or agricultural practices that could threatened habitat suitability for mountain plover and targeting these areas for conservation. Measure progress toward achieving this objective in acres with improved management practices.

### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-2 will support achieving the conservation goal and objectives for this species.

**Table 3-27. Conservation Priorities for Mountain Plover**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| MOPL-1 | 17.1 | Acquire, through fee title purchase or conservation easement, parcels with wintering habitat for mountain plover. |
| MOPL-2 | 17.1, 17.2 | Implement an annual monitoring program for mountain plover in coordination with local conservation groups. |
| MOPL-3 | 17.3 | Work with private landowners on agricultural lands (e.g., grazed pastures, alfalfa fields, fields that have been burned or tilled post-harvest) to help them determine whether mountain plover are using their fields during the winter and develop land management strategies for mountain plover to enhance and increase wintering habitat. |
| MOPL-4 | 17.3 | Work with private landowners to avoid range management or agricultural practices that are detrimental to habitat suitability for mountain plover. |

The priority conservation areas for implementing conservation actions for mountain plover in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 53,477 acres of potential habitat of high conservation value for mountain plover occurs in the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs,* for a map of habitat of high conservation value for mountain plover and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

Mountain plover wintering habitat in the RCIS area is primarily in the large area of grassland habitat and the agricultural areas just east and west of Lancaster. Changes in agriculture practices in response to climate change will very likely affect the distribution of available habitat for this species. Consideration of this species when developing conservation actions on working landscapes that promote agricultural practices that support suitable habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO] 2011).

## 3.4.4.18 Northern Harrier

### Conservation Goals and Objectives

**Goal 18:** Sustain the northern harrier population in the RCIS area; protect and preserve natural and agricultural habitats that support northern harrier at a landscape scale.

- **Objective 18.1:** Protect and preserve known nesting sites for northern harrier as well as nesting habitat in the RCIS area, including dense riparian or marsh vegetation such as willows, grasses, sedges, reeds, and cattails. Measure progress toward achieving this objective in number of nesting sites and potential nesting habitat protected.

- **Objective 18.2:** Reduce the threat of habitat loss by protecting and preserving 236 acres of potential habitat for northern harrier to meet the conservation target of the species (Table 3-10).
- **Objective 18.3**: Increase habitat preservation by enhancing nesting and foraging habitat for northern harrier in already-protected areas or on working lands. Measure progress toward achieving this objective in acres of enhanced foraging habitat within protected areas or on working lands.

## Conservation Actions and Priorities

Implementing the conservation actions in Table 3-28 will support achieving the conservation goal and objectives for this species.

**Table 3-28. Conservation Priorities for Northern Harrier**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| NOHA-1 | 18.1 | Conduct surveys for northern harriers, including nest sites, in potential habitat. |
| NOHA-2 | 18.1 | Monitor nest sites and protect them from human disturbance. |
| NOHA-3 | 18.1, 18.2 | Work with private landowners on working lands, including rangelands and agricultural fields, to implement practices conducive to maintaining nesting and foraging habitat for northern harrier. |
| NOHA-4 | 18.2 | Acquire, through fee title purchase, conservation, or agricultural easement, parcels with potential habitat for northern harrier. |
| NOHA-5 | 18.3 | Install perch sites in suitable foraging habitat for northern harrier. |
| NOHA-6 | 18.3 | Identify suitable wetland habitat that could benefit from increased or better-timed water delivery and partner with water managers to procure water for nesting habitat. |
| NOHA-7 | 18.3 | Protect and conserve fossorial mammal populations on suitable foraging habitat for northern harrier that is not within agricultural fields. |
| NOHA-8 | 18.3 | Include species-specific measures in management plans that prohibit use of poisons, herbicides, and rodenticides with anticoagulant. |

The priority conservation areas for implementing conservation actions for northern harrier in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 4,295 acres of potential habitat of high conservation value for northern harrier occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs,* for a map of habitat of high conservation value for northern harrier and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

## Climate Change Issues and Considerations

Habitats in the RCIS area that support northern harrier include freshwater and brackish marshes; wet meadows; weedy borders of lakes, rivers, and streams; annual and perennial grasslands; weedy fields; ungrazed or lightly grazed pastures; some croplands; sagebrush flats; and desert sinks.

Changes in agriculture practices in response to climate change will very likely affect the distribution of available agricultural habitat for this species, and other natural habitat is likely to undergo some shifts in distribution as the natural communities in which it occurs change their distribution in response to climate change. Consideration of this species when developing conservation actions on working landscapes that promote agricultural practices that support suitable habitat and protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO] 2011).

### 3.4.4.19 Prairie Falcon

#### Conservation Goals and Objectives

**Goal 19:** Sustain the prairie falcon population in the RCIS area; protect and preserve natural and agricultural habitats that support prairie falcon at a landscape scale.

- **Objective 19.1:** Protect and preserve known nesting sites for prairie falcon as well as nesting habitat in the RCIS area, including rock outcrops and cliffs. Measure progress toward achieving this objective in number of nesting sites protected.
- **Objective 19.2:** Reduce the threat of habitat loss by protecting and preserving 70,377 acres of potential habitat for prairie falcon to meet the conservation target of the species (Table 3-10).
- **Objective 19.3**: Increase habitat preservation by enhancing foraging habitat for prairie falcon in already-protected areas or on existing working lands. Measure progress toward achieving this objective in acres of enhancement within protected areas.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-29 will support achieving the conservation goal and objectives for this species.

**Table 3-29. Conservation Priorities for Prairie Falcon**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| PRFA-1 | 19.1 | Conduct surveys for prairie falcons, including nest sites, in potential habitat. |
| PRFA-2 | 191 | Monitor nest sites and protect them from human disturbance. |
| PRFA-3 | 19.1, 19.3 | Work with private landowners in grazed lands and agricultural fields to implement practices conducive to maintaining foraging habitat for prairie falcon. |
| PRFA-4 | 19.2 | Acquire, through fee title purchase or conservation easement, parcels with potential habitat for prairie falcon. |
| PRFA-5 | 19.3 | Reduce recreational vehicle routes and eliminate all shooting ranges within 0.5 mile of known nests of prairie falcon. |
| PRFA-6 | 19.3 | Protect and conserve fossorial mammal populations on suitable foraging habitat for prairie falcon that is not within agricultural fields. |
| PRFA-7 | 19.3 | Include species-specific measures in management plans that prohibit use of poisons, herbicides, and rodenticides with anticoagulant. |

The priority conservation areas for implementing conservation actions for prairie falcon in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 204,254 acres of potential habitat of high conservation value for prairie falcon occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs,* for a map of habitat of high conservation value for prairie falcon and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

## Climate Change Issues and Considerations

Prairie falcon habitat in the RCIS area includes open desert scrub, grassland, mixed-shrub grasslands, and some agricultural fields, including pasturelands, and occasionally grain and hay fields. Changes in agriculture practices in response to climate change will very likely affect the distribution of available agricultural habitat for this species, and other natural habitat is likely to undergo some shifts in distribution as the natural communities in which it occurs change their distribution in response to climate change. Consideration of this species when developing conservation actions on working landscapes that promote agricultural practices that support suitable habitat and protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO] 2011).

### 3.4.4.20 Swainson's Hawk

#### Conservation Goals and Objectives

**Goal 20:** Sustain or increase the number of Swainson's hawk nesting pairs in the RCIS area by protecting and preserving unprotected habitat and enhancing protected habitat to increase habitat quality in already-protected areas.

- **Objective 20.1**: Protect and preserve 15 known Swainson's hawk nesting trees in the RCIS area, based on surveys that documented breeding activity and suitability.
- **Objective 20.2**: Reduce the threat of habitat loss by protecting and preserving 52,745 acres of potential habitat for Swainson's hawk to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 20.3:** Increase habitat preservation by enhancing suitable habitat for Swainson's hawk on protected and working lands in the RCIS area, targeting areas of moderate terrestrial intactness with proximity to potentially suitable habitat of high intactness. Measure progress toward achieving this objective in acres of enhanced habitat on protected or working lands.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-30 will support achieving the conservation goal and objectives for this species.

**Table 3-30. Conservation Actions for Swainson's Hawk**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| SWHA-1 | 20.1 | Conduct surveys of historically documented nesting sites and potential new nesting sites to understand breeding activity in the RCIS area. |
| SWHA-2 | 20.1 | Permanently protect 15 known Swainson's hawk nest trees, based on surveys that documented breeding activity and suitability. |
| SWHA-3 | 20.2 | Acquire parcels of at least 20 acres (or adjacent to habitat patches of at least 20 acres) with potential habitat for Swainson's hawk through fee title purchase or conservation easement, prioritizing lands within 1 mile of known or suitable nest trees (Bloom and England pers. comm.). |
| SWHA-4 | 20.3 | Work with private landowners on working lands to develop land management strategies for Swainson's hawk that enhance and increase foraging and nesting habitat on patches greater than 20 acres within 1 mile of known nest trees, including cropping patterns beneficial to Swainson's hawks (e.g., alfalfa). |
| SWHA-5 | 19.3 | Protect and conserve fossorial mammal populations on suitable foraging habitat for Swainson's hawk that is not within agricultural fields. |
| SWHA-6 | 19.3 | Include species-specific measures in management plans that prohibit use of poisons, herbicides, and rodenticides with anticoagulant. |

The priority conservation areas for implementing conservation actions for Swainson's hawk in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Suitable foraging habitat within 1 mile of a documented nesting site or potentially suitable nesting site is also a high priority for conservation, including the Alpine Butte, Edwards, and Poppy Preserve

Core Habitats as well as the Alpine Butte-Edwards, Little Rock Wash, and Portal Ridge to Poppy Preserve Landscape Linkages.

Approximately 84,234 acres of potential habitat of high conservation value for Swainson's hawk occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs,* for a map of habitat of high conservation value for Swainson's hawk and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

In the RCIS area, Swainson's hawks nest primarily in Joshua trees and non-native ornamental trees, or trees planted as windbreaks, and forage in the alfalfa fields and other agricultural areas as well as grasslands, Joshua tree woodlands, and other desert scrub habitats that support a suitable prey base of small rodents, birds, snakes, and insects such as grasshoppers and crickets. Changes in agriculture practices in response to climate change will very likely affect the distribution of available agricultural habitat for this species, and other natural habitat is likely to undergo some shifts in distribution as the natural communities in which it occurs change their distribution in response to climate change. The presence of large, suitable nest trees is essential for breeding in the RCIS area; therefore, long-term persistence and the recruitment of suitable tree species for nesting is important. Consideration of this species when developing conservation actions on working landscapes that promote agricultural practices that support suitable habitat and protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, *including A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO] 2011).

## 3.4.4.21 Tricolored Blackbird

### Conservation Goals and Objectives

**Goal 21:** Increase the number of tricolored blackbird nesting colonies and the amount of suitable nesting habitat for tricolored blackbird on preservation lands in the RCIS area.

- **Objective 21.1:** Increase the number of breeding sites that support, historically supported, or could support tricolored blackbird colonies on protected lands in the RCIS area (Figure F-20 in Appendix F, *Focal Species Habitat Models*). Measure progress toward achieving this objective in number of breeding sites protected.
- **Objective 21.2:** Reduce the threat of habitat loss by protecting and preserving 71,962 acres of foraging habitat for tricolored blackbird to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10), with emphasis on areas within 3 miles of known colonies.
- **Objective 21.3:** Increase habitat preservation on protected lands by enhancing habitat for tricolored blackbird in the RCIS area. Measure progress toward achieving this objective in acres of enhanced habitat.

## Conservation Actions and Priorities

Implementing the conservation actions in Table 3-31 will support achieving the conservation goal and objectives for this species.

**Table 3-31. Conservation Actions for Tricolored Blackbird**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| TRIB-1 | 21.1 | Acquire unprotected tricolored blackbird colony sites and parcels with modeled breeding and foraging habitat through fee title or conservation easement in the RCIS area. |
| TRIB-2 | 21.2 | Establish conservation easements, including agricultural easements, on land surrounding tricolored blackbird nest colonies or potential nest sites to protect foraging habitat for tricolored blackbird. |
| TRIB-3 | 21.1 | Implement an annual monitoring program, in coordination with local conservation groups, for tricolored blackbird nesting colonies in modeled breeding habitat in the RCIS area. |
| TRIB-4 | 21.3 | Enhance breeding habitat through stable water delivery, reductions in non-native invasive plants, and sediment removal during the inactive nesting season. |
| TRIB-5 | 21.3 | Incentivize (e.g., Safe Harbor Agreement) private landowners to promote pond and marshland management practices that improve breeding habitat for tricolored blackbird and maintain foraging habitat. |
| TRIB-6 | 21.3 | Partner with water managers to procure water for nesting habitat. |
| TRIB-7 | 21.2, 21.3 | Alert flood control and other county maintenance personnel of occupied tricolored blackbird habitat to avoid unintended maintenance impacts. |

The priority conservation areas for implementing conservation actions for tricolored blackbird in the RCIS area are generally in the portions of habitat core areas and landscape linkages with documented colonies in habitat of high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 110,128 acres of potential habitat of high conservation value for tricolored blackbird occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for tricolored blackbird and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

## Climate Change Issues and Considerations

Tricolored blackbird requires three basic habitat elements for selecting its breeding colony site: open, accessible water; a protected nesting substrate, including flooded, thorny, or spiny vegetation; and suitable foraging habitat that provides adequate insect prey within a few miles of the nesting colony. In the RCIS area, habitat for tricolored blackbird is limited to human-made lakes, agricultural fields around Palmdale and Lancaster, and the emergent water areas along the San Andreas fault in the western RCIS area. Sizeable breeding colonies have been reported in the small marshes in Fairmont Reservoir. Preferred foraging habitats include agricultural crops, such as alfalfa, as well as annual grasslands; remnant native habitats, including seasonal wetlands; and riparian scrub habitats.

The persistence of wetlands is adversely affected by extended drought, which is expected to increase in frequency with climate change. Therefore, the amount and distribution of potentially suitable breeding colony habitat for this species are likely to decrease with a warming climate. Changes in agriculture practices in response to climate change will very likely affect the distribution of available agricultural foraging habitat for this species. Other natural habitats are likely to undergo some shifts in distribution as they change their distribution in response to climate change.

Consideration of this species when developing conservation actions on working landscapes that promote agricultural practices that support suitable foraging habitat, protection of groundwater and surface water sources that support breeding colony habitat, and protection and preservation of large, interconnected blocks of natural habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO] 2011).

### 3.4.4.22 Willow Flycatcher

#### Conservation Goals and Objectives

**Goal 22:** Sustain or increase the breeding population of willow flycatcher in the RCIS area by increasing protection for and enhancing the extent and quality of suitable habitat for willow flycatcher (including the southwestern subspecies, *extimus*) in the RCIS area.

- **Objective 22.1:** Reduce the threat of habitat loss by protecting and preserving 1,165 acres of potential habitat for willow flycatcher to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 22.2:** Restore, maintain, and protect natural hydrological and geomorphological conditions in streams, springs, and seeps to enhance and increase suitable habitat for willow flycatcher. Measure progress toward achieving this objective in the number of acres of restored or enhanced stream, seep, or spring habitat.
- **Objective 22.3:** Increase habitat preservation on protected lands by enhancing suitable habitat for willow flycatcher, carefully managing allowed uses, removing non-native plants/planting native vegetation, and controlling nest parasitism by brown-headed cowbird. Measure progress toward achieving this objective in acres of enhancement on existing protected lands.
- **Objective 22.4:** Improve knowledge of the species' abundance and distribution in all potential breeding habitats for willow flycatcher in the RCIS area and adapt habitat management, based on the results.
- **Objective 22.5:** Reduce the numerical abundance of non-native biological stressors (both plants and flycatcher nest parasites) on protected lands that support breeding habitat for willow flycatcher.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-32 will support achieving the conservation goal and objectives for this species.

**Table 3-32. Conservation Actions for Willow Flycatcher**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| WIFL-1 | 22.1 | Acquire parcels of with suitable habitat for migrating and breeding willow flycatcher in the RCIS area through fee title purchase or conservation easement. |
| WIFL-2 | 22.1, 22.2 | Target acquisition of streams that currently have, or historically had, hydrological conditions suitable for willow flycatcher and look for opportunities to enhance hydrological functions to streams, seeps, and other aquatic features in areas with known suitable habitat for willow flycatcher. |
| WIFL-3 | 22.3 | Target acquisition of streams and riparian areas where there are opportunities for enhancement efforts to improve suitable habitat for willow flycatcher. |
| WIFL-4 | 22.4 | Conduct surveys, studies, and research programs to understand species' abundance in the RCIS area and inform management actions. |
| WIFL-5 | 22.5 | Implement non-native invasive species control programs on protected lands to reduce invasive species' impact on willow flycatcher and its habitat. |
| WIFL-6 | 22.3 | Remove livestock grazing from habitat for willow flycatcher on protected lands. |
| WIFL-7 | 22.3 | Remove off-highway vehicle routes from areas within or near habitat for willow flycatcher on protected lands. |

The priority conservation areas for implementing conservation actions for willow flycatcher in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 1,540 acres of potential habitat of high conservation value for willow flycatcher occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for willow flycatcher and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

## Climate Change Issues and Considerations

Willow flycatcher is a riparian bird species that is limited to a few suitable riparian habitats in the western foothills of the RCIS area and habitats east of the RCIS area along the valley floor. The persistence of riparian habitat is adversely affected by extended drought, which is expected to increase in frequency with climate change. Therefore, the amount and distribution of potentially suitable riparian habitat for this species are likely to decrease with a warming climate. Protection and preservation of large, interconnected blocks of habitat and protection of groundwater and surface water sources that support riparian habitats will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of birds in the face of climate change can be found on the CDFW Climate Science Program website, *including A Climate Change Vulnerability Assessment of California's At-Risk Birds* (Gardali et al. 2012), and the interactive species-specific climate change maps and data developed through the climate vulnerability analysis of 358 California birds (Point Blue Conservation Science [formerly PRBO] 2011).

### 3.4.4.23 American Badger

#### Conservation Goals and Objectives

**Goal 23:** Retain habitat for American badger and important habitat linkages for the species in the RCIS area.

- **Objective 23.1:** Reduce the threat of habitat loss by protecting and preserving 64,728 acres[6] of potential habitat for American badger to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 23.2:** Increase the connectivity of modeled suitable habitat in areas that are likely to be important habitat linkages for American badger. Measure progress toward achieving this objective in number of habitat linkages made between areas of potential badger habitat.
- **Objective 23.3:** Increase habitat preservation by enhancing habitat for American badger on protected or working lands in the RCIS area**.** Measure progress toward achieving this objective in acres of enhanced habitat on preserved lands.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-33 will support achieving the conservation goal and objectives for this species.

**Table 3-33. Conservation Actions for American Badger**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| AMB-1 | 23.1 | Acquire parcels with habitat for American badger, including potential habitat and known occupied habitat, through fee title purchase and conservation easement. |
| AMBA-2 | 23.1 | Conduct movement corridor studies of small to large mammals to identify the targeted acquisition areas needed to improve connectivity. |
| AMBA-3 | 23.1, 23.2 | Enhance existing linkages for American badger and other medium-sized and large mammals in movement/foraging habitat in the RCIS area. |
| AMBA-4 | 23.2 | Monitor American badger roadway mortality to identify areas where safe roadway passages can be constructed or roadway management practices can be implemented to discourage roadway use by badgers and other fossorial mammals. |
| AMBA-5 | 23.3 | Prepare a pamphlet on American badger for use in outreach efforts at agricultural operations. Using rodenticides and plowing potentially occupied burrows on the edge of agricultural fields should be discouraged. |

[6] This target is based on the American badger habitat with high conservation value from the agriculture/grassland species group. The American badger is also in the desert species group. Based on that group, 59,604 acres of American badger habitat has high conservation value. The greater of these two acreage targets was selected for the conservation target for the species.

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| AMBA-6 | 23.3 | Work with private landowners in areas that are likely to support American badger and develop land management strategies that are conducive to the species. |
| AMBA-7 | 23.3 | Protect and conserve fossorial mammal populations on suitable foraging habitat for American Badger that is not within agricultural fields. |
| AMBA-8 | 23.3 | Include species-specific measures in management plans that prohibit use of poisons, herbicides, and rodenticides with anticoagulant. |

The priority conservation areas for implementing conservation actions for American badger in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Because American badgers occur in agricultural/grassland and desert habitats, this species was included in both species groups for mapping areas of high biological values (see Section 3.2.1.1, *Focal Species Habitat Groups*). Based on the agriculture/grassland group, the American badger has 210,346 acres of potential foraging habitat of high conservation value within the habitat core areas and landscape linkages. Based on the desert group, it has 208,834 acres of potential foraging habitat of high conservation value in the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for American badger and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

American badgers occur in a variety of habitat types throughout the RCIS area but are most abundant in open habitats with dry, friable soils that are suitable for burrowing, including grasslands; meadows; open scrub communities, such as creosote and sagebrush; and open woodland communities, such as juniper and Joshua tree. Conservation of this species will require active monitoring of environmental conditions where known populations exist. Badgers can disperse up to 70 miles; therefore, protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of mammals in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment for Twenty California Mammal Taxa* (Stewart et al. 2013).

## 3.4.4.24 Desert Kit Fox

### Conservation Goals and Objectives

**Goal 24.** Retain habitat for desert kit fox and important habitat linkages for the species in the RCIS area.

- **Objective 24.1:** Reduce the threat of habitat loss by protecting and preserving 49,757 acres[7] of potential habitat for desert kit fox to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 24-2.** Increase the connectivity of modeled suitable habitat in areas that are likely to be important habitat linkages for desert kit fox. Measure progress toward achieving this objective in habitat linkages protected between modeled suitable habitat areas.
- **Objective 24.3.** Increase habitat preservation by enhancing modeled potentially suitable habitat for kit fox on protected land in the RCIS area. Measure progress toward achieving this objective in acres of protected modeled potentially suitable habitat.

## Conservation Actions and Priorities

Implementing the conservation actions in Table 3-34 will support achieving the conservation goal and objectives for this species.

**Table 3-34. Conservation Actions for Desert Kit Fox**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| DEKF-1 | 24.1 | Acquire parcels with desert kit fox habitat, including potential habitat and known occupied habitat, through fee title purchase and conservation easement. |
| DEKF-2 | 24.2 | Conduct movement corridor studies of small to large mammals to identify the targeted acquisition areas needed to improve connectivity. |
| DEKF-3 | 24.3 | Include species-specific measures in management plans that prohibit use of poisons, herbicides, and rodenticides with anticoagulant and emphasize the conservation and expansion of ground squirrel colonies. |
| DEKF-4 | 24.3 | Work with private landowners in areas that are likely to support desert kit fox and develop land management strategies conducive to desert kit fox. |

The priority conservation areas for implementing conservation actions for desert kit fox in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Because desert kit fox occur in agricultural/grassland and desert habitats, this species was included in both species groups for mapping areas of high biological values (see Section 3.2.1.1, *Focal Species Habitat Groups*). Based on the agriculture/grassland group, the desert kit fox has 174,780 acres of potential foraging habitat of high conservation value within the habitat core areas and landscape linkages. Based on the desert group, it has 171,749 acres of potential foraging habitat of high conservation value in the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs*, for a map of habitat of high conservation value for desert kit fox and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

[7] This target is based on the desert kit fox habitat with high conservation value from the agriculture/grassland species group. The desert kit fox is also in the desert species group. Based on that group, 44,881 acres of desert kit fox habitat has high conservation value. The greater of these two acreage targets was selected for the conservation target for the species.

### Climate Change Issues and Considerations

Desert kit fox can found throughout the RCIS area but primarily in the lower-elevation portions of the Antelope Valley, areas with gently sloping terrain and open, arid vegetation communities such as desert grasslands and scrub where friable soils are suitable for burrowing and den construction. Conservation of this species will require active monitoring of environmental conditions where known populations exist. Habitat connectivity is important in order to allow long-distance dispersal and movement. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of mammals in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment for Twenty California Mammal Taxa* (Stewart et al. 2013).

## 3.4.4.25 Mohave Ground Squirrel

### Conservation Goals and Objectives

**Goal 25:** Conserve the suitable habitat required for the long-term management and conservation of Mohave ground squirrel, emphasizing conservation in 1) key population centers for Mohave ground squirrel, 2) habitat linkages and corridors, 3) expansion areas, and 4) areas where Mohave ground squirrel are likely to be adaptive and resilient in response to ecological changes, including the effects of climate change.

- **Objective 25.1:** Reduce the threat of habitat loss by protecting and preserving 18,884 acres of potential habitat for Mohave ground squirrel to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10). Emphasize protection, based on results of small-mammal trapping or camera studies, to confirm occupancy.
- **Objective 25.2**: Increase habitat preservation by enhancing habitat for Mohave ground squirrel in already-protected areas in the RCIS area. Measure progress toward achieving this objective in acres of enhanced habitat on protected lands.

### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-35 will support achieving the conservation goal and objectives for this species.

**Table 3-35. Conservation Actions for Mohave Ground Squirrel**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| MGSQ-1 | 25.1 | Acquire parcels of occupied or suitable habitat in or within 5 miles of key population areas through fee title purchase or conservation easement. Prioritize acquisitions, based on trapping results, to confirm occupancy. |
| MGSQ-2 | 25.1 | Work with Edwards Air Force Base to permanently protect habitat adjacent to base property, provide buffers, and allow for range shifts. |
| MGSQ-3 | 25.2 | Reduce the number of recreational vehicle routes on protected lands within suitable habitat for Mohave ground squirrel using state-of-the-art disturbed soil reclamation and arid lands revegetation techniques. |
| MGSQ-4 | 25.2 | Fence protected lands that support suitable habitat for Mohave ground squirrel to limit unauthorized vehicle use, trespass, and livestock grazing. |

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| MGSQ-5 | 25.2 | Fund law enforcement patrol or site host on protected lands that support habitat for Mohave ground squirrel to ensure compliance with site rule. |
| MGSQ-6 | 25.2 | Include species-specific measures in management plans that prohibit use of poisons, herbicides, and rodenticides with anticoagulant, especially in potential expansion habitat. |

The priority conservation areas for implementing conservation actions for Mohave ground squirrel in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 107,962 acres of potential habitat of high conservation value for Mohave ground squirrel occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs,* for a map of habitat of high conservation value for Mohave ground squirrel and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

### Climate Change Issues and Considerations

Mohave ground squirrel is distributed predominantly in the northeast portion of the RCIS area, south of Edwards Air Force Base, along the valley floor. The species occurs in a variety of desert shrubland habitats, including desert saltbush scrub, desert sink scrub, desert greasewood scrub, shadscale scrub, and Joshua tree woodland, but is most often found in creosote bush scrub.

Connectivity from remaining occupied habitat patches to areas with greater climate stability or with the potential to support suitable habitat under future climate conditions will be essential in allowing the species to disperse in response to climate change. Conservation of this species will require active monitoring of environmental conditions where known populations exist, and protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of mammals in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment for Twenty California Mammal Taxa* (Stewart et al. 2013).

## 3.4.4.26 Mountain Lion

### Conservation Goals and Objectives

**Goal 26:** Contribute to the support of a genetically sustainable population of mountain lion in the RCIS area and surrounding ecoregions by improving habitat connectivity and public awareness.

- **Objective 26.1:** Reduce the threat of habitat loss by protecting and preserving 14,721 acres of potential habitat for mountain lion to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 26.2:** Implement a public outreach campaign to educate the public about mountain lions in areas where encounters are likely to occur. Measure progress toward achieving this objective in the number of outreach campaigns implemented.
- **Objective 26.3:** Improve habitat connectivity for mountain lion in the RCIS area. Measure progress toward achieving this objective in number of improvements to habitat connectivity.

- **Objective 26.4:** Remove barriers to movement and, where possible, install or repair known or potential mountain lion crossings to increase permeability within the RCIS area. Measure progress toward achieving this objective in the number of barriers removed or repaired and the number of installed crossings.

## Conservation Actions

Implementing the conservation actions in Table 3-36 will support achieving the conservation goal and objectives for this species.

**Table 3-36. Conservation Actions Mountain Lion**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| MOLI-1 | 26.1 | Acquire unprotected parcels adjacent to suitable, protected mountain lion habitat that is important for wildlife connectivity. |
| MOLI-2 | 26.2 | Conduct public education to improve public awareness of mountain lion (e.g., signs at trailheads), particularly in urban areas adjacent to natural lands. |
| MOLI-3 | 26.2 | Prepare mountain lion co-existence educational materials for private landowners living in proximity to protected lands and ensure this outreach material reaches appropriate residents. |
| MOLI-4 | 26.3, 26.4 | Determine where mountain lion connectivity pinch points exist and remove barriers; where possible, install or repair known or potential mountain lion crossings to increase permeability within the RCIS area. |
| MOLI-5 | 26.4 | Conduct targeted studies to determine mule deer use areas and mountain lion travel movement patterns in the RCIS area, particularly between the southernmost (Castaic Ranges) and western (Tehachapi Mountains) portions of the RCIS area. The data should be used to inform MOLI-1. Where barriers to movement or high numbers of vehicle collisions are identified, facilitate improved non-conflict travel areas through adaptive management measures. |
| MOLI-6 | 26.1 | Include species-specific measures in management plans that prohibit use of poisons, herbicides, and rodenticides with anticoagulant, especially in habitat within mountain lion range. |

Generally, the priority conservation areas for implementing conservation actions for mountain lion in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. In some cases, conservation priorities may focus on mountain lion movement and connectivity across major roadways in existing or future urbanizing areas to maintain or enhance the functionality of the wildlife crossing. Approximately 48,486 acres of habitat of high conservation value for mountain lion occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs,* for a map of habitat of high conservation value for mountain lion and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

## Climate Change Issues and Considerations

Mountain lions are habitat generalists but require extensive areas of riparian vegetation as well as brushy stages of various habitats with rocky outcrops and trees, shrubs, and grassland edges. In the RCIS area, mountain lions occur primarily along the southwestern border of the RCIS area, in the foothills of the San Gabriel Mountains. Home ranges can easily cover 100 square miles; therefore, habitat connectivity is essential for this species. Conservation of this species will require active monitoring of environmental conditions, including wildlife crossings where mountain lions are known to occur. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of mammals in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment for Twenty California Mammal Taxa* (Stewart et al. 2013).

### 3.4.4.27 Tehachapi Pocket Mouse

#### Conservation Goals and Objectives

**Goal 27:** Increase the amount of suitable habitat on preserved lands in the RCIS area for the long-term management and conservation of Tehachapi pocket mouse. Emphasize preservation of occupied habitat and areas of suitable habitat adjacent to already-existing conserved habitat.

- **Objective 27.1**: Reduce the threat of habitat loss by protecting and preserving 223 acres of potentially suitable habitat for Tehachapi pocket mouse to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10). Prioritize locations that enhance connectivity as well as areas that are near already-protected or occupied habitat.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-37 will support achieving the conservation goal and objectives for this species.

**Table 3-37. Conservation Actions for Tehachapi Pocket Mouse**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| TEMO-1 | 27.1 | Acquire, through fee title purchase or conservation easement, parcels with documented Tehachapi pocket mouse in the subset of the RCIS area. |
| TEMO-2 | 1 | Include species-specific measures in management plans that prohibit use of poisons, herbicides, and rodenticides with anticoagulant, especially within or adjacent to Tehachapi pocket mouse habitat. |

The priority conservation areas for implementing conservation actions for Tehachapi pocket mouse in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 850 acres of habitat of high conservation value for Tehachapi pocket mouse occurs within the habitat core areas and landscape linkages (Table 3-10). Refer to Appendix H, *Species Conservation Values Maps and Graphs,* for a map of habitat of high conservation value for Tehachapi pocket mouse and a set of graphs showing the proportion of high conservation value in each habitat core area and landscape linkage.

#### Climate Change Issues and Considerations

Tehachapi pocket mouse habitat includes Joshua tree woodland, pinyon-juniper woodland, oak savannah, and native and non-native grasslands. Habitat for the Tehachapi pocket mouse is limited in distribution to small patches in the northwest region of the RCIS area, along the western borders around State Route 138. These habitats are likely to undergo some shifts in distribution in response to climate change (e.g., shifts to higher elevations), which could affect the distribution of this species in the RCIS area. Conservation of this species will require active monitoring of environmental conditions where known populations exist, and translocation to areas of suitable habitat in the future may be required if habitat connectivity is insufficient with respect to allowing the species to reach these areas. Protection and preservation of large, interconnected blocks of habitat will give this species the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of mammals in the face of climate change can be found on the CDFW Climate Science Program website, including *A Climate Change Vulnerability Assessment for Twenty California Mammal Taxa* (Stewart et al. 2013).

## 3.4.5 Conservation Strategy for Conservation Elements

The conservation strategy for the other conservation elements aims to protect and enhance the unique land cover types and other ecological resources in the RCIS area, as identified in Chapter 2, *Environmental Setting*. The conservation strategy focuses on continued provision of identified ecosystem services through the protection and persistence of these important ecological processes and also through land acquisition, enhancement, and public education. Conservation goals, objectives, actions, and priorities are discussed in this section.

The distribution of natural communities and land cover types relative to the habitat cores and landscape linkages are shown in Appendix I, *Land Cover Conservation Values Maps and Graphs*. When considering conservation actions and priorities for natural communities and land cover types, it will be helpful to consult the maps in Appendix I, along with the graphs of the quantitative distribution and conservation value of each land cover type in each habitat core area and landscape linkage.

### 3.4.5.1 Habitat Connectivity and Wildlife Linkage

#### Conservation Goal and Objectives

**Goal 28.** Increase connectivity for native wildlife species across the landscape by improving the condition of natural and semi-natural lands and the permeability of infrastructure.

- **Objective 28.1:** Protect important habitat linkages for the focal species and other native species in the RCIS area. Measure progress toward achieving this objective in the number of linkages protected for focal or native species.
- **Objective 28.2:** Enhance wildlife permeability along State Route 138, State Route 14, and other major roadways in the RCIS area. Measure progress toward achieving this objective in the number of wildlife permeability measures included in projects on State Route 138, State Route 14, or other major roadways.

#### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-38 will support achieving the conservation goal and objectives for this conservation element.

**Table 3-38. Conservation Actions for Habitat Connectivity and Wildlife Linkage**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| HCWL-1 | 28.1 | Identify known or potential road crossings with suitable habitat on both sides of the roadway for focal species or other native species. |
| HCWL -2 | 28.2 | Remove or modify barriers to increase permeability for wildlife and, where possible, install or repair crossings to increase permeability within the RCIS area for focal species or other native species. All road stream crossings should have a natural bottom substrate; be lined with native vegetation, if possible; and be adequately sized to allow for the comfortable passage of deer. Whenever possible, install appropriately sized bridges at road stream crossings on State Route 138, State Route 14, and other roadways. Install fencing and/or native vegetation that leads animals to the undercrossing when transiting in the drainage and inhibits climbing onto the roadway. |
| HCWL-3 | 28.1, 28.2 | Implement a public education campaign that is aimed at informing the public of the benefits of wildlife corridors and opportunities to improve permeability for wildlife. |
| HCWL-4 | 28.1, 28.2 | Implement habitat connectivity enhancement measures to facilitate antelope movement along the southern border of the RCIS and allow dispersal of the re-introduced herd in the Tehachapi Mountains. |

Prioritize habitat connectivity improvements where major roadways cross known wildlife movement corridors and in the landscape linkages delineated for this RCIS.

## Climate Change Issues and Considerations

Maintaining and enhancing wildlife movement corridors and landscape linkages are essential to a long-term conservation strategy that addresses the potential effects of climate change. Most of the habitats and natural communities in the Antelope Valley RCIS area will undergo some change in distribution in response to climate change. Protection and preservation of large, interconnected blocks of habitat with functional wildlife movement corridors and landscape linkages will give species in the RCIS area the best opportunity for adapting to changing environmental conditions.

Additional resources for wildlife movement corridors and landscape linkages in the face of climate change can be found on the CDFW Habitat Connectivity Planning for Fish and Wildlife website.[8]

# 3.4.5.2 Working Landscapes

## Conservation Goals and Objectives

**Goal 29.** Retain working lands for the benefit of focal species as well as other native species and agricultural uses in the RCIS area to the maximum extent practicable.

- **Objective 29.1:** Work with agriculture producers to manage croplands in ways that both maintain economically viable agricultural operations and benefit wildlife use in the RCIS area. Measure progress toward achieving this objective in the acres of croplands incorporating management measures to benefit wildlife.

[8] https://www.wildlife.ca.gov/Conservation/Planning/Connectivity

- **Objective 29.2:** Work with the ranching community to incorporate conservation ranching on public and private lands. Measure progress toward achieving this objective in number and size of ranching operations incorporating conservation ranching practices.

## Conservation Actions and Priorities

Implementing the conservation actions in Table 3-39 will support achieving the conservation goal and objectives for this conservation element.

**Table 3-39. Conservation Actions for Working Landscapes**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| WOLA-1 | 29.1, 29.2 | Provide education for agriculture producers and the ranching community regarding wildlife-friendly practices, such as wildlife-friendly fencing, vegetation conditions that benefit wildlife, and management that practices that promote ground squirrels and other keystone fossorial mammals. |
| WOLA-2 | 29.1, 29.2 | Offer financial and regulatory incentives to private landowners to maintain and enhance habitat for focal species. |
| WOLA-3 | 29.1, 29.2 | Work with agricultural producers and the ranching community to provide, protect, and enhance water sources for wildlife. At any pump station for the provision of water, especially for crops or grazing animals, a small amount of surface water of good quality should be provided to wildlife. This is especially important in any area that has or had a historical spring or seep. |

Implement these conservation actions on ranchland and farmland throughout the Antelope Valley with landowners who are willing to implement them. Prioritize areas around habitat core areas and landscape linkages or where site information confirms use by focal species that would benefit from wildlife-friendly land management practices. Rangeland is concentrated in the western portion of the Antelope Valley, areas where efforts to implement wildlife-friendly grazing practices could benefit grassland/agriculture focal species.

## Climate Change Issues and Considerations

Working landscapes on agricultural lands provide important habitat for many species in the RCIS area. Changes in agriculture practices in response to climate change will very likely affect the distribution of available habitat for these species. Consideration of native species' use of agricultural lands is important when developing conservation actions on working landscapes. Conservation actions that promote agricultural practices and support suitable habitat will give species that use these lands the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of working landscapes in the face of climate change can be found on the CDFW State Wildlife Action Plan 2015 Update – Companion Plans website, which is where the Agriculture Companion Plan can be found.[9]

[9] https://www.wildlife.ca.gov/SWAP/Final/Companion-Plans

### 3.4.5.3 Natural Communities of Conservation Importance

#### Conservation Goals and Objectives

**Goal 30.** Retain unique land cover types to the maximum extent practicable in the RCIS area.

- **Objective 30.1:** Protect and enhance unique land cover types in the RCIS area. Measure progress toward achieving this objective in acres of protected or enhanced unique land cover types.
- **Objective 30.2:** Work with the land managers to incorporate management practices that benefit unique land cover types on public and private lands. Measure progress toward achieving this objective in acres of lands where managers are incorporating management practices that benefit unique land cover types.

#### Conservation Actions and Priorities

The distribution of natural communities and land cover types relative to the habitat cores and landscape linkages are shown in Appendix I, *Land Cover Conservation Values Maps and Graphs*. When considering conservation actions and priorities for natural communities of conservation importance, it will be helpful to consult the maps in Appendix I, along with the graphs of the quantitative distribution and conservation value of each land cover type in each habitat core area and landscape linkage.

Implementing the conservation actions in Table 3-40 will support achieving the conservation goal and objectives for this conservation element.

**Table 3-40. Conservation Actions for Natural Communities of Conservation Importance**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| NCCI-1 | 30.2 | Create a field guide that describes the ideal condition for each unique land cover type that could be used by policy makers, landowners, and land managers alike to strive for an improved vegetative condition for unique land cover types in the RCIS area. |
| NCCI-2 | 30.1 | Fund surveys to document the condition of rare and imperiled community types in the RCIS area. |
| NCCI-3 | 30.1, 30.2 | Offer financial and regulatory incentives to private landowners to maintain and enhance unique land cover types that provide habitat for focal species. |

In areas with foreseeable potential future urbanization, rare and imperiled communities should be conserved as much as possible through avoidance and minimization of impacts and the protection of large blocks of contiguous habitat. Conservation of small, isolated, fragmented areas are generally not viable for long-term protection and should be avoided. Natural communities of conservation importance were identified in Section 3.2.1.2, *Natural Communities of Conservation Importance*. The analysis was applied at the *Alliance* level of the NVCS classification hierarchy, which is the finest resolution of vegetation mapping available in the RCIS area. All alliances that were ranked with a Highest or Very High conservation priority are addressed by these conservation goals and objectives.

**Table 3-41. Conservation Priorities for Rare and Imperiled Community Types**

| Natural Community Prioritization Level | *NVCS Alliance Name* | Natural Community Prioritization Level | *NVCS Alliance Name* |
|---|---|---|---|
| Highest | *Achnatherum hymenoides* | Very High | *Lycium cooperi* |
| Highest | *Yucca brevifolia* | Very High | *Platanus racemosa* |
| Highest | *Achnatherum speciosum* | Very High | *Populus fremontii* |
| Highest | *Atriplex parryi* | Very High | *Prosopis glandulosa* |
| Highest | *Forestiera pubescens* | Very High | *Prunus fasciculata* |
| Highest | *Fremontodendron californicum* | Very High | *Prunus ilicifolia* |
| Highest | *Isocoma acradenia* | Very High | *Pseudotsuga macrocarpa* |
| Highest | *Pleuraphis rigida* | Very High | *Purshia tridentata* |
| Highest | *Ribes quercetorum* | Very High | *Quercus lobata* |
| Highest | *Sporobolus airoides* | Very High | *Salix laevigata* |
| Very High | *Allenrolfea occidentalis* | Very High | *Sambucus nigra* |
| Very High | *Artemisia tridentata* spp. *Parishii* | Very High | *Aesculus californica* |
| Very High | *Encelia (actoni, virginesis)* | Very High | *Ericameria linearifolia* |
| Very High | *Ephedra californica* | Very High | *Ericameria paniculata* |
| Very High | *Eriogonum wrightii* | Very High | *Gutierrezia sarothrae* |
| Very High | *Frankenia salina* | Very High | *Krascheninnikovia lanata* |
| Very High | *Lepidospartum squamatum* | Very High | *Nassella cernua* |

### Climate Change Issues and Considerations

Most if not all of the rare and imperiled community types are likely to undergo some shifts in distribution in response to climate change. Conservation of these rare and imperiled community types will require active monitoring of environmental conditions, and protection and preservation of large, interconnected blocks of habitat will give these communities the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of natural communities in the face of climate change can be found on the CDFW Climate Science Program website, including the *Climate Vulnerability Analysis of Natural Vegetation Community Types Statewide in California* (Thorne et al. 2016).

## 3.4.5.4 Key Aquatic Habitats

### Conservation Goals and Objectives

**Goal 31.** Protect and enhance key aquatic habitats in the RCIS area to benefit focal species.

- **Objective 31.1:** Protect and preserve key aquatic habitat in the RCIS area, including streams, springs, ponds, lakes, and other ephemeral water sources. Measure progress toward achieving this objective in acres of protected key aquatic habitats.

- **Objective 32.2:** Enhance key aquatic habitat in the RCIS area to benefit focal species. Measure progress toward achieving this objective in acres of enhanced key aquatic habitats.

### Conservation Actions and Priorities

Implementing the conservation actions in Table 3-42 will support achieving the conservation goal and objectives for this conservation element.

**Table 3-42. Conservation Actions for Key Aquatic Habitats**

| ID | Cons. Obj. | Conservation Action |
|---|---|---|
| AQUA-1 | 31.1, 31.2 | Incentivize private landowners to promote pond and marshland management practices that improve habitat. |
| AQUA-2 | 31.1, 31.2 | Partner with water managers to procure water and maintain, enhance, or restore aquatic habitat. |
| AQUA-3 | 31.2 | Remove non-native invasive plant species and non-native animal species from key aquatic habitat when deemed to be degrading habitat value for covered species. |
| AQUA-4 | 31.1 | Monitor ephemeral water sources for focal species and other special-status species. |
| AQUA-5 | 31.2 | Manage human uses, including recreational uses and livestock grazing, in key aquatic habitat to minimize habitat degradation and impacts on focal species. |

### Climate Change Issues and Considerations

The persistence of key aquatic habitat is adversely affected by extended drought, which is expected to increase in frequency with climate change. Therefore, the amount and distribution of key aquatic habitat types in the RCIS area are likely to decrease with a warming climate. Monitoring and managing water resources, as well as their distribution, will be important in understanding potential effects on key aquatic habitats. Protection and preservation of large, interconnected blocks of habitat, as well as protection of groundwater and surface water sources that support key aquatic habitats, will give species that rely on these key aquatic habitats the best opportunity for adapting to changing environmental conditions.

Additional resources for conservation and management of natural communities in the face of climate change can be found on the CDFW Climate Science Program website, including the *climate Vulnerability Analysis of Natural Vegetation Community Types Statewide in California* (Thorne et al. 2016).

# 3.5 Applying Conservation Actions and Priorities

The conservation strategy for the Antelope Valley RCIS is designed to function as a voluntary conservation resource and a toolkit for agencies, organizations, and individuals when pursuing mitigation and conservation actions in the RCIS area. A detailed, science-based process identifies the areas with the highest conservation value for each focal species. The resulting conservation toolkit has three tools that will help a user of this RCIS understand what the conservation needs are and how to meet those needs most effectively.

**Antelope Valley RCIS Conservation Toolkit**

- Conservation goals, objectives, and actions for each focal species (Section 3.4.4, *Conservation Strategy for Focal Species*);
- Distribution maps of habitat of high conservation value for each focal species (Appendix H, *Species Conservation Value Maps and Graphs*); and
- Quantitative conservation targets for each focal species (Section 3.3*, Gap Analysis for Focal Species,* Table 3-10, *Gap Analysis Results and Quantitative Conservation Goals*).

The maps of habitat of high conservation value for each focal species provide the amount of habitat, and the pie graphs illustrate the relative conservation value of each habitat core area and landscape linkage. The conservation toolkit allows RCIS users to identify and select the conservation priorities that meet their needs (e.g., mitigation for a particular focal species), review habitat core areas and landscape linkages to identify areas with the greatest conservation opportunities for a given species, and select appropriate conservation actions to support the goals and objectives for that species that will contribute to meeting the quantitative conservation targets established by this RCIS for each focal species.

Given that the spatial analyses, which describe the biological and conservation values in the RCIS area, are based predominantly on modeling of biological, physical, and anthropogenic factors, these conservation strategy tools should be used only for initial screening of potential conservation priority areas. Site-specific biological data and evaluation of the existing and future ecological and land use context, including the foreseeable potential future urbanization, along with the application of basic principles of conservation biology, are essential to further evaluation and consideration of a site for implementation of conservation actions.

This Antelope Valley RCIS was developed to provide the maximum flexibility while using the best-available science and analytical approach. Although there are many ways to apply the information and guidance in this RCIS, the step-wise approach presented below is one that may be of value. To illustrate application of the conservation toolkit, below is a four-step process, using Joshua tree (*Yucca brevifolia*) as an example.

## Step 1: Determine a Conservation or Mitigation Need

Identify one or more species for which there is a need for mitigation or an opportunity for implementation of conservation actions. (Joshua tree will be used for this example.)

- Joshua tree is not state or federally listed; however, it is of special interest in the RCIS area, declining in distribution, and under threat from expanding infrastructure and rural/suburban development as well as the potential effects of climate change. Mitigation is often required under the California Environmental Quality Act (CEQA), and mitigation and conservation needs are likely to increase in the future. Joshua tree is a conservation target in the Mojave Desert Ecoregion of the *California State Wildlife Action Plan* (SWAP) (California Department of Fish and Wildlife 2015), and Joshua tree woodland is a California Natural Diversity Database (CNDDB) sensitive community.

- Several future roadway projects, large-scale solar facility projects, and commercial/residential development projects have the potential to affect Joshua trees; therefore, there is a mitigation and conservation need for Joshua tree (see Foreseeable Potential Future Urbanizing Areas in Figure 3-24).
- The RCIS user may be associated with one of these project types, may be interested in creating advance mitigation for these or other projects (e.g., MCA [see Section 4.3, *Mitigation Credit Agreements*] or conservation bank), or may be interested in contributing to the conservation of the species independent of mitigation needs.
- A conservation target is set for Joshua tree in Table 3-10 (*Gap Analysis Results and Quantitative Conservation Goals*), which indicates that, of the 31,868 acres of habitat of high conservation value for Joshua tree in the habitat core areas and landscape linkages, 4,849 acres are protected (15 percent). Joshua tree has a high species priority level, with a conservation target of 75 percent, or 23,901 acres, and a remaining conservation need (Protection and Preservation Gap) of 19,052 acres (80 percent). This represents the acres on unprotected lands, but it should be noted that there is an additional Possible Preservation Gap on the 4,849 acres, which are on protected lands where additional management actions and monitoring could benefit this species. Management actions that include restoration and enhancement can be used to create mitigation credits, even on lands that are already considered protected.

## Step 2: Review the Conservation Goals, Objectives, and Conservation Actions and Priorities for the Species

In the second step, review the conservation strategy for the species (Joshua tree). The goals, objectives, and conservation actions and priorities focus on protecting and enhancing Joshua tree habitat and reducing threats that result in habitat loss. They also support climate adaptation strategies.

**Goal 3:** Sustain and enhance the quality of Joshua tree woodland in the RCIS area by protecting and preserving existing stands and implementing conservation actions that address present and future pressures on the species, including climate change.

- **Objective 3.1:** Reduce the threat of habitat loss by preserving an additional 19,052 acres of mapped Joshua tree woodlands to meet the conservation target for the species (Protection and Preservation Gap in Table 3-10).
- **Objective 3.2:** Preserve and enhance Joshua tree woodland in protected areas, targeting areas of low or moderate terrestrial intactness in cores and linkages with proximity to Joshua tree woodland habitat of high intactness.
- **Objective 3.3:** Manage Joshua tree woodland habitat adaptively to address climate change effects, incorporating best available science as a basis for management actions.

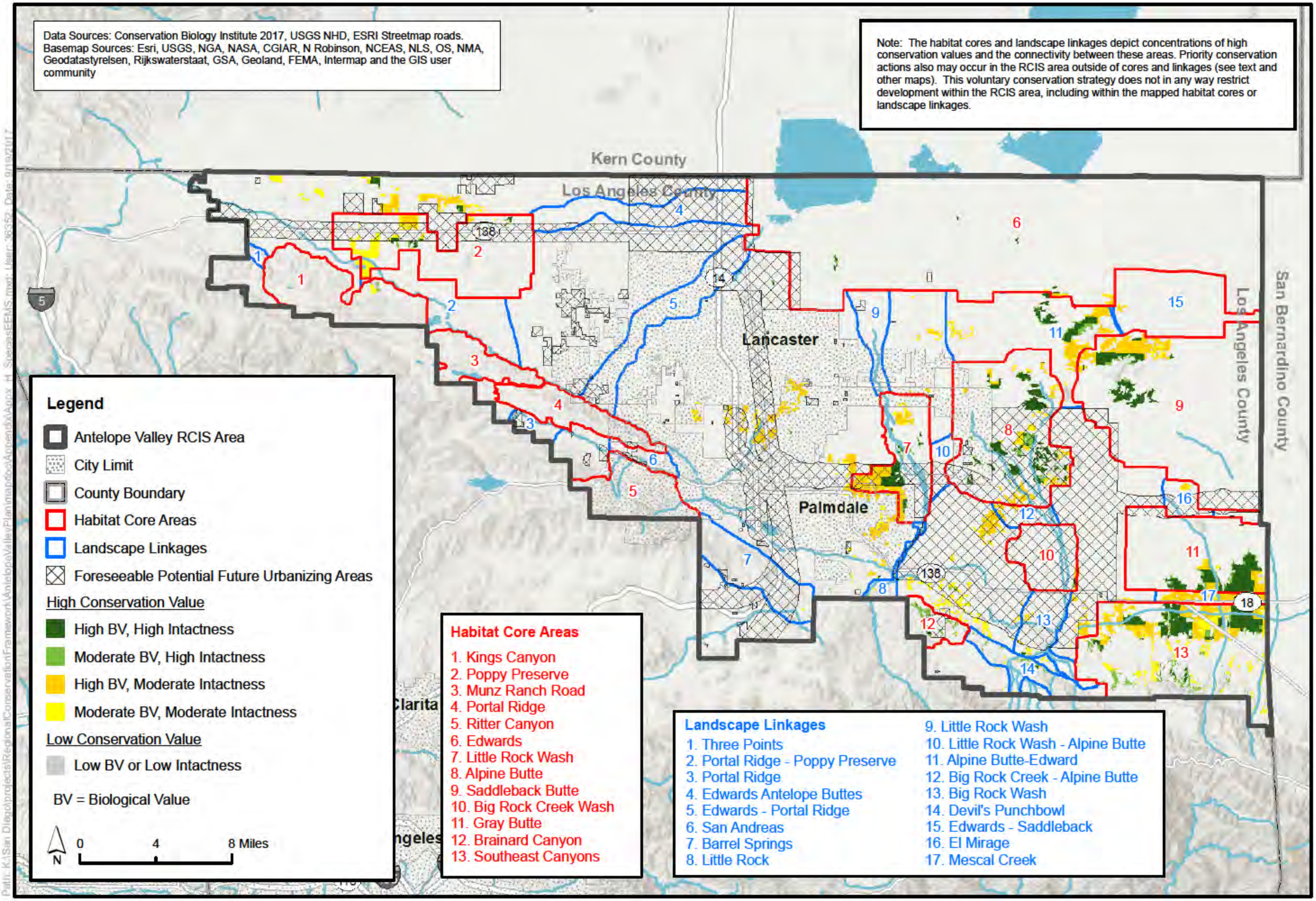


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**Figure 3-24**
**Joshua Tree High Conservation Value Habitat (Desert Species Group)**

#### Conservation Actions and Priorities

##### *Conservation Actions*

**JOTR-1.** Acquire parcels with known Joshua tree stands through fee title purchase or conservation easement, prioritizing large patches of continuous Joshua tree woodlands or areas adjacent to already-protected lands.

**JOTR-2.** Restore burned areas by planting young Joshua trees (caged to prevent herbivory), native shrubs, and perennial grasses to restrict invasion by annual invasive species. Burned Joshua trees should not be removed because they can resprout on occasion, and they provide habitat for wildlife.

**JOTR-3.** Fence preserved Joshua tree woodlands, excluding vehicle access that can increase human-caused ignitions of wildfire and garbage dumping.

**JOTR-4.** Periodically patrol preserved Joshua tree woodlands to monitor human uses.

**JOTR-5.** Prepare wildfire suppression plans for preserved Joshua tree woodlands to minimize resource impacts from fire suppression tactics.

**JOTR-6.** Conduct a fine-scale regional assessment to determine the most intact, largest extent of the oldest Joshua tree stands remaining in the RCIS area.

**JOTR-7.** Conduct monitoring and aid in research of Joshua tree populations—including, but not limited to, flowering timing and frequency, seed germination, sprout dispersal, and Yucca moth activity—to better understand effects of climate change on these populations and identify actions to facilitate adaptation to these effects.

##### *Conservation Priorities*

The priority conservation areas for implementing conservation actions for Joshua tree in the RCIS area are generally in the portions of habitat core areas and landscape linkages with high conservation value for this species that are away from foreseeable potential future urbanization. Approximately 31,868 acres of high conservation value mapped Joshua tree habitat occurs within the habitat core areas and landscape linkages (see Figure 3-24).

### Step 3: Identify Specific Priority Conservation Areas, Mitigation, and Conservation Opportunities

In the third step, identify key conservation opportunities in the habitat core areas and landscape linkages for Joshua tree habitat.

- As described in the approach and analytical methods of the conservation strategy, we have identified the habitat of high conservation value within the habitat core areas and landscape linkages. Although mitigation and conservation opportunities certainly may exist outside of the habitat core areas and landscape linkages, we encourage the RCIS user to start by looking within the habitat core areas and landscape linkages. The accumulation of mitigation and conservation actions within habitat core areas and landscape linkages will generally make a greater contribution to the overall viability of the focal species because these are the areas with the highest levels of habitat intactness and the greatest overall biological value. By contributing to the level of protection and management within the habitat core areas and landscape linkages, the size of protected areas will increase, and the connectivity throughout the RCIS will increase, giving the focal species better long-term population stability and an opportunity to adapt to or seek refuge from the effects of climate change.

- For all focal species, refer to Appendix H, *Species Conservation Priorities Maps and Graphs,* for a map of habitat of high conservation value for the species and the proportion of high conservation value in each habitat core area and landscape linkage. For this example, the map for Joshua tree is included here in Figure 3-24.
- Examine the map and observe the distribution of habitat of high conservation value across the RCIS area, particularly within habitat core areas and landscape linkages. Areas with larger contiguous areas of habitat of high conservation value (especially with the highest biological value and highest intactness) are generally the best places to start looking for conservation opportunity areas (e.g., acquisitions, conservation easements, restoration and enhancement).
- Now examine the accompanying page of pie graphs for the species (Appendix H, *Species Conservation Priorities Maps and Graphs*). This page quantifies the total acres of modeled or mapped habitat of high conservation value in the habitat core areas and landscape linkages (upper left of page) and then quantifies the total acres of all habitat (including habitat of low conservation value) in each pie graph. For this example, the pie graphs for Joshua tree are included as Figure 3-25.
- The pie graphs are numbered and named to correspond to the conservation value map for the species. Each pie graph represents the total acreage of habitat in each habitat core area and landscape linkage, with the proportions indicating the relative conservation value of that habitat.
- As noted in Step 1 of this example, Joshua tree has a high conservation priority level of 75 percent. The conservation need (Protection and Preservation Gap) is to protect an additional 19,052 acres (and, as noted, a Possible Preservation Gap of 4,849 acres). Potentially suitable locations for contributing to the protection of Joshua tree through mitigation and other conservation actions can be found by examining the pie graphs. By doing so, the RCIS user can discover that the largest acreages of Joshua tree habitat are in the Southeast Canyons (9,684 acres), Alpine Butte (4,188 acres), and Saddleback Butte (3,776 acres) habitat core areas and are prime candidates for further investigation of conservation and mitigation opportunities at a parcel level. Note that nearly all of the habitat in these four habitat core areas is of high conservation value (colored portions of pie graph [high or moderate biological value and high or moderate intactness]), with very little habitat of low conservation value (gray portion of pie graph).

### Step 4: Identify Key Parcels and Implement Conservation Priorities through Conservation Actions

In the fourth step, use the information and insight gained from the conservation values map and pie charts in Step 3.

- The RCIS user can now start to identify key parcels that may be available for acquisition or conservation easements or existing protected areas where habitat restoration and enhancement actions could be applied, along with a number of other suitable conservation actions.
- Of the conservation actions identified for Joshua tree, the RCIS user would then determine which conservation actions identified in Step 2 are best suited for the parcels or protected areas of interest.
- The final step would involve implementation of the conservation actions, potentially including development of an MCA if the conservation actions are intended to create advance mitigation credit with the CDFW (Section 4.3, *Mitigation Credit Agreements*).

**Joshua Tree** **Desert**

- High BV, High Intactness
- Moderate BV, High Intactness
- High BV, Moderate Intactness
- Moderate BV, Moderate Intactness
- Low BV or Low Intactness

There are 26,432 acres (6.51%) of High Conservation Value habitat in Cores and 5,436 acres (1%) in Linkages. The total acreages, including all habitat conservation values, are shown with each graph. Proportions indicate the relative Biological Value and Intactness of that habitat.


**Figure 3-25**
Joshua Tree Core and Linkage Conservation Values Distribution

# 3.6 Monitoring and Adaptive Management Framework

In order for an individual or entity to develop an MCA under this Antelope Valley RCIS, the RCIS must include an adaptive management and monitoring framework.[10] This section provides an overview of monitoring and adaptive management and the framework for developing monitoring and adaptive management plans for each MCA in the RCIS area. Monitoring and adaptive management plans will be required for conservation actions that are implemented under MCAs. The level of detail and application of the framework will vary, depending on the size and complexity of the MCA site or sites, the resources being monitored, and the nature of the conservation actions being executed. Unless otherwise determined by the CDFW or other participating regulatory agencies, the elements of the monitoring and adaptive management framework described in this section will need to be addressed in any MCA prepared under this Antelope Valley RCIS.

A monitoring and adaptive management plan could be developed for any voluntary conservation action in the RCIS area (i.e., unrelated to an MCA), but it is not required. Such a monitoring and adaptive management plan, consistent with the framework described in this section, would provide the same benefits as those described for mitigation actions.

## 3.6.1 Objectives

The overarching objective of monitoring and adaptive management is to ensure that conservation actions are being implemented in ways that benefit focal species and other resources credited under the agreement and contributing to achievement of the conservation goals and objectives stated in the RCIS.

This section presents a framework that should be referenced when developing site-specific monitoring and adaptive management strategies for each MCA site. Additional objectives of monitoring and adaptive management include the following:

- Create a structured decision-making framework that can be used as the basis for collecting information, verifying hypotheses, and designing and changing management practices;
- Develop and implement effective and efficient monitoring protocols to ensure that the data collected will inform adaptive management;
- Document the baseline condition of biological resources on mitigation lands and other key habitat outside of mitigation parcels using existing data, modeling, and the results of ongoing field surveys; and
- Provide an organizational framework and decision-making process for evaluating monitoring and other data to determine whether and how to adjust management actions.

[10] CDFW RCIS Guidelines, Section 4, page 4-7.

## 3.6.2 Phases of Monitoring and Adaptive Management

Monitoring and adaptive management can be organized into three phases: baseline inventory, management planning, and long-term monitoring and adaptive management. Key tasks in each phase are described in in this section. In general, activities in the baseline inventory phase occur during the first 1 to 2 years following the commitment to conduct conservation actions. The baseline inventory phase begins as soon as possible after sites for conservation actions are identified and secured (e.g., land acquisition, conservation easement, management agreement with landowner, or other mechanism). In some cases, baseline information may have been collected during the site assessment process. The long-term monitoring phase begins on each site after the baseline inventory phase is complete and any near-term restoration or enhancement actions have been largely completed.

### 3.6.2.1 Baseline Inventory

The baseline inventory occurs on new mitigation sites prior to or when they are secured. Baseline information collected during this phase will be used to assess changes in biological resources once conservation actions are applied and lay the foundation for monitoring and adaptive management. Inventories may need to occur over multiple seasons to ensure that all focal species present are identified or to accommodate any climatic variation between years (e.g., below-average rainfall).

The MCA proponent will inventory and assess populations or status (e.g., presence/absence) of focal species, as appropriate, on mitigation properties. At a minimum, baseline monitoring data must be designed and collected so that MCA proponents can measure the following results:

- Contribution to the relevant conservation goals and objectives in the RCIS,
- Net ecological gain in the area and quality of habitat or other natural resource values, and
- Progress toward performance-based milestones and achievement of ecological performance standards to determine when and how many mitigation credits are released.

During the baseline inventory, the MCA proponent may also develop and test hypotheses about key relationships between species, habitats, and processes; the identification and assessment of threats and stressors to natural communities and species; the prioritization of conservation actions on the mitigation site; and the selection of biotic and abiotic indicators for evaluating habitat condition over time.

Baseline conditions on the mitigation site need to be documented to enable management planning and serve as a comparison for all future monitoring. Accordingly, resources of interest on a site need to be assessed, documented, and mapped. Documented baseline conditions consist of historical data and trends, as available and appropriate, and surveys that focus on the presence/absence of focal species, for which mitigation credit is being sought, and the condition of the habitats that support those species. If mitigation credit is being sought for other conservation elements (e.g., wildlife linkage implementation, aquatic resources, rare or unique land cover types), those resources should be assessed as well. Baseline assessments of resources that are regulated by other federal, state, or local agencies, or subject to other permits within CDFW (e.g., Lake and Streambed Alteration Agreement), should be consistent with standards and protocols recognized by those agencies when possible to create monitoring efficiency.

### 3.6.2.2 Planning for Management and Monitoring

Once the baseline condition of the mitigation site is understood, MCA preparers develop the required monitoring and long-term adaptive management plan. The monitoring and long-term adaptive management plan memorializes the desired outcomes and success criteria for the mitigation site, as described in the MCA. Management and monitoring planning generally consists of the following tasks:

- Describe management actions that will be used to improve habitat for focal species or conditions for other conservation elements;
- Describe desired outcomes of management actions, including species population response, habitat condition, or change in other conservation element;
- Prioritize implementation of conservation actions to best achieve mitigation objectives;
- Describe monitoring protocols (i.e., methods and equipment used, monitoring frequency, monitoring timing) and identify sampling design;
- Develop criteria for measuring success of any enhancement or restoration efforts; and
- Describe condition of infrastructure and necessary infrastructure improvements needed to execute the management program.

As much as possible, the management plan should be a practical guide to the management and monitoring actions that will occur on the mitigation site over time and written with the land manager and monitors in mind.

### 3.6.2.3 Long-Term Monitoring

The planning phase is followed by long-term monitoring to determine the status and trends of focal species and habitats and the effectiveness of the management of the mitigation site. Long-term monitoring uses the framework developed during the planning phase and memorialized in the monitoring and long-term adaptive management plan to carry out effectiveness monitoring and implement adaptive management.

The long-term monitoring phase includes the following tasks:

- Monitor species' response to any enhancement, restoration, or habitat creation described in the MCA and management plan;
- Monitor restoration sites for success, and remediate sites if initial success criteria are not being met. The management plan will identify triggers for remediation, if necessary; and
- Assess status and trends of focal species by monitoring species populations, habitat, and other indicators over time.

In many cases, as sites approach and ultimately meet their performance-based metrics, monitoring frequency and intensity can be reduced. Similar to management actions, the monitoring program can change over time in response to the information collected and the trends observed. This adaptive approach to the monitoring program ensures that enough data are collected to determine whether the mitigation site is performing as expected while also avoiding unnecessary monitoring costs.

#### 3.6.2.4 Adaptive Management

Adaptive management is a decision-making process that promotes flexible management so that actions can be adjusted as uncertainties become better understood or as conditions change. Monitoring the outcomes of management is the foundation of an adaptive approach, and thoughtful monitoring can both advance scientific understanding and modify management actions iteratively (Williams et al. 2007).

Adaptive management is necessary because of the degree of uncertainty and natural variability associated with ecosystems and their responses to management. It is possible that additional and different conservation actions not described in the RCIS or MCA will be identified in the future and proven to be more effective. Results of monitoring may also indicate that some management measures are less effective than anticipated. To address these uncertainties, an adaptive approach will be used to inform management on land subject to MCAs.

The cornerstone of a monitoring and adaptive management program is an approach in which monitoring yields scientifically valid results that inform management decisions. Information collected through monitoring and other experiments will be used to manage mitigation lands and help determine progress toward conservation objectives. The adaptive management process is administered by the MCA holder in coordination with CDFW.

Adaptive management tasks include the following:

- Evaluate efficacy of monitoring protocols,
- Incorporate best available scientific information into management,
- Review any unexpected or unfavorable results and test hypotheses to achieve desired outcome,
- Adjust management actions and continue to monitor, and
- Adjust success criteria and conservation actions, if necessary.

### 3.6.3 Types of Monitoring

A monitoring plan is developed for each mitigation site. The monitoring plan comprises two types of monitoring: routine monitoring and effectiveness monitoring. The monitoring plan will include protocols, indicators, a monitoring schedule, and success criteria, based on the guidance offered in this section. The CDFW will approve the monitoring plan as part of the MCA approval process. Other participating regulatory agencies may also review and approve the monitoring plan.

#### 3.6.3.1 Routine Monitoring

Routine monitoring (also known as easement monitoring) tracks the status of a mitigation site and documents that the requirements of the conservation easement or other management agreements are being met. Routine monitoring verifies that the MCA holder and landowner (if these are different parties) are carrying out the terms of the MCA and the easement. For MCAs in the RCIS area, routine monitoring will, at a minimum, track the components listed below.

- Maintain the property in a condition consistent with the easement,
- Maintain infrastructure and access as stated in the easement,
- Implement enhancement and restoration actions as described in the MCA,

- Implement management actions as described in the MCA, and
- Report monitoring activities conducted.

#### 3.6.3.2 Effectiveness Monitoring

Effectiveness monitoring assesses the biological success or failure of conservation actions or enhancement actions and is required only on actions that have been approved for mitigation credit under an MCA. Effects monitoring may also be used on voluntary conservation investments in order to determine if management actions are achieving the desired outcomes, but they are not required. Specific detail regarding what needs to be included in a monitoring plan for an MCA can be found in the Program Guidelines (California Department of Fish and Wildlife 2017a).

Effectiveness monitoring is focused on the status of focal species or other conservation elements within the RCIS area for which mitigation credit has been assigned under the MCA. Understanding the effects of management actions is a critical component of the monitoring and adaptive management program. The purpose of effects monitoring is to ascertain the success of management in achieving desired outcomes, provide information and mechanisms for altering management if necessary, and evaluate whether the MCA was successful. Monitoring results may also be used to determine when mitigation credits can be released and when they are available for use or sale. Furthermore, results from effectiveness monitoring can be used to establish how implementation of the MCA or voluntary conservation investment contributes to the achievement of conservation goals and objectives.

Effectiveness monitoring includes the development and assessment of success criteria (e.g., performance-based milestones) for conservation actions. The conservation goals and objectives determine the nature of the success criteria. In other words, success criteria should be structured to allow the RCIS applicant, MCA proponent, the CDFW, or other interested agencies, stakeholders, or the public to determine whether implementation of the conservation or enhancement action achieves, or partially achieves, one or more conservation objectives.

### 3.6.4 Key Elements of Monitoring Program

In addition to the guidelines described previously, the steps outlined below will be included when designing the monitoring program so that it can most effectively inform any necessary changes in management.

- **Determine what to measure.** Establish the attributes or variables that the monitoring will measure. This step includes the development of measurable success criteria for evaluating management actions.
    - **Species status.** Monitoring whether species are present and comparing species status (e.g., species health, life history stages, population size) across years can determine whether and how well management actions are working.
    - **Habitat quality**. Monitoring the function and health of certain habitat types can allow for conclusions about several species at one time, without surveying for each species. This includes assessing how species respond to restoration or enhancement actions on mitigation lands.
- **Develop monitoring protocols.** Questions to be answered by the monitoring program will be at the species or habitat level. Monitoring protocols will vary, depending on the species or

habitat type being monitoring. In some cases, standardized or CDFW-approved protocols exist.[11] When appropriate, those protocols should be used, although sometimes variations in those protocols may be warranted.

- **Ensure monitoring frequency matches need.** Monitoring frequency should be tied directly to the needs of the MCA and the cycles of the focal species and other natural resources. In some cases, especially early in implementation, monitoring may need to occur frequently to ensure conservation actions make progress toward performance-based milestones (and, ultimately, credit release). In other cases, monitoring may need to occur more infrequently. Ensure that the frequency of monitoring efforts matches the question being asked. Factors that may influence the frequency or type of monitoring include, but are not limited to, the following:
    - Natural history of the species being monitored,
    - Habitat variability between years due to uncontrollable factors (e.g., rainfall),
    - Variability in species population levels between years due to uncontrollable factors, and
    - Variability in habitat quality between potential sampling locations.
- **Use indicator species, if appropriate.** In some cases, groups of species or indicator species will streamline monitoring. Indicators are selected because they are easy to survey and provide usable information on the species, habitat, or ecosystem in question.

[11] Many CDFW-approved protocols are designed to detect a species' presence on proposed development sites but may not be suitable for long-term monitoring that has been designed to detect a species' trends or responses to management actions.

# Chapter 4
# Implementation Strategy

After approval by the California Department of Fish and Wildlife (CDFW), a regional conservation investment strategy (RCIS) can be used immediately to inform decisions related to land acquisition, restoration, enhancement, management actions for focal species and other species, and other conservation elements addressed by the RCIS. The RCIS may be used by the following entities.

- Conservation organizations making conservation investments in the RCIS area.
- State or federal agencies evaluating grant or permit applications for local conservation or research projects.
- Project proponents to guide the siting and design of compensatory mitigation projects and project-level permitting for listed species.
- Landowners, public agencies, private entities, or others interested in establishing a mitigation or conservation bank or developing a mitigation credit agreement (MCA) with CDFW to provide a mechanism for compensatory mitigation.

## 4.1 Conservation Partnerships: Keys to the Success of the Antelope Valley RCIS

The Antelope Valley RCIS provides a framework for identifying regional conservation priorities and actions for focal species and other conservation elements within the RCIS area. The conservation goals and objectives are designed to be broad-based yet comprehensive in identifying those actions necessary to ensure the long-term conservation of the focal species and other species addressed by this RCIS. While centered on focal species, this RCIS also addresses other key conservation elements, including habitat connectivity and wildlife linkages, working landscapes, and unique land cover types in the RCIS area. As such, the RCIS applicant anticipates that, in addition to the conservation actions implemented within MCAs in the RCIS area, a combination of conservation investments, conservation actions, and compensatory mitigation completed outside of MCAs also will be needed to achieve the RCIS's conservation goals and objectives. This RCIS also anticipates that success in meeting the conservation goals and objectives will require flexibility, creativity, and establishment of strong and enduring partnerships in conservation.

To that end, this Antelope Valley RCIS encourages agencies and organizations that may use this RCIS to guide conservation investments to consider other agencies or organizations operating in the RCIS area if the needs of those agencies or organizations align in a way that would support more robust and more effective implementation of one or more conservation priorities. The organizations whose representatives have participated on the steering committee and advisory committee (listed in Section 4.3.2.2*, Implementation Committee*) have been engaged in the preparation and implementation of this RCIS, and/or are already supporting important conservation activities in the RCIS area.

The implementation committee, when and where appropriate, will look for innovative ways to support others taking the lead in making conservation investments and developing MCAs, if they are consistent with this Antelope Valley RCIS and would help to achieve the goals and objectives of this RCIS.

This chapter describes the implementation process and provides an overview of the new tool enabled by the RCIS, an MCA. This chapter also identifies ways that may be used to implement this RCIS, but are not necessarily required by the California Fish and Game Code (CFGC) or the Program Guidelines. For example, the implementation committee, described in Section 4.3.2.2, is not required by CFGC or the Program Guidelines, but is offered as a suggestion for how local entities may support implementation of the RCIS. Items that are suggestions and not requirements are denoted as those the implementation sponsor *may* do, as opposed to required elements that they *will* do or *shall* do. To make it explicit, Section 4.3.1, *Required Responsibilities of Implementation Sponsor,* describes those elements required during implementation, and Section 4.3.2, *Optional Responsibilities of Implementation Sponsor,* describes elements that are not required, but may prove helpful.

It is not the intent for the implementation sponsor to fully fund all aspects of implementation. Instead, it is assumed that the implementation sponsor would facilitate implementation activities using some funds of their own and through funding partnerships with other interested parties. It is further assumed that entities pursuing mitigation credit agreements under the RCIS would fully fund their involvement in, and development of, those MCAs, and that the implementation sponsor would bear no financial responsibility for development or monitoring of those MCAs.

# 4.2 Goals of Implementation

The purpose of the RCIS is to provide a framework to facilitate conservation actions in the RCIS area. These actions include those driven by regulatory needs (primarily in the form of mitigation) as well as other voluntary conservation actions. This Antelope Valley RCIS was developed to guide investments in conservation, infrastructure, and compensatory mitigation to help ensure that conservation actions in the RCIS area are occurring in an informed and strategic manner to achieve the highest degree of conservation benefit at a regional scale.

# 4.3 Implementation Structure

The RCIS priority conservation actions will be implemented collectively by all voluntary users of the RCIS. These users could include any or all of the entities listed above. The *Regional Conservation Investment Strategies Program Guidelines* (Program Guidelines) (California Department of Fish and Wildlife 2017a) define the RCIS applicant as the public agency or group of public agencies responsible for the technical and administrative updates[1] to an RCIS. For the purposes of this Antelope Valley RCIS, the *implementation sponsor* is the entity or entities responsible for conducting periodic technical and administrative updates to this RCIS consistent with the Program Guidelines. The applicant and implementation sponsor for this RCIS is the Desert and Mountains Conservation Authority (DMCA). The responsibilities of the implementation sponsor and its partners are described in the following subsections.

[1] The Program Guidelines state that "[a]n updated RCIS means updates to an RCIS best available science; it does not include updates or amendments to the geographic area, focal species, or other conservation elements." See Section 4.5, *Amending the RCIS,* for the definition of an RCIS amendment and the RCIS amendment process.

## 4.3.1 Required Responsibilities of Responsibilities of Implementation Sponsor

As the implementation sponsor for this Antelope Valley RCIS, DMCA, in coordination with CDFW and potentially with the support of an implementation committee, will be responsible for the following actions.

- Ensuring that this RCIS is updated at least once every 10 years so that it reflects the most up-to-date information about resources in the RCIS area.
- Assessing progress toward meeting this RICS's goals and objectives, through conservation investments and mitigation actions, at least once every 10 years, or until all mitigation credits are used.

CDFW may extend the duration of an approved RCIS for additional periods of up to 10 years after this RCIS is updated with new scientific information and CDFW finds that this RCIS continues to meet the requirements of CFGC 1852. CDFW will maintain a list and status of all MCAs that are active in the RCIS area on their website.

### 4.3.1.1 Updating this RCIS with Best Available Science

In compliance with CFGC 1856(b), which requires that each RCIS include a process for updating the scientific information used in the strategy at least once every 10 years, DMCA will conduct a review to update and refine, if necessary, the strategy based on current scientific information. DMCA may use various data sources to inform the update, including, but not limited to, recent scientific literature, technical reports or studies, and guidance from regulatory agencies. The review may reconsider the assumptions on which the strategy was built, particularly related to focal species and conservation priorities. The results of this evaluation may be presented either as part of a progress report (Section 4.3.2.1, *Progress Report*) or as a stand-alone document. If the results of this review reveal that fundamental aspects of this Antelope Valley RCIS are no longer valid, DMCA may elect to amend this RCIS to address the changes, as outlined in Section 4.5, *Amending the RCIS*.

### 4.3.1.2 Assessing Progress

To determine whether the Antelope Valley RCIS is meeting its conservation goals and objectives, DMCA, in coordination with CDFW, will assess the status of conservation priorities and conservation actions in the RCIS area and relate those actions to the conservation goals and objectives in this RCIS (Chapter 3, *Conservation Strategy*) at least once every 10 years, or until all mitigation credits are used. As part of this assessment, DMCA will coordinate to use data from CDFW to compile the status of MCAs being used in the RCIS area, as well as progress toward meeting the conservation goals and objectives of this RCIS.

## 4.3.2 Optional Responsibilities of Implementation Sponsor

Section 4.3.1, *Required Responsibilities of Implementation Sponsor*, describes the minimum requirements for implementation, as outlined in CFGC and the Program Guidelines. Beyond those requirements, DMCA has the discretion and flexibility to implement the RCIS in a manner consistent with the vision of their organization and level of funding available at any given time. The following subsections describe some optional items that DMCA may consider during implementation.

#### 4.3.2.1 Progress Report

The implementation sponsor may prepare an RCIS implementation progress report at any point during the 10-year period. Progress reports are not required by CFGC or the Program Guidelines, but they may prove useful in communicating the progress made toward achieving the conservation goals and objectives in the RCIS. If prepared, the progress report could include the following.

- An overview of the conservation actions and habitat enhancement actions that DMCA is aware of, and only those specifically implemented under this Antelope Valley RCIS.
- An assessment of progress in offsetting identified threats to focal species and other conservation elements, and in achieving this RCIS's conservation goals and objectives.
- An evaluation of the effectiveness of conservation actions and habitat enhancement actions in offsetting identified threats to focal species and in achieving the strategy's biological goals and objectives.

MCA proponents must conduct monitoring of their conservation actions to determine whether they have met performance-based milestones that allow release of mitigation credits. MCA proponents provide these reports to CDFW, who must post them online. DMCA can use these public reports, and other data, to assess the progress and effectiveness of conservation actions in the RCIS area to contribute to the RCIS conservation goals and objectives.

#### 4.3.2.2 Implementation Committee

DMCA may choose to partner with other public agencies, organizations, or collaborators to form an RCIS implementation committee to help guide implementation and updates of the Antelope Valley RCIS, particularly in instances where implementation of this RCIS would support the missions of these other organizations. Potential implementation committee members may include representatives from the following organizations:

- Antelope Valley Audubon Society
- Antelope Valley Conservancy
- Association of Rural Town Councils
- California State Parks
- California Native Plant Society
- Defenders of Wildlife
- Edwards Air Force Base
- Lake Los Angeles Rural Town Council
- Land Veritas
- The Nature Conservancy
- Transition Habitat Conservancy
- Other interested organizations, cities, or jurisdictions

The role of the implementation committee would be to periodically assist the DMCA on all aspects of implementation. The implementation committee may also help inform and educate potential RCIS users of how the RCIS can be used and the benefits it provides. The implementation committee will not arbitrate or negotiate mitigation on behalf of project proponents. Such responsibility will remain with the entity pursuing the mitigation and the regulatory agencies.

In summary, the following are potential roles for the implementation committee (this list is not exhaustive).

- Publicize this Antelope Valley RCIS and its successful implementation to participating agencies and other entities that may use this RCIS to inform conservation actions in the RCIS area.
- Answer questions from users and potential users of this RCIS.
- Develop guidance, as needed, to clarify and refine components of this RCIS.
- Assist with preparation of the progress report, or other documents for CDFW, as needed, documenting the implementation of this RCIS and MCAs, as appropriate.
- Support DMCA in undertaking periodic updates of this RCIS (at least every 10 years) based on significant new information on the focal species and their conservation.

If established, the implementation committee would meet periodically (e.g., at least annually) to review how the Antelope Valley RCIS is being used, and to help DMCA assess whether information updates or an amendment is needed.

# 4.4 Mitigation Credit Agreements

It is expected that the Antelope Valley RCIS will be used by third parties to develop MCAs. For an RCIS to support an MCA, CFGC 1856(b) states the following.

> (b) For a conservation action identified in a regional conservation investment strategy to be used to create mitigation credits pursuant to this section, the regional conservation investment strategy shall include, in addition to the requirements of Section 1852, all of the following:
>
> (1) An adaptive management and monitoring strategy for conserved habitat and other conserved natural resources.
>
> (2) A process for updating the scientific information used in the strategy, and for tracking the progress of, and evaluating the effectiveness of, conservation actions identified in the strategy, in offsetting identified threats to focal species and in achieving the strategy's biological goals and objectives, at least once every 10 years.
>
> (3) Identification of a public or private entity that will be responsible for the updates and evaluation required pursuant to paragraph (2).

This RCIS includes these three components in order to facilitate MCAs. Monitoring and adaptive management are addressed in Section 3.6, *Monitoring and Adaptive Management Framework.* The process for updating the scientific information in the RCIS is described below. Finally, DMCA will be responsible for the updates and evaluation consistent with the statute.

An MCA identifies the type and number of credits a person or entity proposes to create by implementing one or more conservation actions, as well as the terms and conditions under which those credits may be used. Typically, credits are used to meet compensatory mitigation obligations for impacts on aquatic resources or special-status species.

An MCA helps establish advance mitigation and can provide a number of significant benefits, particularly for agencies or entities with predictable long-term mitigation needs. An MCA can provide the following benefits.

- The MCA applicant can set aside or purchase lands when doing so is most cost-effective, knowing those lands will provide useful mitigation values in the future.
- Mitigation credits can be pooled across large sites or multiple sites, providing economies of scale to deliver mitigation more efficiently across many projects.
- An MCA provides certainty and predictability to the MCA sponsor for the future costs of project mitigation under state laws.
- An MCA gives CDFW and other resources agencies some assurance that proposed mitigation fits within a larger conservation framework (the RCIS) and that investments in resource protection, restoration, and enhancement collectively contribute to meeting regional conservation goals and objectives.

Once this Antelope Valley RCIS is approved by CDFW, any public or private entity may prepare for CDFW approval an MCA for one or more conservation or enhancement actions that measurably advances the conservation goals and objectives of this RCIS. A person or entity, including a state or local agency, with mitigation needs may choose to enter into an MCA with CDFW for a single, large mitigation site with multiple phases, a suite of mitigation sites, or even a specific region (e.g., watershed boundary or municipality) within the RCIS area.

MCAs will facilitate permitting under the California Endangered Species Act for RCIS focal species that are state-listed and other species whose conservation need is analyzed or otherwise provided for in this Antelope Valley RCIS. The MCA can be designed to satisfy a range of other state wildlife laws and regulations, including the California Environmental Quality Act (CEQA), and Lake or Streambed Alteration requirements of the CFGC. An MCA can also be used to meet the requirements of other state and federal environmental laws and regulations with the approval of applicable state or federal regulatory agencies. Appendix B, *Regulatory Processes*, outlines how other regulatory agencies and local CEQA lead agencies may use this RCIS to facilitate permitting under their respective authorities. This RCIS does not support the development of MCA credits for non-focal species. If an MCA is developed to include non-focal species, it will need to describe how the ecological requirements of each non-focal species align with a focal species or other conservation element, and explain how the proposed conservation actions would provide for the non-focal species.

## 4.4.1 Developing Mitigation Credit Agreements

MCAs identify the types and amounts of mitigation credits that will be created through implementation of conservation actions, and they provide a schedule for the release of the credits based on relevant milestones in project implementation (e.g., land protection, restoration goal achievement). Mitigation credits can be established for any conservation or enhancement action that contributes to the achievement of conservation goals and objectives outlined in this Antelope Valley RCIS and complies with CFGC 1851(d) or (g). CDFW must approve the release of all credits after the MCA sponsor meets performance-based milestones established by the MCA.

Typically, mitigation credits will be established for the following types of conservation actions.

- Permanent acquisition of land development rights (including placement of a conservation easement).
- Restoration of resources that creates new and/or increases existing habitat function for a focal species or species whose conservation need is analyzed or otherwise provided for in the Antelope Valley RCIS.
- Enhancement of focal species or other species whose conservation need is analyzed or otherwise provided for in this RCIS, habitat conditions, or habitat connectivity.

An MCA developed under an RCIS must be consistent with any previously approved or amended RCIS, state or federal recovery plan, or other state or federal approved conservation strategy that overlaps with the RCIS area (Section 1.6, *Relevant Conservation Plans and Policies*). An MCA must also take into account any approved mitigation bank and available mitigation credits at these banks in the RCIS area (Section 4.4.2, *Conservation or Mitigation Banks*). The MCA must explain how available mitigation credits at approved banks will be purchased or used in combination with the MCA mitigation credits. If available bank credits will not be purchased or used, an MCA must explain why. More information on the MCA development and approval process can be found on the CDFW website for the RCIS program.[2]

### 4.4.2 Conservation or Mitigation Banks

A conservation or mitigation bank is privately or publicly owned land that is managed for its natural resource values, with an emphasis on the targeted resource (species or aquatic resources, respectively). Mitigation banks typically include the restoration or creation of aquatic resources. Conservation banks may include restoration projects, but they are more heavily focused on the protection and management of existing occupied habitats of the target species. In exchange for permanently protecting and managing the land—and in the case of mitigation banks, restoring or creating aquatic resources—the bank operator is allowed to sell credits to project proponents who need to satisfy legal requirements for compensating environmental impacts of development projects (Appendix A, *Glossary*).

The goals of private mitigation banks are compatible with and support regional conservation strategies such as the Antelope Valley RCIS. See Section 2.2.4.3, *Mitigation Banks and Conservation Banks in the RCIS Area*, for information on the conservation and mitigation banks with available credits whose service area overlaps the RCIS area.

Private parties wishing to develop and establish a new mitigation or conservation bank in the RCIS area should consult guidance and instructions provided by CDFW and the U.S. Fish and Wildlife Service.[3] This Antelope Valley RCIS can provide voluntary guidance on where mitigation or conservation banks could be established to support focal species.

The only mitigation banks with service areas overlapping the RCIS area (and in Los Angeles County) are the Petersen Ranch Conservation Bank and the Santa Paula Creek Mitigation Bank, which provide mitigation credits for aquatic resources as well as mitigation credits for species.

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[2] https://www.wildlife.ca.gov/Conservation/Planning/Regional-Conservation

[3] For additional information on banking see the following websites:
<www.dfg.ca.gov/hcpb/conplan/mitbank/mitbank.shtml> and <www.fws.gov/sacramento/es/cons_bank.htm>.

### 4.4.3 In-Lieu Fee Programs

In-lieu fee programs are identified by 33 Code of Federal Regulations (CFR) 332, Compensatory Mitigation for Losses of Aquatic Resources (also known as the Mitigation Rule), as a preferred approach to meeting compensatory mitigation needs for adverse effects on waters of the United States, second to mitigation banks. As defined in 33 CFR 332.2, an in-lieu fee program involves:

> …the restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to satisfy compensatory mitigation requirements for DA permits. Similar to a mitigation bank, an in-lieu fee program sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the in-lieu program sponsor. However, the rules governing the operation and use of in-lieu fee programs are somewhat different from the rules governing operation and use of mitigation banks. The operation and use of an in-lieu fee program are governed by an in-lieu fee program instrument.

No mitigation lands associated with an in-lieu fee program currently exist in the RCIS area. The Antelope Valley RCIS could be used by in-lieu fee program proponents to help design the restoration, enhancement, or preservation of aquatic resources in the strategy area.

## 4.5 Amending the RCIS

Under current state law, CDFW may extend the duration of an approved or amended RCIS for additional periods of up to 10 years. Once the Antelope Valley RCIS is updated with new scientific information, and CDFW finds that the Antelope Valley RCIS continues to meet the requirements of CFGC 1852, CDFW may extend the duration of this RCIS.

Additionally, CDFW may amend the RCIS through the amendment process described in CFGC 1854(a). CFGC 1854(a) states, "For purposes of this section, an amended strategy means a complete regional conservation investment strategy prepared by a public agency to amend substantially and to replace an approved strategy submitted by the public agency."

The process and timelines for amending an existing RCIS are the same as for developing a new RCIS, including requirements for public outreach and CDFW review and approval. An RCIS may be amended for a variety of reasons, which may include one or more of the following.

- Changing the RCIS area.
- Adding or removing focal species.
- Substantially changing the conservation goals and objectives of focal species.
- Substantial advancement in the best available science on which the conservation goals and objectives are based (e.g., climate change projections).

# Chapter 5
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Chapter 6
# List of Preparers and Reviewers

## 6.1 ICF

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| Troy Rahmig | Deputy RCIS Program Manager |
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| James Strittholt, Ph.D. | Principal Scientist and Project Leader |
| John Gallo, Ph.D. | Senior Scientist |
| Dustin Pearce, M.E.S.M. | GIS modeler |
| Rebecca Degagne, M.S. | GIS modeler |
| Justin Brice, B.S | GIS analyst |
| Annie Jacobs, B.S | GIS analyst |
| Gladwin Joseph, Ph.D. | Project Manager |

# 6.3 Antelope Valley RCIS Steering Committee

Antelope Valley RCIS Steering Committee members provided important and valuable input to the development of the RCIS. They are listed below in order of last name.

| | |
|---|---|
| Jill Bays | Transition Habitat Conservancy |
| Vern Biehl | Transition Habitat Conservancy |
| Graham Chisholm | Conservation Strategy Group |
| Brian Croft | U.S. Fish and Wildlife Service |
| Stephanie Dashiell | The Nature Conservancy |
| Paul Edleman | Desert and Mountain Conservation Authority |
| Spencer Eldred | Mountains Recreation and Conservation Authority |
| Scott Flint | California Energy Commission |
| Rob Machuca | LA Metro |
| Jeff Olesh | Transition Habitat Conservancy; Desert and Mountain Conservation Authority |
| Charlotte Pienkos | The Nature Conservancy |
| Diane Sacks | Desert and Mountain Conservation Authority |
| Robert Wang | California Department of Transportation |

# 6.4 Antelope Valley RCIS Advisory Committee

Antelope Valley RCIS Advisory Committee members provided important input and perspective during the development of the RCIS. They are listed below in order of last name.

| | |
|---|---|
| Ileene Anderson | Center for Biological Diversity |
| Tracey Brownfield | Land Veritas |
| Betty Courtney | California Department of Fish and Wildlife |
| Brian Croft | U.S. Fish and Wildlife Service |
| Kim Delfino | Defenders of Wildlife |
| Tom Egan | Defenders of Wildlife |
| Don Goeschl | Antelope Valley Audubon |
| Arthur Haubenstock | 8 Minute Energy |
| Jim James | Regional Renewable Group |
| Scott Kiernan | Edwards Air Force Base |

| | |
|---|---|
| Connie Latham | California State Parks |
| Barbara Marquez | High-Speed Rail Authority |
| Brady Moss | California Natural Resources Agency |
| Merrylou Nelson | Association of Rural Town Councils |
| Tom Rademacher | Edwards Air Force Base |
| Vickie Rausch | Antelope Valley Air Quality Management District |
| Margaret Rhyne | Poppy Reserve/Mojave Desert Interpretive Association |
| Randy Rodriguez | California Department of Fish and Wildlife |
| Alex Size | Trust for Public Land |
| Greg Suba | California Native Plant Society |
| Alex Sundquist | 8 Minute Energy |
| Emily Tibbott | California Strategic Growth Council |
| Robert Tse | U.S. Department of Agriculture |
| Erinn Wilson | California Department of Fish and Wildlife |
| Susan Zahnter | Association of Rural Town Councils |
| Jan Zimmerman | Regional Water Quality Control Board |

# 6.5 Antelope Valley RCIS Local and Technical Experts

Antelope Valley RCIS local and technical expert group members provided essential local knowledge and expertise regarding issues in the RCIS area, details about focal species and natural communities, and helpful information regarding the application of conservation actions in the local environment. The local and technical experts are listed below, in order of last name.

| | |
|---|---|
| Jill Bays | Transition Habitat Conservancy |
| Stephanie Dashiell | The Nature Conservancy |
| Tom Egan | Defenders of Wildlife |
| Ken Sanchez | U.S. Fish and Wildlife Service (retired) |
| Greg Suba | California Native Plant Society |

Appendix A

# Glossary

# Appendix A
# **Glossary**

This glossary defines terms used throughout this Antelope Valley Regional Conservation Investment Strategy (RCIS). Additional terms and extended definitions are provided in the *Regional Conservation Investment Strategies Program Guidelines* (Program Guidelines), Section 2, *Standard Terminology.*[1]

| Term | Definitions |
|---|---|
| adaptive management and monitoring strategy | A component of an RCIS that incorporates an adaptive management process informed by periodic monitoring of implementation of both conservation actions and habitat enhancement actions. *Adaptive management* means using the results of new information gathered through a monitoring program to adjust management strategies and practices to help provide for the conservation of focal species and their habitats. A monitoring strategy is the periodic evaluation of monitoring results to assess the adequacy of implementing a conservation action or habitat enhancement action and provide information to direct adaptive management activities and determine the status of the focal species, their habitats, or other natural resources.[2] |
| advance mitigation | Compensatory mitigation for impacts on ecological resources (species and their habitat) and other natural resources; contributes to the fulfillment of regional conservation priorities and is implemented prior to impacts occurring. |
| Advisory Committee | Composed of local stakeholders, this group provided information on regional ecological resources important to the development of this Antelope Valley RCIS. |
| area-dependent species | Species that require large, contiguous blocks of habitat. |
| areas of high biological value | Areas determined to offer the highest biological value for focal species, based on modeled species distribution, natural communities, wildlife movement, habitat resilience, and other factors. |
| areas of high conservation value | Areas determined to have both high biological value and high landscape intactness; prioritized for conservation actions. |
| Assembly Bill 2087 | Amended CFGC Chapter 9, Sections 1850–1861, to create a pilot RCIS through January 1, 2020. |
| biodiversity | The full array of living things considered at all levels, from genetic variants of a single species to arrays of species and arrays of genera, families, and higher taxonomic levels; includes natural communities and ecosystems. |

[1] California Department of Fish and Wildlife. 2017a. *Regional Conservation Investment Strategies*. Program Guidelines. April 3. Sacramento, CA. Available: https://www.wildlife.ca.gov/Conservation/Planning/Regional-Conservation.

[2] Adapted from California Fish and Game Code (CFGC) Section 2805(a)(g).

| Term | Definitions |
|---|---|
| California Climate Adaptation Strategy | The document summarizing climate change impacts and recommending adaptation strategies for California.[3] |
| California Desert Biological Conservation Framework | Developed from the DRECP; incorporates all conservation planning data and results, including biological goals and objectives at the landscape, natural community, and species levels. |
| California Fish and Game Code | State code amended by Assembly Bill 2087 to provide for an RCIS program (CFGC Sections 1850–1861). |
| carr | Land cover with saturated soil or standing water and a more or less well-developed tree canopy or tall shrub layer. |
| compensatory mitigation | Actions taken to fulfill, in whole or in part, mitigation requirements under state or federal law or a court mandate. |
| conservation | The use of habitat and other natural resources such that they remain viable for future generations. |
| conservation action | Actions identified in an RCIS whose implementation through an MCA would create credits to be used as compensatory mitigation. Actions would preserve or restore ecological resources, including habitat, natural communities, ecological processes, and wildlife corridors, to protect those resources permanently and provide for their perpetual management to help achieve one or more goals and objectives for one or more focal species or other conservation elements. |
| conservation bank | Land managed for its natural resource values, with an emphasis on targeted resources. May include habitat restoration or creation in addition to protecting occupied habitats. See *mitigation bank.* |
| conservation easement | Any limitation in a recorded instrument that contains an easement, restriction, covenant, condition, or offer to dedicate, which is or has been executed by or on behalf of the owner of the land, subject to that limitation, and is binding upon successive owners of the land, the purpose of which is to retain land predominantly in its natural, scenic, historical, agricultural, forested, or open-space condition.[4] |
| conservation element | An element with ecological functions in an RCIS area, including focal species and their habitats, wildlife corridors and linkages, and other natural resources. |
| conservation goal | A broad, guiding principle that describes a desired future condition for a focal species, other species, or other important conservation element. Each conservation goal is supported by one or more conservation objectives. |
| conservation investment | Conservation actions or habitat enhancement actions that are implemented under an approved RCIS; however, the implementer does not create credits through an MCA with the CDFW. Conservation investments are typically funded by public agencies and nonprofit or other philanthropic organizations. |
| conservation objective | A concise, measurable statement of what is to be achieved in support of a conservation goal. |

[3] California Natural Resources Agency. 2009. *California Climate Adaptation Strategy.* Sacramento, CA. Available: http://climatechange.ca.gov/adaptation/.

[4] *Conservation easement* includes a conservation easement, as defined in Civil Code Section 815.1; an open space easement, as defined in Civil Code Section 51075; and an agricultural conservation easement, as defined in Public Resources Code Section 10211.

| Term | Definitions |
|---|---|
| conservation priority | A conservation action (land acquisition, restoration, or habitat enhancement) that is ranked according to its importance for contributing to the conservation and recovery of focal species and their habitats or other conservation elements in an RCIS area. |
| conservation purpose | Statement or statements in an RCIS that identify focal species and other natural resource conservation priorities within the RCIS area that outline conservation actions or habitat enhancement actions that, if implemented, will sustain and restore these resources. |
| creation (of natural community or focal species' habitat) | The creation of a specified resource condition where none existed before. See *establishment.* |
| critical habitat | Habitat designated as *critical* (16 USC 1532[5][a]) refers to specific areas occupied by a federally listed species at the time it is listed that are essential to conservation of the species and may require special management considerations or protection. Critical habitat also includes specific areas outside occupied habitat into which the species could spread that are considered essential for the species' recovery. |
| *Draft Desert Renewable Energy Conservation Plan and Environmental Impact Report/Environmental Impact Statement* | Examined the impacts of renewable energy and associated development on public and private lands and is a foundation document for this Antelope Valley RCIS.[5] |
| ecological integrity | The degree to which the components (types of species, soil, etc.), structures (arrangement of components), and processes (flows of energy and nutrients) of an ecosystem or natural community are present and functioning intact. Lands with low ecological integrity generally have been subject to significant human influences or disruption of natural processes, such as fire, floods, or nutrient and hydrological cycling. |
| ecological resources | Species, habitat, biological resources, and natural resources identified in an RCIS. See *conservation element* and *natural resources*. |
| ecoregion, sub-ecoregion | As used in this document, *ecoregion* means a USDA section[6] and *sub-ecoregion* means a portion of the section or USGS hydrological units (assigned HUCs).[7] USDA describes four geographic levels of detail in a |

[5] California Energy Commission, California Department of Fish and Wildlife, U.S. Bureau of Land Management, and U.S. Fish and Wildlife Service. 2014. *Desert Renewable Energy Conservation Plan Environmental Impact Report/Environmental Impact Statement.* Available: http://www.drecp.org/draftdrecp/files/a_Front_Matter_and_Executive_Summary/Title_Main.pdf.

[6] Goudey, C.B., and D.W. Smith (eds.). 1994. *EcoregionsCalifornia 07_3.* McClellan, CA. Remote Sensing Lab. Updated with ECOMAP 2007: Cleland, D.T.; Freeouf, J.A.; Keys, J.E., Jr.; Nowacki, G.J.; Carpenter, C; McNab, W.H. 2007. Ecological Subregions: Sections and Subsections of the Conterminous United States [1:3,500,000] [CD-ROM]. Sloan, A.M., cartog. Gen. Tech. Report WO-76. Washington, DC: U.S. Department of Agriculture, Forest Service.

Miles and Goudey 1997. *Ecological Subregions of California.* Technical Report R5-EM-TP-005, USDA Forest Service, Pacific Southwest Region, San Francisco, CA.

[7] U.S. Department of Agriculture-Natural Resources Conservation Service, U.S. Geological Survey, and U.S. Environmental Protection Agency. n.d. *Watershed Boundary Dataset*. Available: http://datagateway.nrcs.usda.gov. The Watershed Boundary Dataset was created from a variety of sources from each state and aggregated into a standard national layer for use in strategic planning and accountability.

| Term | Definitions |
|---|---|
| | hierarch of regional ecosystems: domains, divisions, provinces, and sections. Sections are subdivisions of provinces, based on major terrain features, such as a desert, plateau, valley, mountain range, or a combination thereof.[8] |
| ecosystem | A natural unit defined by both its living and nonliving components; a balanced system for the exchange of nutrients and energy. See *habitat*. |
| ecosystem function | The processes that sustain species and ecosystems such as the cycling of matter, energy, and nutrients. |
| ecosystem services | The beneficial outcomes to humans from ecosystem functions, such as supplying oxygen, sequestering carbon, supporting the food chain, supporting animal or plant harvesting, providing clean water, recharging groundwater, protecting populations from storms and floods, pollinating and fertilizing for agricultural purposes, and providing scenic views. |
| endemic | A species, subspecies, or variety found only in a specified geographic region. |
| enhancement | A manipulation of an ecological resource or natural resource that improves a specific ecosystem function. An enhancement does not result in a gain in protected or conserved land, but it does result in an increase in ecological function. |
| essential connectivity areas | Those areas essential for ecological connectivity between natural landscape blocks, as depicted in the Essential Connectivity Map prepared as part of the California Essential Habitat Connectivity Project[9] or other connectivity report, plan, or map approved by the CDFW. |
| establishment | The manipulation of the physical, chemical, or biological characteristics present on a site to develop an aquatic or terrestrial habitat resource for focal species. Establishment will result in a gain in resource area and/or function. See *creation*. |
| focal species | Species that are identified and analyzed in an RCIS that will benefit from conservation actions and habitat enhancement actions set forth in the RCIS. |
| gap analysis | An analysis that identifies gaps between land areas that are rich in biodiversity and areas that are managed for conservation. |
| GAP status | GAP status 1–3 lands and unassigned public lands are all evaluated as protected lands in the Antelope Valley RCIS. The level of preservation (see *preservation*) varies among sites, with GAP Status 1 generally having the highest level of preservation. |

[8] Goudey, C.B., and D.W. Smith (eds.). 1994. *EcoregionsCalifornia 07_3.* McClellan, CA. Remote Sensing Lab. Updated with ECOMAP 2007: Cleland, D.T.; Freeouf, J.A.; Keys, J.E., Jr.; Nowacki, G.J.; Carpenter, C; McNab, W.H. 2007. Ecological Subregions: Sections and Subsections of the Conterminous United States [1:3,500,000] [CD-ROM]. Sloan, A.M., cartog. Gen. Tech. Report WO-76. Washington, DC: U.S. Department of Agriculture, Forest Service. Miles and Goudey 1997. *Ecological Subregions of California.* Technical Report R5-EM-TP-005, USDA Forest Service, Pacific Southwest Region, San Francisco, CA.

[9] U.S. Fish and Wildlife Service. n.d. *California Essential Habitat Connectivity Project*. Available: https://www.wildlife.ca.gov/conservation/planning/connectivity/CEHC. Accessed: March 3, 2017.

| Term | Definitions |
|---|---|
| habitat | The specific places where environmental conditions (i.e., physical and biological) are present that are required to support occupancy by individuals or populations of a given species. Habitat may be occupied (i.e., individuals or a population of the species are or have recently been present) or unoccupied. |
| habitat connectivity | The capacity of areas of intact habitat to facilitate the movement of species and ecological processes. |
| habitat enhancement action | An action identified in an RCIS that is intended to improve the quality of wildlife habitat or address risks or stressors to wildlife. Such action has long-term durability but does not involve acquiring land or permanently protecting habitat. Examples include improving in-stream flows to benefit fish species, enhancing habitat connectivity, and controlling or eradicating invasive species. A habitat enhancement action that is implemented through an MCA creates credits to be used as compensatory mitigation. |
| habitat quality | The capacity of a habitat to support a species. The precise meaning of *habitat quality* varies by species and depends on the specific needs of a species in the context of a particular area. High-quality habitat for species may have only foraging and resting elements or may include foraging, resting, and nesting elements. For other species, it may encompass all elements needed for the species to complete its lifecycle. Low-quality habitat has only the minimal elements needed to support an occurrence of the species. High-quality habitat tends to support larger numbers of species than low-quality habitat. |
| habitat conservation plan | A plan that outlines ways of maintaining, enhancing, and protecting a given habitat type needed to protect species. The plan usually includes measures to minimize impacts and might include provisions for permanently protecting land, restoring habitat, and relocating plants or animals to another area. An HCP is required before an incidental take permit may be issued. |
| implementation committee | Potential partners to DMCA in guiding implementation of this Antelope Valley RCIS. |
| implementation sponsor | The entity responsible for implementing the RCIS. |
| in-lieu fee program | Programs that allow payment to the government or nonprofit organization to meet the compensatory mitigation requirements for certain permits. |
| indicator species | A species, the presence or absence of which is indicative of a particular habitat, community, or set of environmental conditions.[10] |
| invasive species, nonnative species | A nonnative species that can spread into the ecosystems and displace native species, hybridize with native species, alter biological communities, and alter ecosystem processes that has the potential to cause environmental or economic harm.[11] According to the California Invasive Plan Council, *nonnative species* refers to any species |

[10] Lincoln, R., G. Boxshall, and P. Clark. 1998. *A Dictionary of Ecology, Evolution and Systematics.* Second edition. Cambridge University Press, Cambridge, UK.

[11] California Department of Fish and Wildlife. 2015. *California State Wildlife Action Plan, 2015 Update: A Conservation Legacy for Californians*. A.G. Gonzales and J. Hoshi (eds.). Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=110399&inline. Accessed: March 16, 2017.

| Term | Definitions |
|---|---|
| | introduced to California after European contact as a direct or indirect result of human activity.[12] |
| keystone species | A species whose impacts on its community or ecosystem are much larger than would be expected from its abundance[13] or whose loss from an ecosystem would cause a greater-than-average change in other species' populations or ecosystem processes and whose continued well being is vital for the functioning of a whole community. |
| land conversion | The conversion of natural and agricultural land to other land uses through the process of development. |
| land cover type | The dominant feature of the land surface, defined by vegetation, water, or human uses. |
| land preservation | Generally, the conservation of natural resources by acquiring land in its natural state. |
| Madrean | Floristic region encompassing arid or semiarid areas in the southwestern United States and northwestern Mexico. |
| mitigation bank | Land managed for its natural resource values, with an emphasis on targeted resources. Typically requires the restoration or creation of aquatic resources. See *conservation bank*. |
| mitigation credit agreement | Identifies the type and number of credits a person or entity proposes to create by implementing one or more conservation actions or habitat enhancement actions. An MCA includes the terms and conditions under which those credits may be used. The person or entity may create and use, sell, or otherwise transfer the credits upon the CDFW's determination that the credits have been created in accordance with the MCA. To enter into an MCA with the CDFW, a person or entity shall submit a draft MCA to the CDFW for its review, revision, and approval. |
| natural community | A group of organisms living together and linked together by their effects on one another and their responses to the environment they share.[14] A general term that is often used synonymously with habitat or vegetation type. |
| natural resources | Biological and ecological resources that are in addition to species and their habitats, including waters of the state, waters of the United States, wetlands, and natural communities. See *ecological resources* and *conservation element*. |
| monitoring plan | The plan for monitoring a project. It includes information needs, indicators, monitoring methods, spatial scales and locations, timeframes, and roles and responsibilities for collecting data. |
| natural community conservation plan | A plan developed pursuant to the Natural Community Conservation Planning Act (CFGC Sections 2800–2835). |

[12] California Invasive Plant Council. 2006 (updates the 1999 CalEPPC List). *Cal-IPC Invasive Plant Inventory*. Available: www.cal-ipc.org.

[13] Groom, M.J., G.K. Meffe, and R.C. Carroll, and contributing authors. 2006. *Principles of Conservation Biology.* Third edition. Sinauer Associates: Sunderland, MA, 793 pp.

[14] Sawyer, J.O., T. Keeler-Wolf, and J.E. Evens. 2009. *A Manual of California Vegetation*. Second edition. Sacramento, CA: California Native Plant Society.

| Term | Definitions |
|---|---|
| nonnative species | Any species introduced to California after European contact as a direct or indirect result of human activity.[15] See *invasive species*. |
| performance standards | Observable or measurable physical or biological attributes that are used to determine if a conservation action or habitat enhancement action has met its objectives. |
| performance-based milestones | Identified steps in implementation of a conservation action or habitat enhancement action, such as protecting a site, initiating implementation, completing implementation, or achieving performance standards. |
| permanently protect | *Permanently protect* is defined in the RCIS guidelines as "(1) recording a conservation easement and (2) providing secure, perpetual funding for management of the land, monitoring, and legal enforcement." This definition requires the actions associated with *protection* and the recording of a conservation easement, as well as *preservation,* as defined in the Antelope Valley RCIS. |
| population | The number of individuals of a particular taxon inhabiting a defined geographic area. |
| preservation | Preservation is defined in this RCIS to mean additional conservation measures above and beyond basic land protection and includes funding and implementation of long-term management and monitoring. |
| pressure | An anthropogenic (human-induced) or natural driver that could result in changing the ecological conditions of the focal species or other conservation element. Pressures can be positive or negative, depending on intensity, timing, and duration. The influence of a pressure on the target is likely to be significant. See *stressor*. |
| protected area | Public or private lands managed for open space use. |
| protection | Protection is defined in this RCIS as acquisition of land in fee title ownership and/or a conservation easement to benefit the conservation of species, habitats, and agricultural lands. |
| public agency | Any state agency, board, or commission; any county, city and county, city, regional agency, public district, redevelopment agency; or other political subdivision. |
| RCIS applicant | The public agency or group of public agencies responsible for developing an RCIS for review and approval by the CDFW. For this Antelope Valley RCIS, the applicant is the Desert and Mountains Conservation Authority. |
| RCIS area | The geographic area encompassed by an RCIS. |
| RCIS state agency sponsor | The public state agency that submits the approval request letter to the CDFW, stating that the RCIS fulfills the planning need for conservation and infrastructure or forestry. |

[15] California Invasive Plant Council. 2006 (updates the 1999 CalEPPC List). *Cal-IPC Invasive Plant* Inventory. Available: www.cal-ipc.org.

| Term | Definitions |
|---|---|
| regional conservation investment strategy | Information and analyses to inform nonbinding and voluntary conservation actions and habitat enhancement actions to advance the conservation of focal species, habitat, and other natural resources and provide nonbinding voluntary guidance for the identification of conservation priorities, investments in ecological resource conservation, or identification of priority locations for compensatory mitigation for impacts on species and natural resources. RCISs are intended to provide scientific information for the consideration of public agencies and are voluntary. RCISs are required if MCAs are to be developed. |
| *Regional Conservation Investment Strategies Program Guidelines* | Guidelines for regional conservation investment strategies, published in support of Assembly Bill 2087.[16] |
| reclamation | The act or process of recovering and/or the state of being recovered. Many reclamation techniques can be used on the path to recovering or restoring pre-disturbance profiles. |
| recovery | The process by which the decline of an endangered or threatened species is halted or reversed or threats to its survival are neutralized so that its long-term survival in nature can be ensured.[17] Entails actions to achieve the conservation and survival of a species, including actions to prevent any further erosion of a population's viability and genetic integrity. Also includes actions to restore or establish environmental conditions that enable a species to persist (i.e., the long-term occurrence of a species through the full range of environmental variation). |
| recovery plan | A document published by the USFWS, NMFS, or CDFW that lists the status of a listed species and the actions necessary to remove the species from the endangered species list. |
| reestablishment | Manipulation of a piece of land, with the goal of returning natural or historical ecosystem functions to a former resource. Results in rebuilding a former resource and increasing its area and ecosystem functions. |
| rehabilitation | Manipulation of a piece of land, with the goal of repairing natural or historic ecosystem functions to degraded habitat or natural resources. This results in a gain in ecological functions but it does not result in a gain in area. |
| restoration | Manipulation of a site, with the goal of returning species, habitat, and ecosystem functions to a site that historically supported such species, habitat, and functions but no longer does so because of the loss of one or more required ecological factors or past disturbance. |

[16] California Department of Fish and Wildlife. 2017. *Regional Conservation Investment Strategies.* Program Guidelines*.* June. Sacramento, CA. Available: https://www.wildlife.ca.gov/Conservation/Planning/Regional-Conservation.

[17] U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. *Recovery Plan for Upland Species of the San Joaquin Valley, California*. Portland, OR: Region 1.

| Term | Definitions |
|---|---|
| revegetation | The process of replanting and rebuilding the soil of disturbed land. This may be a natural process produced by plant colonization and succession, human-made rewilding projects, or accelerated processes designed to repair damage to a landscape due to wildfire, mining, flood, or other cause. |
| sensitive species | Any special-status species identified by a state or federal agency, usually a plant or animal species for which population viability is a concern. |
| Significant Ecological Area | Areas in Los Angeles County designated for their biological value to rare species or habitats, as identified in the *Los Angeles County General Plan*.[18] |
| species of special concern | *Species of special concern*[19] is an administrative designation and carries no formal legal status. The intent of designating SSCs is to focus the attention of the CDFW; state, local, and federal governmental entities; regulators; land managers; planners; consulting biologists; and others on animals that are at conservation risk. SSCs are also intended to stimulate research on poorly known species and achieve conservation and recovery of these animals before they meet California Endangered Species Act criteria for listing as threatened or endangered. |
| State Wildlife Action Plan | A comprehensive plan for conserving fish and wildlife across the state.[20] |
| Steering Committee | Composed of representatives from agencies and organizations; provided guidance on development of this Antelope Valley RCIS. |
| stewardship | Land planning and ecological resources management, with the goal of protecting and enhancing ecosystems and biodiversity. |
| strategy | A plan of action or policy designed to achieve a major or overall aim. |
| strategy term | The initial 10-year period of RCIS approval. May be extended by CDFW after review. |
| stressor, pressure | Stressor is a degraded ecological condition of a focal species or other conservation element that resulted directly or indirectly from a negative impact of pressures such as habitat fragmentation. A pressure is an anthropogenic (human-induced) or natural driver that could result in changing the ecological conditions of the focal species or other conservation element. Stressors are negative by definition. Pressures can be positive or negative, depending on intensity, timing, and duration. Negative or positive, the influence of a pressure to the target is likely to be significant. |
| Technical Subcommittee | Formed by the Steering and Advisory Committees to analyze key technical issues. |
| terrestrial landscape intactness | Describes the extent to which areas have been altered by anthropogenic actions. |
| threat | See *stressor*, *pressure*. |

[18] Los Angeles County. 2015. *Los Angeles County General Plan 2035.* Available: http://planning.lacounty.gov/generalplan.

[19] California Department of Fish and Wildlife. 2019. *Species of Special Concern*. Available: https://www.wildlife.ca.gov/Conservation/SSC.

[20] California Department of Fish and Wildlife. 2017. *SWAP Final 2015 Document.* Available: https://www.wildlife.ca.gov/SWAP/Final.

| Term | Definitions |
|---|---|
| umbrella species | A species whose conservation would indirectly conserve other species that are dependent on the same ecological conditions. |
| vernal pool | Seasonal depressional wetland covered by shallow water for variable periods from winter to spring but may be completely dry for most of the summer and fall, ranging in size from a small puddle to a shallow lake. |
| watershed | An area or ridge of land that contains a common set of streams and rivers that all drain into one location, such as a marsh, stream, river, lake, or ocean. |
| working lands | An area where people live and work in a way that allows native ecosystems or ecosystem functions to be sustained. Business and social activities strive to minimize disturbance to native plants and animals while retaining the working nature of the landscape. |

RCIS = resource conservation investment strategy; CFGC = California Fish and Game Code; DRECP = *Desert Renewable Energy Conservation Plan*; MCA = mitigation credit agreement' CDFW = California Department of Fish and Wildlife; USC = United States Code; USDA = U.S. Department of Agriculture; USGS = U.S. Geological Survey; HUC = hydrological unit code; DMCA = Desert and Mountains Conservation Authority; HCP = habitat conservation plan; NCCP = natural community conservation plan; USFWS = U.S. Fish and Wildlife Service; NMFS = National Marine Fisheries Service; SEA = Significant Ecological Area; SSC = species of special concern; SWAP = State Wildlife Action Plan; GAP = Gap Analysis Project

# Appendix B
# **Regulatory Processes**

# Appendix B
# **Regulatory Processes**

It is anticipated that this Antelope Valley Regional Conservation Investment Strategy (RCIS) will inform implementation of conservation actions and conservation enhancements as well as the implementation of projects that will require mitigation (e.g., transportation projects). When undertaking any type of ground-disturbing or vegetation-manipulating activities, it is important to consider that the action taken may affect resources that are regulated by one or more agency and may require one or more regulatory permits. This appendix provides a brief overview of the key regulations and implementing agencies.

When developing permit applications for these agencies, a key consideration is whether the proposed project falls under an existing permitting program or regional program for compensatory mitigation. In addition, it is important to consider how this RCIS and other existing permitting programs are applicable to the different regulatory agencies that may have purview over the project. To that end, this appendix provides guidance related to established programs as well as guidance on how the information in this Antelope Valley RCIS can be used to support the mitigation requirements of the different regulatory agencies.

## Regulatory Overview

The following sections provide a high-level overview of the regulatory agencies that are typically involved in project permitting when a proposed activity may disturb aquatic resources or species covered by the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA). This overview is not comprehensive, and other permits from other agencies or local jurisdictions may be required. The purpose of this overview is to provide basic guidance on regulations that may relate to proposed projects.

### U.S. Army Corps of Engineers

Under Section 404 of the federal Clean Water Act (CWA), a permit is required from the U.S. Army Corps of Engineers (Corps) for the placement of dredged or fill material in waters of the United States, including wetlands. Projects may be authorized under existing general permits (nationwide permits or regional general permits) or may require an individual permit. A nationwide permit is a more streamlined permit process compared with an individual permit, although supporting compliance efforts, such as for the ESA or National Historic Preservation Act, are similar, regardless of permit type. Project activities that could trigger CWA Section 404 permitting (individual or general) include temporarily or permanently filling any portion of a water of the United States.

### U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) administers the federal ESA. The ESA requires agencies to maintain lists of threatened and endangered species. It affords substantial protection to listed species. The ESA includes mechanisms that provide exceptions to Section 9 take prohibitions. These are discussed in ESA Section 7 for federal actions and ESA Section 10 for nonfederal actions.

## Endangered Species Act Section 7

Section 7 of the ESA requires all federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in destruction or adverse modification of habitat that is critical to such species' survival. To ensure that its actions would not jeopardize listed species or adversely modify critical habitat,[1] each federal agency must consult with the USFWS regarding federal agency actions that may affect listed species. Consultation begins when the federal agency (often the Corps) submits a written request for initiation to the USFWS, along with the agency's biological assessment of its proposed action, and the USFWS accepts the biological assessment as complete. If the USFWS concludes that the action is not likely to adversely affect a listed species, the action may be conducted without further review under the ESA. Otherwise, the USFWS must prepare a written biological opinion that describes how the agency's action will affect the listed species and its critical habitat.

If the biological opinion concludes that the proposed action would jeopardize the continued existence of a listed species or adversely modify its critical habitat, the opinion will suggest "reasonable and prudent alternatives" to avoid that result. If the biological opinion concludes that the proposed action would take a listed species but would not jeopardize its continued existence, the biological opinion will include an incidental take statement. *Incidental take* is "incidental to, and not intended as part of, an otherwise lawful activity."[2] The incidental take statement specifies the amount of take that will be allowed as a result of the action and states whether reasonable and prudent measures will be required to minimize the impact of the take.

## Endangered Species Act Section 10

In cases where federal land, funding, or authorization is not required for an action by a nonfederal entity, the take of listed fish and wildlife species can be permitted by the USFWS through the Section 10 process. Private landowners, corporations, state agencies, local agencies, and other nonfederal entities must obtain a Section 10(a)(1)(B) incidental take permit for take of federally listed fish and wildlife species "that is incidental to, but not the purpose of, otherwise lawful activities."

The take prohibition for listed plants is more limited than for listed fish and wildlife. Under Section 9(a)(2)(B) of the ESA, endangered plants are protected from "removal, reduction to possession, and malicious damage or destruction" in areas that are under federal jurisdiction. Section 9(a)(2)(B) of the ESA also provides plants protection from removing, cutting, digging up, damaging, or destroying when the action takes place in violation of state law or regulation or in violation of a state criminal trespass law. Therefore, the ESA does not prohibit the incidental take of federally listed plants on private or other nonfederal lands, unless the action requires federal authorization or is in violation of state law. Although Section 10 incidental take permits are required only for wildlife and fish species, the Section 7(a)(2) prohibition against jeopardy applies to plants. Issuance of a Section 10(a)(1)(B) incidental take permit cannot result in jeopardy to a listed plant species.

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[1] *Critical habitat* is defined as specific geographic areas, whether occupied by listed species or not, that are determined to be essential for the conservation and management of listed species and formally described in the *Federal Register*.

[2] See 64 Code of Federal Regulations (CFR) 60728.

# California Department of Fish and Wildlife

## California Endangered Species Act

The CESA prohibits take of wildlife and plants listed as threatened or endangered by the California Fish and Game Commission. *Take* is defined under the California Fish and Game Code (more narrowly than under the ESA) as any action or attempt to "hunt, pursue, catch, capture, or kill." Therefore, take under the CESA does not include "the taking of habitat alone or the impacts of the taking."[3] Rather, the courts have affirmed that, under the CESA, "taking involves mortality."

Like the ESA, the CESA allows exceptions to the prohibition for take that occurs during otherwise lawful activities. The requirements of an application for incidental take under CESA are described in CFGC Section 2081. Incidental take of state-listed species may be authorized if an applicant submits an approved plan that minimizes and "fully mitigates" the impacts of this take.

## Natural Community Conservation Planning Act

In 1991, California's Natural Community Conservation Planning Act (NCCP Act)[4] was enacted to implement broad-based planning that balances appropriate development and growth with conservation of wildlife and habitat. Pursuant to the NCCP Act, local, state, and federal agencies are encouraged to prepare natural community conservation plans (NCCPs) to provide comprehensive management and conservation of multiple species and their habitats under a single plan rather than through preparation of numerous individual plans on a project-by-project basis. The NCCP Act is broader in its orientation and objectives than the ESA and the CESA. Preparation of an NCCP is voluntary. The primary objective of the NCCP Act is to conserve natural communities at the ecosystem scale while accommodating compatible land use. To be approved by the California Department of Fish and Wildlife (CDFW), an NCCP must provide for the conservation of species and protection and management of natural communities in perpetuity within the area covered by permits. *Conservation* is defined, in summary, by the NCCP Act and the CFGC as actions that result in the delisting of state-listed species. Therefore, NCCPs must contribute to the recovery of listed species or prevent the listing of nonlisted species rather than just mitigate the effects of covered activities. This recovery standard is one of the major differences between an NCCP and a habitat conservation plan prepared to satisfy the ESA or CESA.

The 1991 NCCP Act was replaced with a substantially revised and expanded NCCP Act in 2002. The revised NCCP Act established new standards and guidance for many facets of the program, including scientific information, public participation, biological goals, interim project review, and approval criteria. The new NCCP Act took effect on January 1, 2003.

## Streambed Alteration Agreement

A project proponent is required to enter into a streambed alteration agreement with the CDFW when a proposed project would substantially divert, obstruct, or change the natural flow of a river, stream, or lake; substantially change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed.[5] Through this process, the CDFW can impose conditions on a project and ensure that no net loss of wetland values or acreage will be incurred. Strictly speaking, the agreement is not a permit but, rather, a mutual agreement between the CDFW and the applicant; however, it serves a similar regulatory and protective function. The CDFW cannot provide a streambed alteration agreement until after the California Environmental Quality Act review is complete.

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[3] *Environmental Council of Sacramento v. City of Sacramento*, 142 Cal. App. 4th 1018 (2006).

[4] California Fish and Game Code (CFGC) Section 2800 *et seq.*

[5] CFGC Section 1602.

# Compensatory Mitigation Approach

This Antelope Valley RCIS was designed with the intent to not only meet the compensatory mitigation requirements of the CDFW under the CESA but also support compliance with state and federal water-related regulations and the ESA. Guidance on how this Antelope Valley RCIS can support implementation of compensatory mitigation for separate, but related, regulations is provided below.

# Compliance with the Clean Water Act and the Porter-Cologne Water Quality Control Act

An RCIS can provide information and analysis for identifying conservation actions and habitat enhancements that fulfill compensatory mitigation requirements under federal and state water quality protection laws. For example, both federal and state guidance regarding compensatory mitigation for impacts on aquatic resources stress the need for a *watershed approach* to compensatory mitigation. This approach considers the importance of both landscape and resource compensatory mitigation projects for the sustainability of aquatic resource functions within a watershed.

In 2008, the Corps and U.S. Environmental Protection Agency (USEPA) adopted regulations that govern compensatory mitigation for impacts on waters of the United States authorized in permits issued pursuant to CWA Section 404 (the Compensatory Mitigation Rule).[6] The Compensatory Mitigation Rule requires the Corps to ". . . use a watershed approach to establish compensatory mitigation requirements in [Corps] permits to the extent appropriate and practicable."[7] The rule defines a watershed approach as:

> . . . an analytical process for making compensatory mitigation decisions that support the sustainability or improvement of aquatic resources in a watershed. It involves consideration of watershed needs, and how locations and types of compensatory mitigation projects address those needs. A landscape perspective is used to identify the types and locations of compensatory mitigation projects that will benefit the watershed and offset losses of aquatic resource functions and services caused by activities authorized by [Corps] permits. The watershed approach may involve consideration of landscape scale, historic and potential aquatic resource conditions, past and projected aquatic resource impacts in the watershed, and terrestrial connections between aquatic resources when determining compensatory mitigation requirements for [Corps] permits.[8]

The ultimate goal of a watershed approach is to ". . . maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites."[9] Similarly, the State Water Resources Control Board proposes an almost identical watershed approach to compensatory mitigation, as identified in its *Procedures for Discharges of Dredged or Fill Materials to Waters of the State* (Procedures) (State Water Resources Control Board 2019).

The information needs identified for a watershed approach under the Compensatory Mitigation Rule and State Water Resources Control Board's Procedures are almost identical. If a watershed plan is available, it can be the basis of the watershed approach. A *watershed plan* is defined as follows:

[6] See 33 CFR 332.
[7] See 33 CFR 332.3(c)(1).
[8] See 33 CFR 332.2.
[9] See 33 CFR 332.3(c)(1).

> . . . a plan developed by federal, tribal, state, and/or local government agencies or appropriate non-governmental organizations, in consultation with relevant stakeholders, for the specific goal of aquatic resource restoration, establishment, enhancement, and preservation. A watershed plan addresses aquatic resource conditions in the watershed, multiple stakeholder interests, and land uses. Watershed plans may also identify priority sites for aquatic resource restoration and protection. Examples of watershed plans include special area management plans, advance identification programs, and wetland management plans.[10]

If a watershed plan is not available, a watershed approach to compensatory mitigation may be based on the following elements:

> . . . analysis of information regarding watershed conditions and needs, including potential sites for aquatic resource restoration activities and priorities for aquatic resource restoration and preservation. Such information includes current trends in habitat loss or conversion; cumulative impacts of past development activities, current development trends, the presence and needs of sensitive species; site conditions that favor or hinder the success of compensatory mitigation projects; and chronic environmental problems such as flooding or poor water quality.[11]

An RCIS is intended to provide information, analysis, and a process that supports a watershed approach to compensatory mitigation. The Corps, USEPA, and applicable Regional Water Quality Control Boards (RWQCBs) are included in the process of developing the RCIS to ensure that it provides accurate and up-to-date information and analysis regarding the watersheds and aquatic resources within the RCIS strategy area.

This Antelope Valley RCIS includes information and analysis regarding aquatic resources that can be used for compensatory mitigation under the federal CWA and the Porter-Cologne Act (State Water Resources Control Board 2017) in several ways. Project proponents can use the information to develop and site permittee-responsible mitigation actions in connection with a specific permit or project. Mitigation bankers can use the information to develop and site mitigation banks that generate mitigation credits. Public agencies can use the information to develop and establish in-lieu fee programs that generate mitigation credits. In each of these cases, approval of the Corps and/or the applicable RWQCB would be required. However, this RCIS could be useful in developing mitigation proposals for approval.

Mitigation credit agreements (MCAs) that meet the requirements of relevant Corps, USEPA, and RWQCB mitigation regulations and policies could also be used to generate mitigation credits for compensatory mitigation under the CWA and Porter-Cologne Act. MCAs can create mitigation credits that can be used to fulfill "compensatory mitigation requirements established under any state or federal environmental law, as determined by the applicable local, state, or federal regulatory agency . . ."[12] CDFW approval of an MCA does not authorize the creation of mitigation credits under the CWA or Porter-Cologne Act. However, if the Corps or RWQCB determines that an MCA meets relevant federal requirements under the CWA and Porter-Cologne Act, it could allow the MCA to create mitigation credits, which could be used under those acts. For example, the Corps and USEPA could determine that the MCA meets Compensatory Mitigation Rule regulations and policies for in-lieu fee programs and approve the MCA as an enabling instrument for such programs. By fulfilling relevant Corps and USEPA requirements and obtaining approval, the MCA could then be used to create mitigation credits, which could be used to comply with the CWA. Similarly, the RWQCB could determine that such mitigation credits are consistent with Porter-Cologne Act requirements for purposes of a CWA Section 401 certification.

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[10] See 33 CFR 332.2:25, lines 872–878.

[11] See 33 CFR 332.3(c)(3):29, lines 1030–1948.

[12] CFGC Section 1856(c).

# Compliance with the Federal Endangered Species Act

An RCIS can provide information and analysis for identifying conservation actions and habitat enhancements that fulfill compensatory mitigation requirements under federal wildlife protection laws. For example, in December 2016, the USFWS published its final compensatory mitigation policy under the ESA.[13] For compensatory mitigation under the federal ESA, the USFWS prefers the following mitigation conditions:

- Compensatory mitigation projects sited within priority conservation areas identified in landscape-scale conservation plans,
- Compensatory mitigation projects implemented in advance of impacts, and
- Mitigation mechanisms that consolidate compensatory mitigation on the landscape.
- The USFWS has also described the following standards for compensatory mitigation:
- Siting compensatory mitigation in locations identified in landscape-scale conservation plans or mitigation strategies that meet conservation objectives and provide the greatest long-term benefit to the species;
- Providing compensatory in-kind mitigation for the species affected by the proposed action;
- Providing metrics to measure ecological functions at compensatory mitigation sites that are science based, quantifiable, consistent, repeatable, and related to the conservation goals for the species;
- Providing benefits beyond those that would have otherwise occurred through routine or required practices or actions;
- Achieving conservation objectives within a reasonable timeframe or for at least the duration of the impacts;
- Securing the compensatory mitigation by durable means, including adequate legal, real estate, and financial protections that ensure its success;
- Providing accountability in case compensatory mitigation fails to meet its conservation objectives; and
- Providing for appropriate and effective engagement of local communities and stakeholders.

This Antelope Valley RCIS is intended specifically to provide information, analysis, and a process that supports compensatory mitigation and meets all of the criteria. (In some cases, a future MCA would meet the criteria.) The USFWS has been involved in the process of developing this Antelope Valley RCIS to ensure that it provides accurate and up-to-date information and analysis regarding species listed under the federal ESA.

This Antelope Valley RCIS includes information and analysis regarding federally listed species that can be used for compensatory mitigation under the federal ESA in a variety of ways. For example, the information and analysis can be used by project proponents to develop and site permittee-responsible mitigation actions in connection with a specific permit or project. Mitigation bankers can use the information and analysis to develop and site conservation banks that generate mitigation credits, and public agencies can use the information and analysis to develop and establish in-lieu fee programs that generate mitigation credits. In each of these cases, approval of the USFWS would be required. However, this Antelope Valley RCIS could be useful in developing mitigation proposals for approval.

[13] See 81 *Federal Register* 95316–95349.

The USFWS or National Marine Fisheries Service could also incorporate or refer to an RCIS in regulatory designations and analyses, such as recovery plans, critical habitat designations, habitat conservation plans, and biological opinions. For example, the USFWS could determine that the mitigation strategies or actions of an RCIS meet the requirements of Section 7 of the federal ESA and include them in a biological opinion.

MCAs that meet the requirements of relevant USFWS mitigation regulations and policies could also be used to generate mitigation credits for compensatory mitigation under the federal ESA. As described previously for the CWA and Porter-Cologne Act, MCA-based mitigation credits are provided for under the federal ESA with USFWS approval.[14] For example, the USFWS could determine that the MCA meets the regulations and policies for conservation banks and approve the MCA as a programmatic (umbrella) conservation bank-enabling instrument, or the USFWS could determine that the MCA meets its policies for in-lieu fee programs and approve the MCA as an in-lieu fee program-enabling instrument.

# References

State Water Resources Control Board. 2019. *Procedures for Discharges of Dredged or Fill Materials to Waters of the State*. May 2019.

State Water Resources Control Board. 2017. *Porter-Cologne Water Quality Control Act*. Water Code Division 7 and Related Sections (as amended, including statutes, 2016).

[14] CFGC 1856(c).

Appendix C

# Stakeholder Involvement and Public Outreach

# Appendix C
# Stakeholder Involvement and Public Outreach

## Antelope Valley RCIS Public Outreach

The Antelope Valley RCIS development process began in March 2016. The process was initiated by the Desert and Mountains Conservation Authority (DMCA), in collaboration with the California Energy Commission (CEC). ICF was the lead technical consultant on the RCIS document, working under the direction of Steering and Advisory committees (see subsections below). The RCIS process benefited from multiple layers of outreach, briefings, and opportunities for input from the Antelope Valley community; non-profit organizations, including environmental, conservation, and community organizations; business interests; regulatory agencies; and federal, state, and local governments.

The goals of the public outreach were:

1. Provide engaged stakeholders and the public with information on this RCIS planning effort.
2. Receive information regarding the region's ecological values, planning, and conservation priorities.

As part of the process, 12 committee meetings were held, including eight Steering Committee meetings and four separate Advisory Committee meetings. In addition, one public meeting and one briefing were held in Lancaster, California.

- June 13, 2016: Steering Committee kick-off meeting
- June 22, 2016: kick-off meeting for Steering and Advisory Committees
- July 12, 2016: Steering Committee meeting
- July 19, 2016: Advisory Committee meeting
- August 16, 2016: Steering Committee meeting
- August 23, 2016: Advisory Committee meeting
- November 18, 2016: All Committee Participants Informational WebEx: Legislative Updates
- December 14, 2016: Steering Committee meeting
- February 21, 2017: Steering Committee meeting
- March 1, 2017: Steering Committee meeting
- March 7, 2017: public meeting
- April 26, 2017: briefing hosted by Association of Rural Town Councils

The public meeting notice, agenda and meeting summary notes, PowerPoint presentation, and meeting materials are included in Attachment C-1. Public meeting materials were made available to participants and the broader public by posting them on the DCMA website (http://dmca.ca.gov/).

# Steering Committee

The coordination and development of the Antelope Valley RCIS was guided by a Steering Committee. The Steering Committee was composed of representatives listed in Table C-1. The Steering Committee met eight times throughout 2016 and 2017 to provide guidance on the development of the RCIS, including input on Advisory Committee meeting agendas and engagement; identification of the RCIS area; focal species; the development of conservation goals, objectives, and priorities; implementation structure; and stakeholder outreach coordination.

**Table C-1. Steering Committee Participants**

| Agency/Organization | Participant |
|---|---|
| California Energy Commission | Scott Flint |
| Conservation Strategy Group | Graham Chisholm |
| California Department of Transportation | Robert Wang |
| DCMA | Paul Edelman |
| Los Angeles Metropolitan Transportation Authority | Robert Machuca (invited) |
| Mountain Recreation & Conservation Authority | Spencer Eldred |
| Sierra Club | Sarah Friedman<br>Katherine Allen |
| The Nature Conservancy | Charlotte Pienkos<br>Stephanie Dashiell |
| Transition Habitat Conservancy | Jill Bays<br>Jeff Olesh<br>Vern Biehl |
| U.S. Fish and Wildlife Service | Brian Croft |

# Advisory Committee

A broader group of stakeholders in the Antelope Valley comprised the Advisory Committee, which included representatives from other non-profit organizations including conservation, environmental and community; federal and state agencies, city and county governments, and businesses (Table C-2). The Advisory Committee met four times, including invitations to informational online presentations and meetings, throughout the development of the RCIS, and provided information concerning ecological resources in the region as well as reviewed and commented on interim RCIS work products including the RCIS area and focal species list. In addition to participating in Advisory Committee meetings, participants were invited to the public meeting on March 7th and Association of Rural Town Councils briefing on April 26th.

**Table C-2. Advisory Committee Participants**

| Agency/Organization | Participant |
|---|---|
| Antelope Valley Air Quality Management District | Vickie Rausch |
| Antelope Valley Audubon | Don Goeschl |
| Antelope Valley Conservancy | |
| Association of Rural Town Councils | Merrylou Nelson<br>Susan Zahnter |
| Audubon California | Garry George |
| California Department of Fish and Wildlife | Betty Courtney<br>Erinn Wilson<br>Randy Rodriguez |
| California Native Plant Society | Greg Suba |
| California Natural Resources Agency | Brady Moss |
| California State Parks | Connie Latham |
| California Strategic Growth Council/High-Speed Rail Authority | Emily Tibbott |
| Center for Biological Diversity | Ileene Anderson |
| City of Lancaster | (Invited) |
| City of Palmdale | (Invited) |
| Defenders of Wildlife | Jeff Aardahl<br>Tom Eagan<br>Kim Delfino |
| Edwards Air Force Base | Tom Rademacher<br>Scott Kiernan |
| Endangered Habitats League | Dan Silver |
| High-Speed Rail Authority | Barbara Marquez |
| Land Veritas | Tracy Brownfield |
| Natural Resources Defense Council | Helen O'Shea |
| Poppy Reserve and Mojave Desert Interruptive Association | Margaret Rhyne |
| Regional Water Quality Control Board | Jan Zimmerman |
| Trust for Public Land | Alex Size |
| Regional Renewable Group | Jim James |
| U.S. Fish and Wildlife Service | Brian Croft |
| U.S. Department of Agriculture | Robert TSE |
| 8 Minute Energy | Arthur Haubenstock<br>Alex Sundquist |

# Technical Subcommittee

The Steering and Advisory Committees formed a Technical Subcommittee to analyze key technical and conservation planning issues and make recommendations. The Technical Subcommittee was composed of conservation specialists with local knowledge of the species, habitats, and natural communities throughout the RCIS area. The Technical Subcommittee met seven times (via conference calls and online meetings) during the preparation of the technical components. During these meetings, the subcommittee finalized the focal species list and identified conservation priorities in the RCIS area. Data Basin, a web-based mapping and analysis platform, was used to view species distribution maps and other data as a tool for the Technical Subcommittee to provide comments on components of the conservation priorities analysis, including the Habitat Cores and Landscape Linkages.

Technical Subcommittee Participants, in addition to the Consultant Team, are listed below.

- Stephanie Dashiell, The Nature Conservancy
- Tom Eagan, Defenders of Wildlife
- Garry George, Audubon California
- Ken Sanchez, Western Resource Advocates
- Greg Suba, California Native Plant Society
- Jill Bays, Transition Habitat Conservancy

# Public Meeting

A public meeting was held March 7, 2017 at the Antelope Valley Transit Authority offices, 42210 6th St. W., Lancaster. The meeting provided an opportunity for interested parties to receive information about the RCIS program and the preparation of the Antelope Valley RCIS and to provide comments. The public meeting was broadly noticed through posting the notice on the DCMA website and distribution through DCMA's listserv, the County of Los Angeles, and many of the Steering Committee participating organizations. Refer to Attachment C-1 for public meeting materials. Two public comment cards were submitted at this meeting; they are included, along with their responses, in Attachment C-2.

# Public Comments

Land Veritas, representing the Petersen Ranch Mitigation Bank, submitted a public comment letter to the Antelope Valley RCIS on March 24, 2017. This letter, along with the response, is included in Attachment C-2.

# Appendix C-1
# Public Meeting Materials

Notice of Public Meeting on the Proposed

Antelope Valley Regional Conservation Investment Strategy

March 7, 2017

1:00pm to 4:00pm

Antelope Valley Transit Authority Offices

Interested parties are invited to attend a Public Meeting to learn about the Proposed Antelope Valley Regional Conservation Investment Strategy to be held on March 7, 2017 at the Antelope Valley Transit Authority offices, 42210 6th St. W., Lancaster. The meeting will allow interested parties to receive preliminary information about a non-regulatory planning effort underway to prepare an Antelope Valley Regional Conservation Investment Strategy (RCIS) and to provide comments.

Regional Conservation Investment Strategies are new, voluntary, landscape-scale conservation planning tools that will identify conservation priorities to guide public and private conservation actions and investment, such as habitat restoration and protection. Guided by state legislation signed by the Governor in 2016 (AB 2087), the effort is being led by a Steering Committee, convened by the Desert and Mountains Conservation Authority, and comprised of local, state and federal agency representatives and stakeholders. This public meeting is being hosted by the Desert and Mountain Conservation Authority. If the Antelope Valley RCIS is approved by the California Department of Fish and Wildlife (Department) in Summer 2017, conservation actions identified in the RCIS could be used to develop mitigation credit agreements with the Department for transportation and other projects. The Antelope Valley RCIS is part of a broader effort to implement regional advanced mitigation planning in the state to facilitate landscape-scale conservation and improve the delivery of transportation and other projects.

Public Comments: Interested parties may provide written comments at the Public Meeting, by mail to: DMCA c/o Michelle Osborn, 630 K St. Suite 400, Sacramento, CA 95814, or by email to: michelle.osborn@icf.com. Comment forms will be provided at the meeting and all written comments must be submitted by March 24, 2017. Written comments will be considered in the development of the

Antelope Valley RCIS, but there will not be any written response to comments provided.

Additional background information will be available and posted at http://dmca.ca.gov by Feb 17th.

If you have questions concerning this Public Meeting Notice please contact: michelle.osborn@icf.com, 916-231-9585.

**Antelope Valley Regional Conservation Investment Strategy**
Public Meeting, March 7, 2017
Antelope Valley Transit Authority Community Room

**Public Comments**

| **Name/Organization (Optional):** |
| --- |

| **Questions/Comments on the Content of the Presentation and Stations:** Were there items that were unclear? Did any topics need more explanation? We would like feedback to inform future outreach. |
| --- |

| **Suggestions for Public Outreach/Engagement:** How should the public best be informed about the development of the Antelope Valley RCIS? |
| --- |

| **Additional feedback about the Antelope Valley RCIS:** How do you foresee the RCIS being applicable to your interest/organization? What would you expect to see in a regional conservation document, such as an RCIS? |
| --- |

| **How did you hear about the public meeting?** |
| --- |

We welcome written comments on the material presented in this meeting by March 24, 2017 to:

DMCA
c/o Michelle Osborn
630 K St. Suite 400
Sacramento, CA 95814
michelle.osborn@icf.com

Summary Notes:

Antelope Valley Regional Conservation Investment Strategy Public Meeting and Open House

March 7, 2017

1:00 – 4:00 PM

Antelope Valley Transit Authority Community Room, Lancaster CA

**AGENDA**

1:00 – Welcome from Paul Edelman, DMCA

1:05 – Introduction (Jeff Olesh)

1:30 – Presentation (Scott Fleury/Graham Chisholm)

2:00 – 4:00 – Open House Stations and Materials

1. Regional Conservation Investment Strategy (RCIS)
    a. What is an RCIS, Attachment 1
    b. Legislation, Attachment 2
    c. RCA/RCIS/MCA Process, Attachment 3
    d. Antelope Valley RCIS and Key Stakeholders within the region, Attachment 4

2. Biological Information for the AV RCIS
    a. Regional Mapping Process & Building Blocks, Attachment 5
    b. Focal Species, Natural Communities, and Existing Protected Lands within the AV RCIS, Attachment 6

3. Comment:
    a. How to Comment and Stay Engaged in the Process, Attachment 7
    b. Comment Card, Attachment 8

The Public Meeting was opened by Paul Edelman, Desert and Mountains Conservation Authority. Paul welcomed the nearly 60 participants and the described the purpose of the meeting to inform the public about the status and purpose of the Antelope Valley Regional Conservation Investment Strategy and how they can stay engaged. He emphasized that the meeting is intended for interested parties to receive preliminary information about a non-regulatory planning effort underway to prepare an Antelope Valley Resource Conservation Investment Strategy (RCIS) and to provide comments at this early stage of the process. Paul underscored that Regional Conservation Investment Strategies are new, voluntary, landscape-scale conservation planning tools that will identify conservation priorities to guide public and private conservation actions and investment, such as habitat restoration and protection. He noted that the RCIS Process is guided by state legislation signed by the Governor in 2016 (AB 2087), and the effort is being led by a Steering Committee, convened by the Desert and Mountains Conservation Authority (DMCA), and comprised of local, state and federal agency representatives and stakeholders. He concluded by saying that this public meeting is being hosted by the Desert and Mountain Conservation Authority and introduced Jeff Olesh, Chair of the DMCA and on the Board of the Transition Habitat Conservancy.

Jeff Olesh, also welcomed everyone and thanked them for attending the Public meeting. He opened by reading the DMCA Mission Statement (below) noting that the Antelope Valley RCIS is consistent with and will help advance that Mission:

DMCA Mission: The DMCA has been established to identify, acquire and manage open space lands within the boundaries of the two founding agencies for long term conservation benefits. It provides a capability to cooperate with local government and developers in creating an offsite mitigation program to offset open space loss and improve habitat for species such as burrowing owls, desert tortoise, alkali mariposa lilies, Joshua-juniper woodlands, and so forth.

Jeff offered that the objective today is to familiarize you with the RCIS and what it does and does not do and noted the Process:

- allows you to provide input into the plan and bring your expert knowledge; your local boots on the ground input to the process; and
- To be sure you are plugged into the planning process to the extent you wish to be engaged.

He gave a local example of conservation by the THC and DMCA that underscores the opportunity to bring additional resources to the area to protect areas of conservation, connectivity and aesthetic value to the community.

He invited the Planning Team members, Steering and Advisory Committee members to stand up and introduce themselves.

Jeff underscored that the RCIS is your planning effort, driven by science and local knowledge. He said the DMCA and THC are actively participating because this effort will inform priority conservation targets and help drive funding for these project. Jeff then introduced Susan Zahnter, Director of Association of Rural Town Councils.

Susan also welcomed the participants, noting the residents in the 16 Town Councils feel the impacts of large infrastructure projects and some of the Town Council Areas have felt impacts of large scale solar that have deeply impacted community and wildlands. She repeated this process allows us to identify areas worthy of conservation and expand areas we already enjoy. The RCIS provides a plan that as we move forward the great opportunity is we can plan now for mitigation so we do not end up with fragmentation, noting that just as important is this process is stakeholder driven. The fact that people can provide input and that is exemplary part of the program.

Susan added that the Association of Town Councils will be hosting an evening meeting at ARTC likely April 26th.

Susan, introduces Scott Fleury

Scott presents PPT slides (Link).

Scott reinforces that the RCIS process will result in a voluntary, non-regulatory plan noting and reviews the planning context for the RCIS. Scott adds the RCIS is a pilot program within a hierarchy of planning tools including a regional conservation assessment (optional and broader), RCIS (the planning effort underway) and Mitigation Credit Strategies (follow approval of the RCIS by CDFW). In late Spring/early summer there will be a draft for public review and then submittal to CDFW.

Benefits of the RCIS:

- Flexible tool to bring focus and resources for conservation in the area
- Provides regional context for conservation and mitigation funds
- Voluntary
- Supports public infrastructure with efficient mitigation options
- Creates mitigation credits for habitat protection and restoration and enhancement
- Provides assurances that transportation agencies can get credit for regional advanced mitigation as an incentive to provide early funding for conservation

Elements, including study area and focal species, of the RCIS were informed by the Steering and Advisory committees.

Information for the Plan includes:

- Species distribution models based on occurrence data
- Land cover and natural communities
- Protected Areas (CPAD)
- Land use and Roads
- Species occurrences (CNDDB, Ebird points, Herpmapper points as examples)

Scott notes that the Planning Team wants to understand the biodiversity of the area, recognizing what is already protected so these areas can be expanded as warranted.

RCIS elements boil down to key blocks of information including:

- Current threats
- Future threats

- Biological information
- Priority Conservation areas, high biological value areas to identify Conservation Area Prioritization

The next step will be to identify Priority Conservation Areas with input. He emphasizes that stakeholder/local expertise will be brought in to supplement data and other information (e.g., from models and data bases).

Next immediate steps include:

1. Drafting conservation goals and objectives
2. Selecting priority conservation areas

With the Draft RCIS emerging in late spring/early summer after which there will be a 30-60-day public review period.

Scott then opened it up for questions.

Questions and Answers:

Q: Is there a minimum acreage for a priority conservation area for mitigation?

A: No established minimum acreage requirement.

Q: Can you elaborate on the sponsors for Mit Credit Agreements?

A: Open to anyone who has interest in an agreement. Does not have to be a public agency. Most likely candidates would be Caltrans, LA Metro, DMCA to generate credits and sell them as they are needed, but likely in any case, an agency of some type that needs mitigation.

Q: City of Lancaster has biological mitigation fund and how will you interact with them? Partner with them?

A: The RCIS will discuss and describe those separate mitigation programs. RCIS does not replace but simply intended to be a broader umbrella.

Q: When will the group have opportunity to review RCIS Guidelines?

A: April 3 is when the Guidelines are supposed to be released to the public by DFW and right now intention is no public review, they will just be released. Rationale is guidelines are preliminary and if the legislation is extended then will go through more formal process.

Q: How does the new program relate to NCCPs and HCPs? How can community oriented efforts be competitive with large private banks and sell credits?

A: RCIS not intended to compete with NCCPs or HCPs, but instead would be coordinated.

Q: Is the RCIS effectively the same as an NCCP?

A:  RCIS's are very different and intended to fill a gap in the middle between permits and the other end NCCP that are very large and comprehensive.   The RCIS effectively guides where mitigation and conservation could be directed.

Q: Land stewardship?

A: The legislation speaks directly to the importance of landscape scale conservation plan for enhancement action as well as acquisition.  Maybe not an opportunity to protect, but to enhance through enhancement credits where a property owner is interested.

Q: Is there a preference for working lands versus new land acquisition?

A: No preference is stated in the legislation. Preservation, restoration and enhancement all identified as possible.

Q: Where is the oversight to be sure done with integrity.

A: That would be under DFW, with RCIS ultimately approved by DFW and monitored by DFW.

The Q and A period adjourned and the Open House stations portion of the public meeting began.  See Attachments 1 through 8 for Station handouts.

# Appendix C-2
# Responses to Public Comments

# Comment Letter from Land Veritas

LAND VERITAS

March 24, 2017

Desert and Mountains Conservation Authority
c/o Ms. Michelle Osborn
ICF International
Michelle.Osborn@icf.com

Dear Ms. Osborn,

Thank you very much for this opportunity to provide comments on the Antelope Valley Regional Conservation Investment Strategy (AV-RCIS) pilot process. I represent Petersen Ranch Mitigation Bank (Petersen Ranch) in Los Angeles County and have been identified as a Stakeholder in this new state of California promulgated process. At the most recent public meeting on March 7, 2017, you requested comments, "...to inform the planning team of information or key items that should be considered or incorporated into the Draft AV-RCIS." Based on your solicitation we provide the following comments.

First and foremost, we appreciate your inclusion of Petersen Ranch in the AV-RCIS Study Area. Keeping in mind that the property has been recognized and approved by the Department of Army Corps of Engineers (ACOE), the California Department of Fish and Wildlife (CDFW), the Environmental Protection Agency (EPA) and the Regional Water Quality Control Board (RWQCB) as a mitigation and conservation bank with the authorization to serve species, habitats and wetland mitigation needs in the AV-RCIS Planning Area and in portions of Los Angeles, Kern, San Bernardino and Ventura counties, this property is well placed to contribute to the success of the final AV-RCIS.

After experiencing a costly, 5+ year process to create the Petersen Ranch, we support the state's efforts to streamline the delivery of advanced mitigation. However, we originally opposed AB 2087 because we were concerned that it would create a parallel process for delivering a less durable, lower quality of advanced mitigation vis-à-vis existing mitigation banks. Many of our concerns were addressed with changes to the legislation that were discussed during collaborative meetings with the bill's sponsors, including Graham Chisolm. However, we feel that ambiguities still exist in the legislation and, additionally, have questions about the process. Accordingly, we want to continue to work on a collaborative basis to help ensure these concerns are addressed so the legislation's goals can be achieved.

Our comments fall into three categories:

- Conservation Priorities
- Mitigation Credit Agreements
- Process

***Conservation Priorities***

We are hopeful that the Petersen Ranch Mitigation Bank can be identified as a "Conservation Priority" in the AV-RCIS. We believe that Petersen Ranch provides high quality durable conservation for many of the plant and animal species and plant communities identified on the species list for the Planning Area

Land Veritas 1001 Bridgeway, #246, Sausalito CA 94965 415.729.3733

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including Swainson's hawk, California juniper, coast horned lizard, Pacific pond turtle, loggerhead shrike, prairie falcon, tricolored blackbirds, willow flycatcher, etc., as well as providing important east-west and north-south connectivity. **As the process moves forward we are confident that Petersen Ranch can be identified as a "Conservation Priority" in the AV-RCIS and based on the significant biological attributes present on the property today and agency approval of the property as an advanced mitigation site**.

***Mitigation Credit Agreement (MCA***)

First a word on the guidance; as with any process established in new legislation there will be uncertainty on the part of the regulated (albeit voluntary) community and the varied understandings of the regulators as to how to implement the new law. As this process moves forward I suggest we be cautious with the criteria for the AV-RCIS and the MCA.

Specifically, we are concerned that mitigation created pursuant to the MCAs may not be as durable as mitigation created pursuant to existing CDFW banking statutes. For example, in the legislation we do not understand how the perpetual protection of the land (Par 1856(f)12) and permanent endowment funding (Par 1856(f)13) requirements apply to habitat enhancement actions that do not involve ..."land acquisition or the permanent protection of habitat, such as improving in-stream flows to benefit fish species, enhancing habitat connectivity, or invasive species control or eradication."

Petersen Ranch is set up and approved by the agencies as a durable or permanent advanced mitigation credit type. The cost for establishing a durable credit is significant and certainly costlier than entitling a temporary protective instrument. However, the more important point is that durable mitigation provides biological benefits far beyond that of temporary mitigation. While it may seem reasonable that, for example, a 40-year impact (e.g. Solar Farm) be required to purchase a 40-year easement, it does not, in our opinion, adequately address the long-term biological impacts of the project. For example, the loss of 40 years of breeding opportunities of affected species goes far beyond a potential prescribed conservation requirement time of 40 years. Some species may take decades to recover the consequences of lost breeding opportunities over a 40-year period. Also, after 40 years, the impacts to the plant community are not ameliorated in a single year if restored. In essence, the 40-year impact to plants and animal community structure that results from lost opportunity has genetic, community, and population effects that are not mitigated by "short-term" protections.

Petersen Ranch is in the final phases of restoration and is already under intensive management to meet very stringent criteria for successful biological, hydrological and physical goals. It is already providing advanced mitigation and will do so in perpetuity, thus fully mitigating the adverse effects of long-term impacts.

In the absence of clear regulatory guidance, **we suggest planning for the AV-RCIS and the MCAs include a strong preference, if not a requirement, for durable "in-perpetuity" protection in response to what are likely to be long-term impacts.**

www.landveritas.com

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***Process***

Per my comments at the March 7, 2017 public meeting, we are disappointed that the Stakeholders will not have an opportunity to comment on the Implementing Guidelines prior to their publication. As pointed out, we feel there are ambiguities in the legislation that could be worked out during a public review period for the Guidelines.

Additional concerns we have include the pace of this process in the absence of Agency guidance of the new Legislation, due consideration of the optional development of the Regional Conservation Assessment (RCA), and length of time for public comment on the Draft AV-RCIS.

We are concerned that the AV-RCIS has not selected to develop a Regional Conservation Assessment (RCA). While the legislation indicates that the development of an RCA is an optional process, it makes sense and is certainly accepted practice in conservation biological principles to first look at a scale with relevance to the species and processes being managed and conserved. We understand time is of the essence based on the legislative sunset of 2020, however, the ecological systems and processes at risk in the AV-RCIS Study Area should be viewed in a larger scale. **Therefore, we recommend the team prepare an RCA that can guide local (county/sub-county) scale decisions.**

And lastly, we strongly believe the public have adequate opportunity to provide meaningful input into this draft AV-RCIS. Rushing through a public comment period, after spending a significant period developing what is likely to be a comprehensive document, presents a poor perception of the process and work product. **Therefore, we recommend a minimum 60-day comment period for this important phase of the process.**

Thank you very much for your consideration of our comments and we look forward to contributing to the development of the AV-RCIS. If you have any questions please contact our biological representative for the AV-RCIS, Kenneth Sanchez of WRA Inc., at (916) 798-2770 or myself at the letterhead contact.

LAND VERITAS CORP

H. Tracey Brownfield, President

Cc: AV-RCIS Stakeholders

www.landveritas.com

# Public Comment Cards

**Antelope Valley Regional Conservation Investment Strategy**
Public Meeting, March 7, 2017
Antelope Valley Transit Authority Community Room

**Public Comments**

**Name/Organization (Optional):** Tom Egan Defenders of Wildlife

**Questions/Comments on the Content of the Presentation and Stations:** Were there items that were unclear? Did any topics need more explanation? We would like feedback to inform future outreach.

Focal species selection for the planning area is fairly representative, however there are 3 exceptions as outlined below.

**Suggestions for Public Outreach/Engagement:** How should the public best be informed about the development of the Antelope Valley RCIS?

**Additional feedback about the Antelope Valley RCIS:** How do you foresee the RCIS being applicable to your interest/organization? What would you expect to see in a regional conservation document, such as an RCIS? ~~Short-joint Beavertail~~

Including specific focal species, whose careful management could benefit local communities, appear to have been omitted. As my previously provided comments indicate, the short joint beavertail cactus (Opuntia basilaris var. brachyclada)

**How did you hear about the public meeting?** SSB falls Setween

We welcome written comments on the material presented in this meeting by March 24, 2017 to:

DMCA
c/o Michelle Osborn
630 K St. Suite 400
Sacramento, CA 95814
michelle.osborn@icf.com

has not been incorporated as a focal species. This species reaches its western extent in the AV RCIS Pilot Area and the primary impact to this species, which occurs primarily on private land, is private land development. It should be included as a focal species to facilitate local planning & conservation.

CNPS 1B plant species, BLM designated sensitive, western extent in pilot.

Mtn Lion, a SWAP species should also be included as a focal species. The local community & general conservation in the region could greatly benefit from appropriate apex carnivore linkage identification and suggested management actions.

It is unclear if Sand transport Corridors will be addressed with the currently selected focal species.

The CDFW guidelines to be released in April need to have a public comment opportunity

**Antelope Valley Regional Conservation Investment Strategy**
Public Meeting, March 7, 2017
Antelope Valley Transit Authority Community Room

**Public Comments**

**Name/Organization (Optional):** Ileene Anderson / CBD

**Questions/Comments on the Content of the Presentation and Stations:** Were there items that were unclear? Did any topics need more explanation? We would like feedback to inform future outreach.

**Suggestions for Public Outreach/Engagement:** How should the public best be informed about the development of the Antelope Valley RCIS? public meetings : updated/informative website

**Additional feedback about the Antelope Valley RCIS:** How do you foresee the RCIS being applicable to your interest/organization? What would you expect to see in a regional conservation document, such as an RCIS? enhance conservation in northern L.A. County

**How did you hear about the public meeting?** email notice - thanks

We welcome written comments on the material presented in this meeting by March 24, 2017 to:

DMCA
c/o Michelle Osborn
630 K St. Suite 400
Sacramento, CA 95814
michelle.osborn@icf.com

I believe that the RCIS would benefit from including a few other focal species as follows
- short-joint beavertail (Opuntia basilaris brachyclada) - good species to "fill in" Blum Trees; PJ woodland
- Chorizanthe artemisifolia - desert "vernal pool" plant species
- mtn. lion (versus mule deer) - apex predator. Santa Monica Mtns have lots of deer but their mtn lions are effectively isolated.
- pronghorn - re-introduction opportunity for namesake species for antelope valley

Also please incorporate Andy Zdon's spring/seep survey data. Important data for a crucial resource in the area

# Responses to Comments

| Commenter | Comment | Response | Document Section |
|---|---|---|---|
| Tracey Brownfield, Land Veritas Corp | As the process moves forward we are confident that Petersen Ranch can be identified as a "Conservation Priority" in the AV-RCIS and based on significant biological attributes present on the property today and agency approval of the mitigation site. | Petersen Ranch, as a protected area of high habitat value with low pressure from development, meets the criteria set forth in the Antelope Valley RCIS of a conservation priority. However, the Antelope Valley RCIS serves as a guidance document for users to determine conservation priority areas rather than specifically identifying them at this planning level. | 3.4.2 |
| | In the absence of clear regulatory guidance, we suggest planning for the AV-RCIS and the MCAs include a strong preference, if not a requirement, for durable "in-perpetuity" protection in response to what are likely to be long-term impacts. | California Fish and Game Code Section 1856(f)(12), Government Code 65965–65968, and the recently published Mitigation Credit Agreement Guidelines all require that properties be preserved in perpetuity. The Mitigation Credit Agreement guidelines clarify that this also applies to temporary credits. | N/A |
| | Therefore, we recommend the team prepare an RCA that can guide local (county/sub-county) scale decisions. | The Antelope Valley RCIS contains the information and analysis that would have been provided in a Regional Conservation Assessment, plus additional guidance and recommended measures to aid local decisions in the future. | N/A |
| | Therefore, we recommend a minimum 60-day comment period for this [public comment period] important phase of the process. | This comment appears to be directed at the RCIS program itself instead of the Antelope Valley RCIS. The length of the public comment period is outside of the scope of this document to address. | N/A |
| Tom Egan, Defenders of Wildlife | Include short-joint beavertail (*Opuntia basilaris* var. *brachyclada*) as a focal species. | Short-joint beavertail is a focal species. | 2.1.4.5 |
| | Include mountain lions as a focal species. | Mountain lions are included as a focal species. | 2.1.4.5 |

| Commenter | Comment | Response | Document Section |
|---|---|---|---|
| | It is unclear if sand transport corridors will be addressed with the currently selected focal species. | Sand transport processes are currently addressed through Conservation Objective 1.4 under alkali mariposa lily. | 3.4.4.1 |
| Ilene Andersen, CBD | Include short-joint beavertail (*Opuntia basilaris* var. *brachyclada*) as a focal species. | Short-joint beavertail is a focal species. | 2.1.4.5 |
| | Include *Chorizanthe artemisifolia*, a desert vernal pool species, as a focal species. | This scientific name does not correlate to a known plant species. Vernal pools are addressed in the Antelope Valley RCIS as a natural land cover type. | 2.1.3 |
| | Include mountain lions as a focal species. | Mountain lions are included as a focal species. | 2.1.4.5 |
| | Include pronghorn as a focal species – reintroduction opportunity for the namesake species of the Antelope Valley. | The intent of an RCIS is to identify conservation strategies for a region. Reintroducing a locally extinct species is outside the scope of this analysis. | N/A |
| | Please incorporate Andy Zdon's spring/seep survey data. [It is i]mportant data for a crucial resource in the area. | Andy Zdon's published works focus on the eastern Mojave, which is outside of the geographic scope of the Antelope Valley RCIS area. | N/A |

Appendix D

# Letters of Support

SANTA MONICA MOUNTAINS CONSERVANCY
RAMIREZ CANYON PARK
5750 RAMIREZ CANYON ROAD
MALIBU, CALIFORNIA 90265
PHONE (310) 589-3200
FAX (310) 589-3207
WWW.SMMC.CA.GOV

February 25, 2019

Charlton H. Bonham, Director
California Department of Fish and Wildlife
1416 Ninth Street
Sacramento, California 95814

**Antelope Valley Regional Conservation Investment Strategy**

Dear Mr. Bonham:

The Santa Monica Mountains Conservancy (Conservancy) is writing as the prospective state agency sponsor to request, in accordance with California Fish and Game Code Section 1852(a), that the California Department of Fish and Wildlife (CDFW) approve the Antelope Valley Regional Conservation Investment Strategy (AV RCIS). The 707,076-acre AV RCIS area is of statewide importance for conservation as it supports numerous rare, endangered and desert endemic species in the largest remaining undisturbed natural and rural lands left in Los Angeles County; contains important habitat within the Pacific Flyway for tens of thousands of migratory birds during spring and fall migratory seasons; and features critical areas for wildlife connectivity including the nexus between the South Coast Wildlands identified Tehachapi Connection and Sierra Madre-Castaic Connection and a desert floor connection through the Los Angeles County designated Antelope Valley Significant Ecological Area.

The AV RCIS would facilitate current efforts to safeguard these and other conservation values by contributing to smart growth principles including informed planning for conservation, urbanization, and public infrastructure that are important to the Conservancy. The AV RCIS will also help target acquisition, restoration, or enhancement where it will have the largest benefit for focal species and other conservation elements.

The AV RCIS was developed by ICF in coordination with the Desert and Mountains Conservation Authority, Conservation Strategy Group, Los Angeles County Planning Department, California Energy Commission, SoCal Edison, Los Angeles County Metropolitan Transportation Authority, Transition Habitat Conservancy, Sierra Club, and

The Nature Conservancy with an additional 30-plus member active Advisory Committee. The AV RCIS area encompasses unincorporated Los Angeles County within the Desert Renewable Energy Conservation Plan (DRECP). As such, the AV RCIS was prepared consistent with Section 1852(c)(6) and (10).

The AV RCIS is based on the collaborative, science-based approach of the DRECP, Los Angeles County's Antelope Valley Area Plan and public stakeholder meetings to identify areas of high conservation value in the region.

The Conservancy expects several transportation and infrastructure projects will be designed and proposed for construction in the next three to ten years within the AV RCIS area. The AV RCIS will inform the mitigation needs of other projects occurring in the AV RCIS area including ongoing development in the western portion near Gorman, the north-south State Route 14 corridor, the east-west State Route 138 corridor, and other sensitive areas within the AV RCIS.

Thus, the Conservancy endorses the Antelope Valley Regional Conservation Investment Strategy and requests CDFW approve the AV RCIS to help agencies avoid and minimize project impacts and identify priority conservation actions for compensatory mitigation. The AV RCIS will provide a powerful science-based tool to expand the quality and quantity of biological mitigation to protect one of the most unique ecosystems in California.

Thank you for your consideration. Should you have any questions, please contact me at (310) 589-3200 ext. 128, edelman@smmc.ca.gov, or at the above letterhead address.

Sincerely,

PAUL EDELMAN
Deputy Director
Natural Resources and Planning

Appendix E

# Focal Species Assessment

| Taxa | Common Name | Scientific Name | Federal Status | State Statue | Other Status | Global / State Ranking | Vulnerability Status: Listed, Candidate, or Potential for Listing? | Status: Planning Species? | Occurrence: Known to Occur in Mojave Basin and Range Ecoregion? | Data: Enough existing data in study area to propose viable conservation actions. | Status: Listed or likelihood of listing within 5 years? | Importance of study area: Portion of range, critical habitat, or core habitat in study area? | Benefit/Cost: Overlap in habitat or management w/ other potential focal species? | Alignment with other conservation goals: Addressed in state/regional strategy or covered by local HCP? | Filtering Decision | Rationale/Comments | Sophie Parker (TNC) | Becky Mandich (Southern California Edison0 | Other AC/SC Member Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant [1] | alkali mariposa-lily | *Calochortus striatus* | None | None | CNPS 1B.2 | G2S2 | Yes | No | Yes | Yes | High Likely | High | High | High | Focal Species | Covered by DRECP. | Yes - Definitely | Yes - Definitely | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Plant [1] | Spreading navarretia | *Navarretia fossalis* | FT | None | CNPS 1B.1 | G2 S2 | Yes | No | Yes | No | Listed - T | Moderate | *Moderate* | Low | Focal Species | Maybe single occurrence in study area? Cirtical habitat designated far south of study area. Associated with vernal pools and ephemeral wetlands. Some ephemeral wetlands mapped in study area for High Speed Rail. Species likely undersurveyed in study area. | Yes - Maybe | | Sophie Parker (TNC): Appears to be found within the study area, rare, and associated with vernal pools/wetlands.<br>Suba (CNPS): Why wouldn't this be on the list. Occurs in vernal pools. There is vernal pool habitat in western antelope valley that has been undersurveyed. However, vernal pools in AV have been sited in NW AV. |
| Plant 1 | short-joint beavertail | *Opuntia basilaris var. brachyclada* | None | None | CNPS List 1B.2 | G5S3/S3 | *Yes* | No | Yes | Yes | Low Likely | High | Moderate | Low | Focal Species | Recommended by Steering Committee. | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species.<br>Greg Suba (CNPS): Recommended focal species for foothills |
| Plant [1] | California juniper | *Juniperus californica* | None | None | | G5S5 | No | Umbrella | Yes | Yes | No | Low | High | Low | Focal Species | Included as focal species as an umbrella species for foothills. | | | |
| Plant 1 | Joshua tree | *Yucca brevifolia* | None | None | | G4G5 SNR | No | Umbrella | Yes | Yes | Low Likely | High | High | *Moderate* | Focal Species | Umbrella planning species. | Yes - Definitely | Yes - Definitely | Sophie Parker (TNC):It is a good idea to include both widespread and narrow-range species on ths list of focal species.<br>Suba: Yes recommended |
| Reptile/Amphibian [1] | coast horned lizard | *Phrynosoma coronatum blainvillei* | FC/FS/BCC/BLM | CSC | | G3G4 S3S4 | Yes | No | Yes | Yes | High Likely | High | High | High | Focal Species | Covered by DRECP. | Yes - Definitely | Yes - Definitely | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Reptile/Amphibian [1] | Desert horned lizard | *Phrynosoma platyrhinos calidiarum* | None | None | | | No | Indicator | Yes | Yes | Low Likely | Moderate | High | Moderate | Focal Species | Documented at Portal Ridge Wildlife Preserve. | Yes - Definitely | Yes - Definitely | |
| Reptile/Amphibian [1] | desert tortoise | *Gopherus agassizii* | FT | ST | None | G4S2 | Yes | No | Yes | Yes | Listed - T | High | High | High | Focal Species | Covered by DRECP. | Yes - Definitely | Yes - Definitely | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Reptile/Amphibian [1] | Western pond turtle | *Emys marmorata* | BLM | CSC | IUCN:VU | G3G4 S3 | Yes | No | Yes | Yes | Low Likely | Low | High | Moderate | Focal Species | Occurrences documented in the Plan Area. Indicator of aquatic habitat quality. DRECP species of interest. | Yes - Definitely | Yes - Definitely | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Bird [1] | burrowing owl | *Athene cunicularia* | BLM/BCC | CSC | None | G4S2 | Yes | No | Yes | Yes | Low Likely | Moderate | High | High | Focal Species | Covered by DRECP. | Yes - Definitely | Yes - Definitely | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Bird [1] | California condor | *Gymnogyps californianus* | FE | SE/FP/CDF | None | G1S1 | Yes | No | Yes | Yes | Listed - E | Low | Low | *High* | Focal Species | Little overlap with occurrence data in study area. Based on telemetry occurrence data, appear to occur just west of the study area, but little activity within study area. No nesting habitat in study area. However, high-profile species covered by DRECP so should be considered in RCE where appropriate | | Yes - Definitely | Becky Mandich (SCE): May consider making California Condor a focal species due to range expansion. They are currently in the Techachapi area and in the ANF and may move into |
| Bird [1] | golden eagle | *Aquila chrysaetos* | BLM/BCC | FP/CDF | Bald and Golden Eagle Protection Act | G5S3 | Yes | No | Yes | Yes | Low Likely | Low | High | Moderate | Focal Species | Covered by DRECP. | Yes - Definitely | Yes - Definitely | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Bird [1] | Le Conte's thrasher | *Toxostoma lecontei* | BLM | CSC | BCC | G3 S3 | Yes | No | Yes | Yes | Low Likely | Moderate | High | Moderate | Focal Species | Many documented occurrences in the Plan Area. DRECP species of interest. | | Yes - Definitely | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Bird [1] | least Bell's vireo | *Vireo bellii pusillus* | FE/BCC | SE | None | G5T2S2 | Yes | No | Yes | Yes | Listed - E | Moderate | High | High | Focal Species | Covered by DRECP. | | Yes - Definitely | Jill Bays (Transition Habitat Conservancy): Cooper's hawk, Loggerhead shrike, Northern harrier, Prairie falcon American badger all definitely Yes (6/14/16) |
| Bird [1] | Loggerhead shrike | *Lanius ludovicianus* | BCC | CSC | | G4 S4 | No | Indicator | Yes | Yes | Low Likely | Low | High | *Moderate* | Focal Species | Indicator planning species. California population declining and considered vulnerable. | Yes - Definitely | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Bird [1] | mountain plover | *Charadrius montanus* | BLM/BCC | CSC | None | G2S2? | Yes | No | Yes | Yes | Low Likely | High | High | High | Focal Species | Ground nesting, grassland habitat. | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Bird [1] | Northern harrier | *Circus cyaneus* | None | CSC | IUCN:LC | G5 S3 | No | Indicator | Yes | Yes | Low Likely | Low | High | Low | Focal Species | Grassland /wetland/marsh foraging habitat. Ground nesting. Indicator planning species. California population declining and vulnerable. | Yes - Definitely | | Jill Bays (Transition Habitat Conservancy): Cooper's hawk, Loggerhead shrike, Northern harrier, Prairie falcon American badger all definitely Yes (6/14/16).<br>Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Bird [1] | Prairie falcon | *Falco mexicanus* | BCC | WL | IUCN:LC | G5 S3 | No | Area-dependent | Yes | Yes | Low Likely | Low | High | Low | Focal Species | Grassland foraging habitat. Cliff nesting. Enough habitat overlap with Swainson's hawk and golden eagle to remove from focal species? | Yes - Definitely | | Jill Bays (Transition Habitat Conservancy): Cooper's hawk, Loggerhead shrike, Northern harrier, Prairie falcon American badger all definitely Yes (6/14/16)<br><br>Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Bird [1] | Swainson's hawk | *Buteo swainsoni* | FS/BCC/BLM | ST | ABC | G5S2 | Yes | No | Yes | Yes | Low Likely | Moderate | Moderate | *Moderate* | Focal Species | Covered by DRECP. | Yes - Definitely | Yes - Definitely | Sophie Parker (TNC): There are a lot of birds included on the list of focal species. I would challenge the group to demonstrate that these species are sufficiently different in their habitat needs, range, and other factors to warrant all of them being included.<br>Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |

| Taxa | Common Name | Scientific Name | Federal Status | State Statue | Other Status | Global / State Ranking | Vulnerability Status: Listed, Candidate, or Potential for Listing? | Status: Planning Species? | Occurrence: Known to Occur in Mojave Basin and Range Ecoregion? | Data: Enough existing data in study area to propose viable conservation actions. | Status: Listed or likelihood of listing within 5 years? | Importance of study area: Portion of range, critical habitat, or core habitat in study area? | Benefit/Cost: Overlap in habitat or management w/ other potential focal species? | Alignment with other conservation goals: Addressed in state/regional strategy or covered by local HCP? | Filtering Decision | Rationale/Comments | Sophie Parker (TNC) | Becky Mandich (Southern California Edison0 | Other AC/SC Member Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bird [1] | Tricolored blackbird | *Agelaius tricolor* | BCC/BLM | CSC | IUCN:EN, ABC:WLBCC | G2G3 S2 | Yes | No | Yes | Yes | Low Likely | Moderate | Low | High | Focal Species | Covered by DRECP. | Yes - Definitely | Yes - Definitely | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Bird [1] | willow flycatcher | *Empidonax traillii* | FS | SE | ABC | G5S1S2 | Yes | No | Yes | Yes | Low Likely | Low | Low | *Low* | Focal Species | State listed endangered. | | | |
| Bird [1] | Long-billed curlew | Numenius americanus | BCC | WL | ABC:WLBCC | G5 S2 | Yes | No | Yes | Yes | Low Likely | Moderate | Low | Moderate | Focal Species | Focal species of SWAP. Climate vulnerable and dependent on water/agriculture. | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Mammal [1] | American badger | *Taxidea taxus* | None | CSC | IUCN:LC | G5 S4 | Yes | No | Yes | Yes | Low Likely | Low | High | Moderate | Focal Species | Documented occurrence in the Plan Area. DRECP species of interest. | Yes - Definitely | Yes - Definitely | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Mammal [1] | desert kit fox | *Vulpes macrotis arsipus* | None | None | IUCN:LC | G4 S3S4 | No | Area-dependent | Yes | Yes | Low Likely | Low | High | High | Focal Species | Area-dependent planning species | Yes - Definitely | Yes - Definitely | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Mammal [1] | Mohave ground squirrel | *Spermophilus [Xerospermophilus] mohavensis* | BLM | ST | None | G2G3S2S3 | Yes | No | Yes | Yes | Listed - T | High | High | High | Focal Species | Covered by DRECP. | Yes - Definitely | Yes - Definitely | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Mammal [1] | Tehachapi pocket mouse | *Perognathus alticolus inexpectatus* | BLM/FS | CSC | IUCN:EN | G1G2T1T2 S1S2 | Yes | No | Yes | Yes | High Likely | High | Moderate | Low | Focal Species | Documented occurrence in the Plan Area. DRECP species of interest. | Yes - Definitely | | |
| Mammal [1] | Mountain lion | *Puma concolor* | None | None | IUCN:NT | G5 S5 | *No* | Umbrella | Yes | Yes | Low Likely | Low | High | *Low* | Focal Species | Recommended as umbrella focal species as an apex predator and for landscape connectivity considerrations. | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Plant [2] | desert cymopterus | *Cymopterus deserticola* | BLM | None | CNPS List 1B.2 | G3S3.2 | Yes | No | Yes | No | Low Likely | Low | Moderate | High | Non-Focal Potentially Benefitting | | Yes - Definitely | | |
| Plant [2] | Arrowweed | *Pluchea sericea* | None | None | | G4G5 SNR | No | No | Yes | *Yes* | Low Likely | Low | High | *Low* | Non-Focal Potentially Benefitting | Consider as natural community conservation target. | No | No | Sophie Parker (TNC): if we include wetlands and riparian corridors in the planning process as community-level targets, then we don't need to call this species out individually |
| Plant [2] | Big galleta grass | *Hilaria rigida* | None | None | | G5 SNR | No | Umbrella | Yes | *Yes* | Low Likely | Low | High | *Low* | Non-Focal Potentially Benefitting | Consider as natural community conservation target. | No | | Sophie Parker (TNC): The updated scientific name is "*Hilaria rigida*" |
| Plant [2] | Blackbrush | *Coleogyne ramosissima* | None | None | | G5 SNR | No | Umbrella | Yes | *Yes* | Low Likely | Low | High | *Low* | Non-Focal Potentially Benefitting | Consider as natural community conservation target. | No | | Sophie Parker (TNC):The common name is "Blackbrush" with an "R". Check to make sure this species is found in Los Angeles county |
| Plant [2] | Cat claw acacia | *Senegalia greggii* | None | None | | G5 SNR | No | Umbrella | Yes | *Yes* | Low Likely | Low | High | *Low* | Non-Focal Potentially Benefitting | Consider as natural community conservation target. | No | | Sophie Parker (TNC):The updated scientific name is "*Senegalia greggii";* appears to be more common further east |
| Plant [2] | Desert willow | *Chilopsis linearis* | None | None | | G5 SNR | No | Umbrella | Yes | *Yes* | Low Likely | Low | High | *Low* | Non-Focal Potentially Benefitting | Consider as natural community conservation target. | No | | Sophie Parker (TNC):Check to make sure this species is found in Los Angeles county-- it appears to be limited to the more eastern portions of the CA Mojave Desert |
| Plant [2] | Honey mesquite | *Prosopis glandulosa* | None | None | | G5? SNR | No | Umbrella | Yes | Yes | Low Likely | Low | *High* | Low | Non-Focal Potentially Benefitting | Only a single occurrence in study area on CalFlora. Does this pass data criteria? Recommend capturing this species as a rare natural community. | Yes - Maybe | | Sophie Parker (TNC): This species is commonly known as "honey mesquite". Given its limited range in the desert portion of Los Angeles County, its importance for supporting wildlife, and its ability to act as an indicator species for groundwater conditions, I would lean towards including this species. Is there enough of it to consider it as a "community" target?<br><br>Suba: Consider as rare community? Could be suitable. Occurrences in study area are western most in range. Should be well represented in DRECP veg data. Mesquite stands to the east of AV are dying. |
| Plant [2] | Mojave tarplant | *Deinandra mohavensis* | BLM | SE | CNPS List 1B.3 | G2S2.3 | Yes | No | Yes | No | | | | | Non-Focal Potentially Benefitting | Very uncertain if the species occurs in plana area. Only a single documented occurrence in the study area on CalFlora. DRECP model does not cover study area. No CNPS records in study area. May occur, but doesn't meet data criteria. | Yes - Maybe | | Betty Courtney (CDFW): You may want to consider Mojave Tarplant – we have heard rumor of two possible location (Alpine Butte Wildlife Sanctuary and Redman)<br><br>Sophie Parker (TNC): Calflora shows a record for this species in the study area (LA County): http://www.calflora.org/cgi-bin/species_query.cgi?where-taxon=Deinandra+mohavensis<br><br>Suba: haven't been able to find records in study area. |
| Plant [2] | Paperbag bush | *Scutellaria mexicana* | None | None | | G5 SNR | No | Umbrella | Yes | Yes | Low Likely | Low | *High* | Low | Non-Focal Potentially Benefitting | Appears that its habitat overlaps with joshua tree woodland. If so, that species would cover this species. | Yes - Maybe | | Sophie Parker (TNC):The updated scientific name is "Scutellaria mexicana". This species has many records for the study area (LA County). I would consider including it.<br><br>Suba: Ubiquitous, but doesn't know if it overlaps study area.<br><br>Sarah Friedman (verbal during 6/12/16 SC mtg): Does not make for a good indicator or planning species. |

| Taxa | Common Name | Scientific Name | Federal Status | State Statue | Other Status | Global / State Ranking | Vulnerability Status: Listed, Candidate, or Potential for Listing? | Status: Planning Species? | Occurrence: Known to Occur in Mojave Basin and Range Ecoregion? | Data: Enough existing data in study area to propose viable conservation actions. | Status: Listed or likelihood of listing within 5 years? | Importance of study area: Portion of range, critical habitat, or core habitat in study area? | Benefit/Cost: Overlap in habitat or management w/ other potential focal species? | Alignment with other conservation goals: Addressed in state/regional strategy or covered by local HCP? | Filtering Decision | Rationale/Comments | Sophie Parker (TNC) | Becky Mandich (Southern California Edison0 | Other AC/SC Member Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plant [2] | Peirson's morning glory | *Calystegia peirsonii* | None | None | CNPS List 4.2 | G4 S4 | No | Umbrella | Yes | *Yes* | Low Likely | High | High | *Low* | Non-Focal Potentially Benefitting | Documented at Portal Ridge Wildlife Preserve. Narrow range, much of which is in study area. Calflora lists habitats as Shadscale Scrub, Chaparral, Foothill Woodland, Coastal Sage Scrub, Yellow Pine Forest. Could make for a plant species of narrow range with high conservation benefit. | Yes - Maybe | | Sophie Parker (TNC):Appears to be widespread in the focal area, but with a limited distribution overall.<br><br>Suba: Sure, as umbrella species.<br><br>Tom Egan (Defenders of Wildlife): Not a suitable planning species. Not umbrella, area-dependent, indicator, or climate change. |
| Plant [2] | round-leaved filaree | *California macrophylla* | None | None | CNPS List 1B.2 | G3? S3? | Yes | No | Yes | Yes | Low Likely | Low | *Moderate* | Moderate | Non-Focal Potentially Benefitting | Documented at Portal Ridge Wildlife Preserve. CalFlora lists community as Valley Grassland, Foothill Woodland. Core range is east of study area, where numbers increasing. Only marginal range/habitat extends into study area. | No | | Sophie Parker (TNC):appears to be more of a cismontane species than a transmontane species.<br>Max Thelander (LA County): I discussed it with our County Biologist, Joe Decruyenaere, and he suggested that round-leaved filaree should be one of the 25 focal species.<br><br>Suba: Documented number increasing overall. Well represented outside of study area. Low priority. |
| Plant [2] | Golden goodmania | Goodmania luteola | None | None | CNPS 4.2 | G3S3 | No | Indicator | Yes | Yes | Low Likely | Moderate | Moderate | Low | Non-Focal Potentially Benefitting | Planning species associated with ephemeral wetlands and vernal pools. CNPS Fairly endangered in California. Well documented throughout study area. | | | |
| Invert - Lepidoptera [2] | Bernardino dotted blue | *Euphilotes bernardino* | None | None | | G3G4 SNR | No | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | | | | |
| Invert - Lepidoptera [2] | Ford's swallowtail | *Papilo indra fordi* | None | None | | G5 SNR | No | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | | | | |
| Invert - Lepidoptera [2] | Yucca moth | *Tegeticula synthetica* | None | None | | G4G5 | No | Indicator | Yes | *Yes* | Low Likely | Low | Moderate | *Low* | Non-Focal Potentially Benefitting | | | | |
| Reptile/Amphibian [2] | Chuckwalla | *Sauromalus ater* | None | None | | G5 S4 | No | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | | | | Sophie Parker (TNC): The commonly-recognized scientific name is "Sauromalus ater" |
| Reptile/Amphibian [2] | Coachwhip | *Masticophis flagellum* | None | None | | G5 S5 | No | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Reptile/Amphibian [2] | Collared lizard | *Crotaphytus bicinctores* | None | None | | G5 S5 | No | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | | | | |
| Reptile/Amphibian [2] | Desert night lizard | *Xantusia vigilis* | None | None | | G5 S4 | *No* | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | Tom Egan (Defenders of Wildfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Reptile/Amphibian [2] | Mojave rattlesnake | *Crotalus scutulatus* | None | None | | G5 S4 | No | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | | | | |
| Reptile/Amphibian [2] | Northern California legless lizard | *Anniella pulchra* | None | CSC | FS | G3 S3 | Yes | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | Cal Herps on Habitat: Occurs in moist warm loose soil with plant cover. Moisture is essential. Occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Leaf litter under trees and bushes in sunny areas and dunes stabilized with bush lupine and mock heather often indicate suitable habitat. Often can be found under surface objects such as rocks, boards, driftwood, and logs. Can also be found by gently raking leaf litter under bushes and trees.<br><br>Not covered by DRECP, nor a species of interest. Listing unlikely. | | | |
| Reptile/Amphibian [2] | Northern three-lined boa | *Lichanura orcutti* | None | None | | | No | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | Recently identified species, separate from Rosy Boa. | | | |
| Reptile/Amphibian [2] | Regal ring-necked snake | *Diadophis punctatus regalis* | None | None | | G5 SNR | No | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | | | | |
| Reptile/Amphibian [2] | Southern Western pond turtle | *Emys marmorata pallida* | BLM | CSC | IUCN:VU | G3G4 S3 | Yes | No | *Yes* | No | | | | | Non-Focal Potentially Benefitting | Southern Western pond turtle not recognized by CDFW. Refer to Western pond turtle. | No | | |
| Reptile/Amphibian [2] | Speckled rattlesnake | *Crotalus mitchellii* | None | None | | G5 S4 | No | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | | | | |
| Reptile/Amphibian [2] | Western patch-nosed snake | *Salvadora hexalepis* | None | None | | G5 S4 | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Reptile/Amphibian [2] | Western skink | *Eumeces skiltonianus* | None | None | | G5T5 | No | No | *Yes* | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Reptile/Amphibian [2] | California whipsnake | Coluber lateralis lateralis | None | None | | | No | Yes | Yes | Yes | Low Likely | Low | Low | Low | Non-Focal Potentially Benefitting | Not addressed in State Wildlife Action plan for Desert Province. Chaparral will be considered as a natural community conservation target. Low priority as a focal species. | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Reptile/Amphibian [2] | Mojave fringe-toed lizard | *Uma scoparia* | BLM | CSC | IUCN:LC | G3G4 S3S4 | Yes | No | Yes | Yes | Low Likely | Low | Low | High | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | southwestern willow flycatcher | *Empidonax traillii extimus* | FE | SE | ABC | G5T1T2S1 | Yes | No | Yes | Yes | Listed - E | Low | Low | *High* | Non-Focal Potentially Benefitting | No CNDDB Occurrence data in study area or study area. Small amount of WHR in study area; none in study area. Unlikely that the species breeds in the study area | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species |
| Bird [2] | Ash-throated flycatcher | *Myiarchus cinerascens* | None | None | IUCN:LC | G5 S5 | *No* | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | cavity nesting | | | |
| Bird [2] | bald eagle | *Haliaeetus leucocephalus* | FD/BCC/BLM/FP | SE/FP/CDF | | G5S2 | Yes | No | Yes | Yes | Low Likely | Low | Low | Low | Non-Focal Potentially Benefitting | Occurrence at Piute Ponds and Lake Elizabeth. Nesting? | | | |
| Bird [2] | Bell's sage sparrow | *Amphispiza belli belli* | BCC | WL | ABC | G5T2T4 S2? | Yes | No | Yes | Yes | Low Likely | Moderate | *Moderate* | Low | Non-Focal Potentially Benefitting | Lots of sightings in study area (eBird). Shrub nesting. Recently Bell's Sparrow and Sagebrush Sparrow split into two species that are very difficult to tell apart in the field. All sightings are "Sabrush/Bell's Sparrow (Sage Sparrow). Given this ambiguity, devising a conservation strategy could be fruaght with uncertainty. | | | |
| Bird [2] | Black-chinned sparrow | *Spizella atrogularis* | BCC | None | ABC:WLBCC | G5 S3 | *No* | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Black-tailed Gnatcatcher | *Polioptila melanura* | None | None | IUCN:LC | G5 S4 | *No* | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | shrub nesting | | | |
| Bird [2] | Black-throated Sparrow | *Amphispiza bilineata* | None | None | IUCN:LC | G5 SNRB, SNRN | No | No | Yes | *Yes* | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Brown-crested flycatcher | *Myiarchus tyrannulus* | None | WL | IUCN:LC | G5 S2S3 | *Yes* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | California horned lark | *Eremophila alpestris actia* | None | None | CDFW:WL IUCN:LC | G5T3Q S3 | Yes | No | Yes | *Yes* | Low Likely | Low | Moderate | *Low* | Non-Focal Potentially Benefitting | Documented at Portal Ridge Wildlife Preserve. | | | |
| Bird [2] | Common yellowthroat | *Geothlypis trichas* | None | None | IUCN:LC | G5 S3 | No | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Cooper's hawk | *Accipiter cooperii* | None | None | WL | G5 S4 | No | No | Yes | *Yes* | | | | | Non-Focal Potentially Benefitting | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bird [2] | Ferruginous hawk | *Buteo regalis* | BLM | WL | | G4 S3S4 | No | Area-dependent | Yes | Yes | Low Likely | Moderate | *Moderate* | Moderate | Non-Focal Potentially Benefitting | | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Bird [2] | Grasshopper sparrow | *Ammodramus savannarum* | None | CSC | IUCN:LC | G5 S2 | *Yes* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | No eBird sightings in study area. | | | |
| Bird [2] | Gray vireo | *Vireo vicinior* | BLM, BCC | CSC | | G4 S2 | Yes | No | Yes | Yes | Low Likely | Low | *Moderate* | Low | Non-Focal Potentially Benefitting | Only 2 ebird occurences in study area. | | | |
| Bird [2] | Greater roadrunner | *Geococcyx californianus* | None | None | IUCN:LC | G5 SNR | *No* | Area-dependent | Yes | Yes | Low Likely | Low | High | *Low* | Non-Focal Potentially Benefitting | | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species |
| Bird [2] | Juniper Titmouse | *Baeolophus griseus* | None | None | IUCN:LC | G5 SNRN | *No* | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Ladder-backed woodpecker | *Picoides scalaris* | None | None | IUCN:LC | G5 S4 | No | Keystone | Yes | Yes | Low Likely | Low | Low | Low | Non-Focal Potentially Benefitting | Considered as planning species as a cavity nester. Ultimately removed with preference to more vulnerable species. | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species |
| Bird [2] | Lawrence's goldfinch | *Spinus lawrencei* | BCC | None | ABC:WLBCC | G3G4 S3 | *No* | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Long-eared owl | *Asio otus* | BLM | CSC | IUCN:LC | G5 S3 | Yes | No | Yes | Yes | Low Likely | Moderate | *Low* | Moderate | Non-Focal Potentially Benefitting | Focal species of State Wildlife Action plan Desert Province. Comparatvely low conservation risk compared to other focal species | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species |
| Bird [2] | Lucy's warbler | *Oreothlypis luciae* | BCC | CSC | | G5 S2S3 | *Yes* | No | Yes | Yes | Low Likely | Low | Low | *Low* | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Merlin | *Falco columbarius* | None | None | CDFW:WL IUCN:LC | G5 S3S4 | Yes | No | Yes | *Yes* | Low Likely | Low | Moderate | *Low* | Non-Focal Potentially Benefitting | Documented at Portal Ridge Wildlife Preserve. | | | |
| Bird [2] | northern goshawk | *Accipiter gentilis* | BLM/FS | CSC | | G5 S3 | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Nuttall's woodpecker | *Picoides nuttallii* | BCC | None | ABC:WLBCC | G5 SNR | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | oak titmouse | *Baeolophus inornatus* | BCC | None | ABC:WLBCC | G5 S3? | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | olive-sided flycatcher | *Contopus cooperi* | BCC | CSC | ABC:WLBCC | G4 S4 | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Osprey | *Pandion haliaetus* | None | None | CDFW:WL IUCN:LC | G5 S4 | No | No | Yes | *Yes* | Low Likely | Low | Moderate | *Low* | Non-Focal Potentially Benefitting | Documented at Portal Ridge Wildlife Preserve. | | | |
| Bird [2] | Phainopepla | *Phainopepla nitens* | None | None | IUCN:LC | G5 S4S5 | *No* | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Pinyon Jay | *Gymnorhinus cyanocephalus* | None | None | IUCN:VU | G5 S5 | No | Indicator | Yes | *Yes* | Low Likely | Low | High | *Low* | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Purple martin | *Progne subis* | None | CSC | IUCN:LC | G5 S3 | *Yes* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | No | | |
| Bird [2] | red-breasted sapsucker | *Sphyrapicus ruber* | None | None | | G5 SNR | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | rufous hummingbird | *Selasphorus rufus* | BCC | None | IUCN:LC | G5 S1S2 | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Rufous-crowned sparrow | *Aimophila ruficeps* | None | None | None | G5 SNR | No | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Sage sparrow | *Amphispiza belli* | None | None | None | G5 SNRB, SNRN | Yes | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Scott's Oriole | *Icterus parisorum* | None | None | IUCN:LC | G5 SNRB | No | No | Yes | *Yes* | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Scrub Jay | *Aphelocoma californica* | None | None | IUCN:LC | G5 SN4 | No | Indicator | Yes | *Yes* | Low Likely | Low | High | *Low* | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | sharp-shinned hawk | *Accipiter striatus* | None | WL | | G5 S3 | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Short-eared Owl | *Asio flammeus* | None | CSC | ABC:WLBCC | G5 S3 | *No* | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Southern California rufous-crowned sparrow | *Aimophila ruficeps canescens* | None | WL | | G5T2T4 S2S3 | Yes | No | Yes | Yes | Low Likely | Low | *Low* | Low | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Summer tanager | *Piranga rubra* | None | CSC | IUCN:LC | G5 S2 | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species |
| Bird [2] | Verdin | *Auriparus flaviceps* | None | None | IUCN:LC | G5 S5 | *No* | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Vermilion flycatcher | *Pyrocephalus rubinus* | None | CSC | IUCN:LC | G5 S2S3 | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | western yellow-billed cuckoo | *Coccyzus americanus occidentalis* | FT/FS/BCC/BLM | SE | None | G5T2QS1 | Yes | No | Yes | No | | | | | Non-Focal Potentially Benefitting | DRECP model does not extend into study area. Only singe eBird occurrence in study area at Piute Ponds, more recent record from 2007. No critical habitat proposed in study area. | | | |
| Bird [2] | white-tailed kite | *Elanus leucurus* | None | FP | IUCN:LC | G5 S3 | Yes | No | Yes | No | | | | | Non-Focal Potentially Benefitting | Spotty occurrences in study area, except for at Piute Ponds. Fully protected in CA, but unlikely to be listed. | | | |
| Bird [2] | Yellow warbler | *Dendroica petechia brewsteri* | BCC | CSC | | G5T3? S2 | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Yellow-breasted chat | *Icteria virens* | None | CSC | IUCN:LC | G5 S3 | *Yes* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Yellow-headed blackbird | *Xanthocephalus xanthocephalus* | None | CSC | IUCN:LC | G5 S3S4 | *No* | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | |
| Bird [2] | Great-horned owl | Bubo virginianus) | None | None | | | No | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species |
| Bird [2] | Wrentit | Chamaea fasciata | None | None | | | No | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Mule deer | *Odocoileus hemionus* | None | None | IUCN:LC | G5 S5 | No | Area-dependent | Yes | Yes | Low Likely | Low | High | *Low* | Non-Focal Potentially Benefitting | Focal species of State Wildlife Action plan Desert Province. Ultimately through stakeholder input, mountain lion was chosen to represent the area-dependent umbrella species. | | | |
| Mammal [2] | American beaver | *Castor canadensis* | None | None | | | No | No | Yes | *Yes* | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | big brown bat | *Eptesicus fuscus* | None | None | G5 SNR | | No | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | Documented at Portal Ridge Wildlife Preserve. | | | |
| Mammal [2] | California pocket mouse | *Chaetodipus californicus* | None | None | IUCN:LC | G5 S5 | No | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Desert pocket mouse | *Chaetodipus penicillatus* | None | None | IUCN:LC | G5 S4 | No | No | Yes | *Yes* | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Desert woodrat | *Neotoma lepida* | None | None | IUCN:LC | G5 S5 | No | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Fringed myotis | *Myotis thysanodes* | BLM | None | WBWG:H | G4G5 S4 | No | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Hoary bat | *Lasiurus cinereus* | None | None | WBWG:M | G5 S4? | No | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | Documented at Portal Ridge Wildlife Preserve. | | | |
| Mammal [2] | little brown bat | *Myotis lucifugus* | None | None | WBWG:M | G5 S2S3 | *Yes* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Little pocket mouse | *Perognathus longimembris* | None | None | IUCN:LC | G5 S5 | No | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Long-eared myotis | *Myotis evotis* | BLM | None | WBWG:M | G5 S4? | No | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |

| Taxa | Common Name | Scientific Name | Federal Status | State Statue | Other Status | Global / State Ranking | Vulnerability Status: Listed, Candidate, or Potential for Listing? | Status: Planning Species? | Occurrence: Known to Occur in Mojave Basin and Range Ecoregion? | Data: Enough existing data in study area to propose viable conservation actions. | Status: Listed or likelihood of listing within 5 years? | Importance of study area: Portion of range, critical habitat, or core habitat in study area? | Benefit/Cost: Overlap in habitat or management w/ other potential focal species? | Alignment with other conservation goals: Addressed in state/regional strategy or covered by local HCP? | Filtering Decision | Rationale/Comments | Sophie Parker (TNC) | Becky Mandich (Southern California Edison0 | Other AC/SC Member Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mammal [2] | Merriam's kangaroo rat | *Dipodomys merriami* | None | None | IUCN:LC | G5 S5 | No | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Mexican free-tailed bat | *Tadarida brasiliensis* | None | None | G5 SNR | | No | No | Yes | *No* | | | | | Non-Focal Potentially Benefitting | Documented at Portal Ridge Wildlife Preserve. | | | |
| Mammal [2] | Pallid bat | *Antrozous pallidus* | BLM/FS | CSC | IUCN:LC | G5 S3 | Yes | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Round-tailed ground squirrel | *Spermophilus tereticaudus* | None | None | | G5 S4 | *No* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | southern grasshopper mouse | *Onychomys torridus* | None | CSC | | G5T3 S3 | No | No | Yes | Yes | Low Likely | Moderate | Moderate | *Low* | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Spotted bat | *Euderma maculatum* | BLM | CSC | WBWG:H | G2 S2S3 | *Yes* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Townsend's big -eared bat | *Corynorhinus townsendii* | BLM/FS | CSC | IUCN:LC | G4 S2S3 | Yes | No | Yes | No | Low Likely | | *Low* | Moderate | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Western mastiff bat | *Eumops perotis* | BLM | CSC | WBWG:H | G5T4 S3? | *Yes* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Western red bat | *Lasiurus blossevillii* | BLM, FS | CSC | WBWG:H | G5 S3? | *Yes* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Western small-footed myotis | *Myotis ciliolabrum* | BLM | None | WBWG:M | G5 S2S3 | *Yes* | No | Yes | No | | | | | Non-Focal Potentially Benefitting | | | | |
| Mammal [2] | Yellow-eared pocket mouse | *Perognathus xanthonotus* | BLM | None | | G5T2T3 S1S2 | Yes | No | Yes | No | | | | | Non-Focal Potentially Benefitting | Only single CNDDB record in study area. No WHR habitat in study area or study area. | | | |
| Mammal [2] | Ringtail | *Bassariscus astutus raptor* | None | None | FP | G5 S3S4 | No | No | Yes | Yes | | | | | Non-Focal Potentially Benefitting | | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Plant [3] | Barstow woolly sunflower | *Eriophyllum mohavense* | BLM | None | CNPS List 1B.2 | G2S2.2 | Yes | No | Yes | No | Low Likely | Moderate | *Low* | High | Range unlikely in study area | Most of intact habitat is outside of study area. Only very small patches of habitat and potential distribution in study area and no documented occurrences. | Yes - Maybe | | Sophie Parker (TNC): Might want to check with botanical experts, as "Many of the occurrence points are relatively old and need to be updated" according to the DRECP. Suba: As far as I know, doesn't occur in study area. |
| Plant [3] | Charlotte's phacelia | *Phacelia nashiana* | None | None | CNPS 1B.2 | G3S3 | Yes | No | Yes | No | | | | | Range unlikely in study area | NO documented occurrences in study area. Doesn't pass data criteria. Would Parish's phacelia provide conservation benefit in terms of potential habitat? | Yes - Maybe | | Sophie Parker (TNC): we might want to give this one a second look--while there are no records for it in the study area, given its habitat requriments, there is a likelihood that it could be found there. Suba: Kern county. Double check sci name. |
| Plant [3] | Cushenbury milk-vetch | *Astragalus albens* | FE | None | CNPS List 1B.1 | G1S1.1 | Yes | No | Yes | No | | | | | Range unlikely in study area | NO occurrences in vicinity of study area. Only documented to southeast. | No | | Sophie Parker (TNC):not within the study area-- this is an edaphic endemic species |
| Plant [3] | Kelso Creek monkeyflower | *Mimulus shevockii* | None | None | CNPS 1B.2 | G2S2 | Yes | No | Yes | No | | | | | Range unlikely in study area | | No | | |
| Plant [3] | Kern buckwheat | *Eriogonum kennedyi var. pinicola* | None | None | CNPS 1B.1 | G4T1 S1.1 | Yes | No | Yes | No | | | | | Range unlikely in study area | | No | | |
| Plant [3] | Mojave yucca | *Yucca schidigera* | None | None | | G4G5 SNR | No | Umbrella | Yes | *No* | Low Likely | Low | High | *Low* | Range unlikely in study area | | No | | Sophie Parker (TNC):appears to be limited to the more eastern portions of the CA Mojave Desert |
| Plant [3] | Parish's daisy | *Erigeron parishii* | FT | None | CNPS List 1B.1 | G2S2.1 | Yes | No | Yes | **No** | | | | | Range unlikely in study area | | No | | Sophie Parker (TNC):appears to be limited to the more eastern portions of the CA Mojave Desert |
| Plant [3] | Parish's phacelia | *Phacelia parishii* | None | None | CNPS 1B.1 | G2G3 S1.1 | Yes | No | Yes | No | High Likely | Moderate | Moderate | High | Range unlikely in study area | | Yes - Definitely | | Suba: Is it in study area? I don't have records of it. |
| Plant [3] | Piute Mountains jewel-flower | *Streptanthus cordatus var. piutensis* | None | None | CNPS 1B.2 | G5T1 S1.2 | Yes | No | Yes | No | | | | | Range unlikely in study area | | No | | Sophie Parker (TNC):does not appear to occur in study area |
| Plant [3] | Red Rock poppy | *Eschscholzia minutiflora ssp. twisselmannii* | None | None | CNPS 1B.2 | G5T2 S2.2 | Yes | No | Yes | No | High Likely | High | Moderate | *Moderate* | Range unlikely in study area | CNPS records on Edwards Airforce Base, but all other records to the north. No records within study area. | No | | Sophie Parker (TNC):does not appear to occur in study area |
| Plant [3] | Red Rock tarplant | *Deinandra arida* | None | SR | CNPS List 1B.2 | G1S1.2 | Yes | No | Yes | No | | | | | Range unlikely in study area | | No | | Sophie Parker (TNC):does not appear to occur in study area |
| Plant [3] | Spanish Needle onion | *Allium shevockii* | None | None | CNPS 1B.3 | G1 S1.3 | Yes | No | Yes | No | | | | | Range unlikely in study area | | No | | Sophie Parker (TNC):does not appear to occur in study area |
| Plant [3] | triple-ribbed milk-vetch | *Astragalus tricarinatus* | FE | None | CNPS List 1B.2 | G1S1.2 | Yes | | Yes | No | Listed - E | Low | Low | *Moderate* | Range unlikely in study area | | No | | Sophie Parker (TNC): Note for all plants: I would potentially like to see more plants included on the list of focal species..especially some plants that represent matrix community types for the study area. |
| Plant [3] | Bakersfield cactus | *Opuntia basilaris var. treleasei* | FE | SE | CNPS List 1B.1 | G5T2/S2.1 | *Yes* | No | Yes | No | Listed - E | Low | Low | *High* | Range unlikely in Study Area | Uncertain if range exttends into study area, although habitat mapped there for HSR. No occurrence data in study area so not a suitable focal species. | No | Yes - Maybe | Sophie Parker (TNC): probably doesn't occur as far south as the study area Becky Mandich (SCE): Suggest moving Bakersfield cactus to focal species list if it is present in framework area. |
| Fish [3] | Mohave tui chub | *Gila bicolor mohavensis* | FE | SE/FP | AFS:EN | G4T1S1 | | | No | | | | | | Range unlikely in study area | Included as Focal Species in memo, but does not occur in study area. | | | |
| Reptile/Amphibian [3] | arroyo toad | *Anaxyrus (Bufo) californicus* | FE | CSC | None | G2G3 S2S3 | Yes | | No | *No* | Listed - E | High | High | *High* | Range unlikely in study area | | | | |
| Reptile/Amphibian [3] | Mojave fringe-toed lizard | *Uma scoparia* | BLM | CSC | IUCN:LC | G3G4 S3S4 | Yes | | No | No | | | | | Range unlikely in study area | Very small patch of modeled habitat in study area, otherwise scattered patches in eastern portion of study area. | | | Tom Egan (Defenders of Wildlfie): Recommended Focal, Area Dependent or Umbrella Species. |
| Reptile/Amphibian [3] | Rosy boa | *Charina trivirgata* | BLM, FS | None | | G4G5 S3S4 | Yes | No | No | No | | | | | Range unlikely in study area | Taxonomy of this species recently revised. Recently, two species have been identified. The only way to tell them apart is by range. The Rosy Boa occurs only in extreme southwestern San Diego County. | | | |
| Reptile/Amphibian [3] | Southern California legless lizard | *Anniella stebbinsi* | None | CSC | FS | None | No | No | No | *No* | | | | | Range unlikely in study area | | | | |
| Reptile/Amphibian [3] | Southern rubber boa | *Charina umbratica* | FS | ST | | G5T2T3 S2S3 | Yes | No | Yes | No | | | | | Range unlikely in study area | | No | | |
| Reptile/Amphibian [3] | Tehachapi slender salamander | *Batrachoseps stebbinsi* | BLM/FS | ST | None | G2S2 | Yes | | Yes | No | | | | | Range unlikely in study area | | | | |
| Bird [3] | Bendire's thrasher | *Toxostoma bendirei* | BLM, BCC | CSC | ABC:WLBCC, IUCN:VU | G4G5 S3 | No | Area-dependent | Yes | No | | | | | Range unlikely in study area | | | | |
| Bird [3] | Costa's hummingbird | *Calypte costae* | None | None | ABC:WLBCC | G5 S3? | No | | Yes | No | | | | | Range unlikely in study area | | | | |
| Bird [3] | Harris's hawk | *Parabuteo unicinctus* | None | WL | IUCN:LC | G5 S1 | *Yes* | No | Yes | No | | | | | Range unlikely in study area | | | | |
| Mammal [3] | desert bighorn sheep | *Ovis canadensis nelsoni* | BLM/FS | FP | | G4T4 S3 | Yes | No | Yes | No | | | | | Range unlikely in study area | | | | |

| Taxa | Common Name | Scientific Name | Federal Status | State Statue | Other Status | Global / State Ranking | Vulnerability Status: Listed, Candidate, or Potential for Listing? | Status: Planning Species? | Occurrence: Known to Occur in Mojave Basin and Range Ecoregion? | Data: Enough existing data in study area to propose viable conservation actions. | Status: Listed or likelihood of listing within 5 years? | Importance of study area: Portion of range, critical habitat, or core habitat in study area? | Benefit/Cost: Overlap in habitat or management w/ other potential focal species? | Alignment with other conservation goals: Addressed in state/regional strategy or covered by local HCP? | Filtering Decision | Rationale/Comments | Sophie Parker (TNC) | Becky Mandich (Southern California Edison0 | Other AC/SC Member Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mammal [3] | Mojave River Vole | *Microtus californicus mohavensis* | Rank:G5T1 S1 | None | CSC | G5T1 S1 | Yes | No | Yes | No | | | | | Range unlikely in study area | | | | |
| Mammal [3] | Western yellow bat | *Lasiurus xanthinus* | None | CSC | WBWG:H | G5 S3 | Yes | No | Yes | No | | | | | Range unlikely in study area | | | | |

| Abbreabtions of Listing Codes | |
|---|---|
| AFS_TH | American Fisheries Society - Threatened |
| ABC_WLBCC | American Bird Conservancy - U. S. Watch List of Birds of Conservation Concern |
| AFS_EN | American Fisheries Society - Endangered |
| AFS_VU | American Fisheries Society - Vulnerable |
| BCC | Fish and Wildlife Service: Birds of Conservation Concern |
| BLM | Bureau of Land Management - Sensitive |
| CDF | Calif Dept of Forestry & Fire Protection - Sensitive |
| CNPS | California Native Plants Society |
| CSC | California Species of Special Concern |
| FC | Federal candidate species |
| FD | Federally delisted |
| FE | Federally listed as Endangered |
| FP | Fully Protected |
| FPD | Federally proposed for delisting |
| FPE | Federally proposed for listing as Endangered |
| FPT | Federally proposed for listing as Threatened |
| FS | USDA Forest Service - Sensitive |
| FT | Federally listed as Threatened |
| G1 | NatureServe Conservation Status: Global Ranking: Critically Imperiled |
| G2 | NatureServe Conservation Status: Global Ranking: Imperiled |
| G3 | NatureServe Conservation Status: Global Ranking: Vulnerable |
| G4 | NatureServe Conservation Status: Global Ranking: Apparently Secure |
| G5 | NatureServe Conservation Status: Global Ranking: Secure |
| FS | U. S. Forest Service - Sensitive |
| IUCN_CD | IUCN - Conservation Dependent |
| IUCN_CR | IUCN - Critically Endangered |
| IUCN_DD | IUCN - Data Deficient |
| IUCN_EN | IUCN - Endangered |
| IUCN_LC | IUCN - Least Concern |
| IUCN_NT | IUCN - Near Threatened |
| IUCN_VU | IUCN - Vulnerable |
| MMC_SSC | Marine Mammal Commission - Species of Special Concern |
| NMFS_SC | National Marine Fisheries Service - Species of Concern |
| S1 | NatureServe Conservation Status: State Ranking: Critically Imperiled |
| S2 | NatureServe Conservation Status: State Ranking: Imperiled |
| S3 | NatureServe Conservation Status: State Ranking: Vulnerable |
| S4 | NatureServe Conservation Status: State Ranking: Apparently Secure |
| S5 | NatureServe Conservation Status: State Ranking: Secure |
| SCD | State candidate for delisting |
| SCE | State candidate for listing as Endangered |
| SCT | State candidate for listing as Threatened |
| SE | State-listed as Endangered |
| SNR | NatureServe Conservation Status: |
| SR | State-listed rare |
| ST | State-listed as Threatened |
| USFWS_BCC | U. S. Fish & Wildlife Service Birds of Conservation Concern |
| USFWS: UR | U.S. Fish & Wildlife Service - Under Review |
| WBWG_H | Western Bat Working Group - High Priority |
| WBWG_LM | Western Bat Working Group - Low-Medium Priority |
| WBWG_M | Western Bat Working Group - Medium Priority |
| WBWG_MH | Western Bat Working Group - Medium-High Priority |
| WL | Calif Dept of Fish & Game - Watch List |
| XERCES_CI | Xerces Society - Critically Imperiled |
| XERCES_DD | Xerces Society - Data Deficient |
| XERCES_IM | Xerces Society - Imperiled |
| XERCES_VU | Xerces Society - Vulnerable |

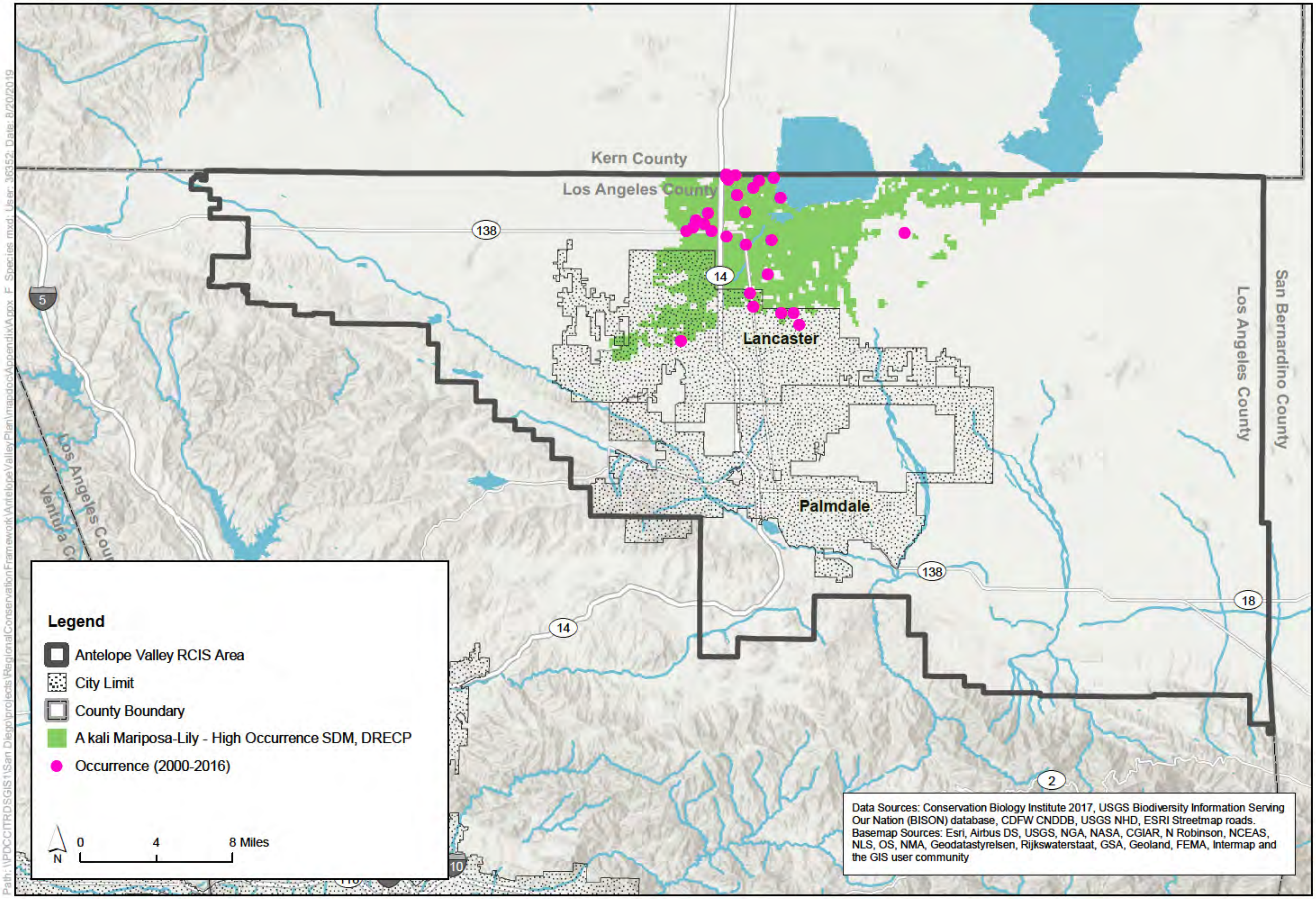
| LEGEND: List Color Code |
|---|
| [1] This row provides status and decision criteria for Proposed Focal Species |
| [2] This row provides status and decision criteria for Non-Focal Species Potentially Benefitting from RCF |
| [3] This row provides status and decision criteria for species whose Range is unlikely in study area |

| Count of Taxa | Column Labels | | | |
|---|---|---|---|---|
| **Row Labels** | **Focal Species** | **Non-Focal Potentially Benefitting** | **Range unlikely in study area** | **Grand Total** |
| Bird | 13 | 48 | 3 | 64 |
| Fish | | | 1 | 1 |
| Invert - Lepidoptera | | 3 | | 3 |
| Mammal | 5 | 23 | 3 | 31 |
| Plant | 5 | 12 | 14 | 31 |
| Reptile/Amphibian | 4 | 14 | 6 | 24 |
| **Grand Total** | **27** | **100** | **27** | **154** |

| Date | Commenter Name | Organization | Comment |
|---|---|---|---|
| 6/24/2016 | Dan Silver | Endangered Habitats League | Let me offer a general comment on the choice of focal species. In the large scale habitat plans I worked on, the guiding principle was that the plans were habitat rather than species-based. Care was taken to ensure that there were surrogate species for each habitat type sufficient to represent the community, e.g., coastal sage scrub, grassland, chaparral, woodland, etc. Perhaps your use of umbrella species will cover this, but I wanted to emphasize the habitat focus and the need for representative species. We also support the use of rare and regulated species, indicator species, etc. as you have outlined. |
| 6/30/2016 | Susan Zahnter | Association of Rural Town Councils | I mentioned other federally protected Golden (on the list already) and Bald Eagles at the meeting, as well as Condors. |
| 6/30/2016 | Betty Courtney | CA Dept. of Fish and Wildlife | 1) You may want to consider Mojave Tarplant – we have heard rumor of two possible location (Alpine Butte Wildlife Sanctuary and Redman)<br>2) I was curious why ladder-backed woodpecker was chosen? |
| 7/6/2016 | Sophie Parker | The Nature Conservancy | Note for all plants: I would potentially like to see more plants included on the list of focal species..especially some plants that represent matrix community types for the plan area.<br>There are a lot of birds included on the list of focal species. I would challenge the group to demonstrate that these species are sufficiently different in their habitat needs, range, and other factors to warrant all of them being included.<br>It is a good idea to include both widespread and narrow-range species on ths list of focal species. |
| 7/7/2016 | Becky Mandich | Southern California Edison | Thank you for allowing us to participate in this process and my apologies for the delayed response. Attached is Southern California Edison's thoughts on the status of the species within the framework. Note the following:<br>• We only put in the species that are a "yes-definitely" and added comments for the species that we think should be moved from non-focal to focal. We did not indicate "yes-maybe" or "no" species since we did not have any issues with the additional species being on the list.<br>• It may also be worth considering sensitive plant communities or habitat types such as juniper woodlands. One idea would be to review the CDFW sensitive community list to see if there are any on the list that should be included. |
| 7/7/2016 | Max Thelander | Los Angeles County | I discussed it with our County Biologist, Joe Decruyenaere, and he suggested that round-leaved filaree should be one of the 25 focal species, and that generally the focus should be on species other than those that are already federal- or state-listed, since listed species already have other mechanisms in place for their protection. |
| 7/13/2016 | Tom Egan | Defenders of Wildlife | See comment letter: Egan_Antelope Valley RCF Draft Focal Species Review_watt.pdf |
| 7/18/2016 | Greg Suba | California Native Plant Society | See comment letter: Suba_AV RCF plant & veg notes.pdf |
| 7/18/2016 | Garry George | Audubon | See comment letter: AVRCF Focal Species List - Auduboncomments - FINAL.pdf |

**NOTE**: Species-specific comments are documented in the "SC/AC Member Comments" column on the "Focal Species List" page.

# Appendix F
# Focal Species Habitat Models




Path: \\PDCCITRDSGIS1\San Diego\projects\RegionalConservationFramework\AntelopeValleyPlan\mapdocs\Appendix\Apox_F_Species.mxd; User: 36352; Date: 8/20/2019

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**Figure F-1**
**Alkali Mariposa-Lily Predicted Habitat Distribution in the RCIS Area**

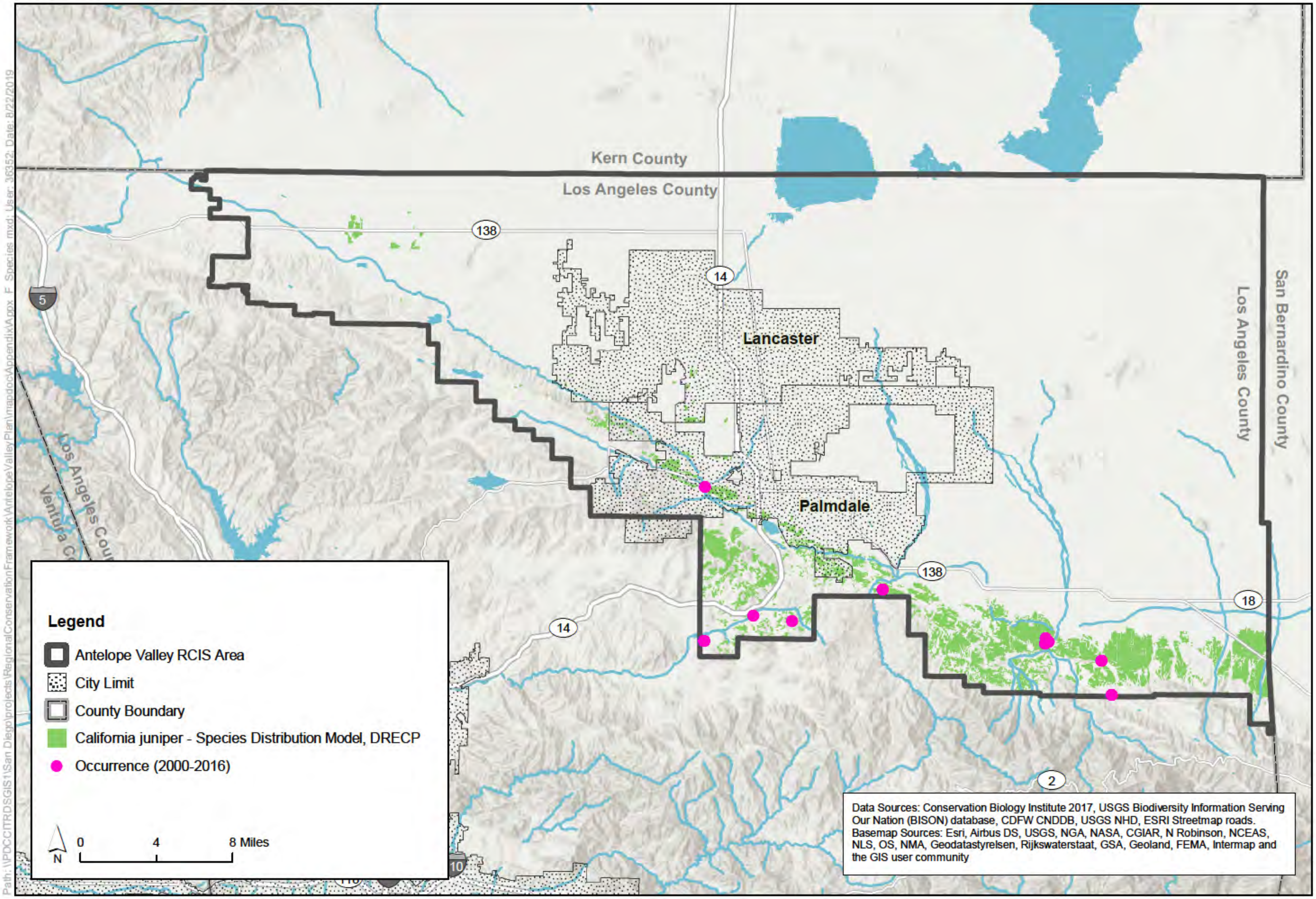


**Figure F-2**
**California Juniper Predicted Habitat Distribution in the RCIS Area**

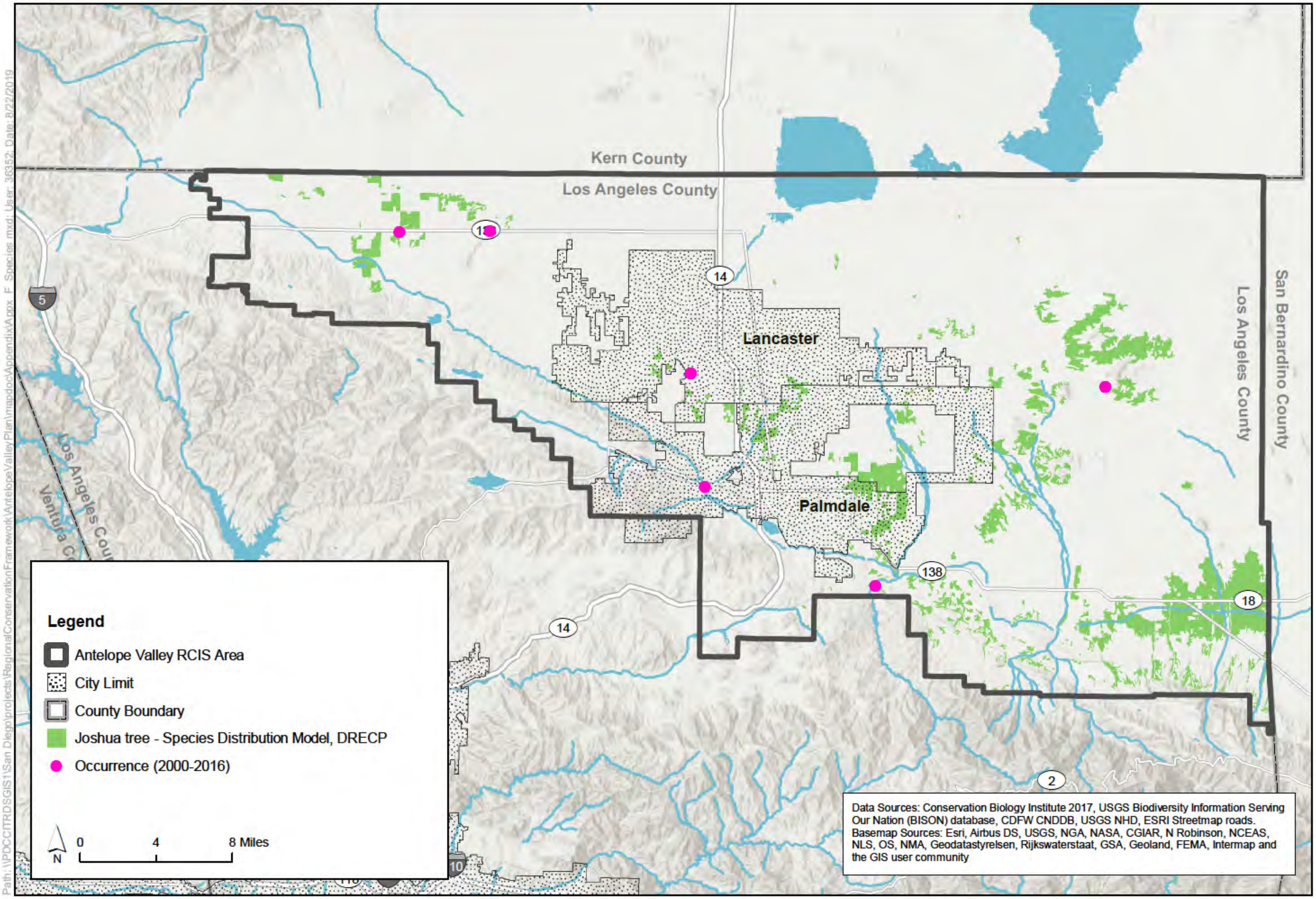


**Figure F-3**
**Joshua Tree Predicted Habitat Distribution in the RCIS Area**

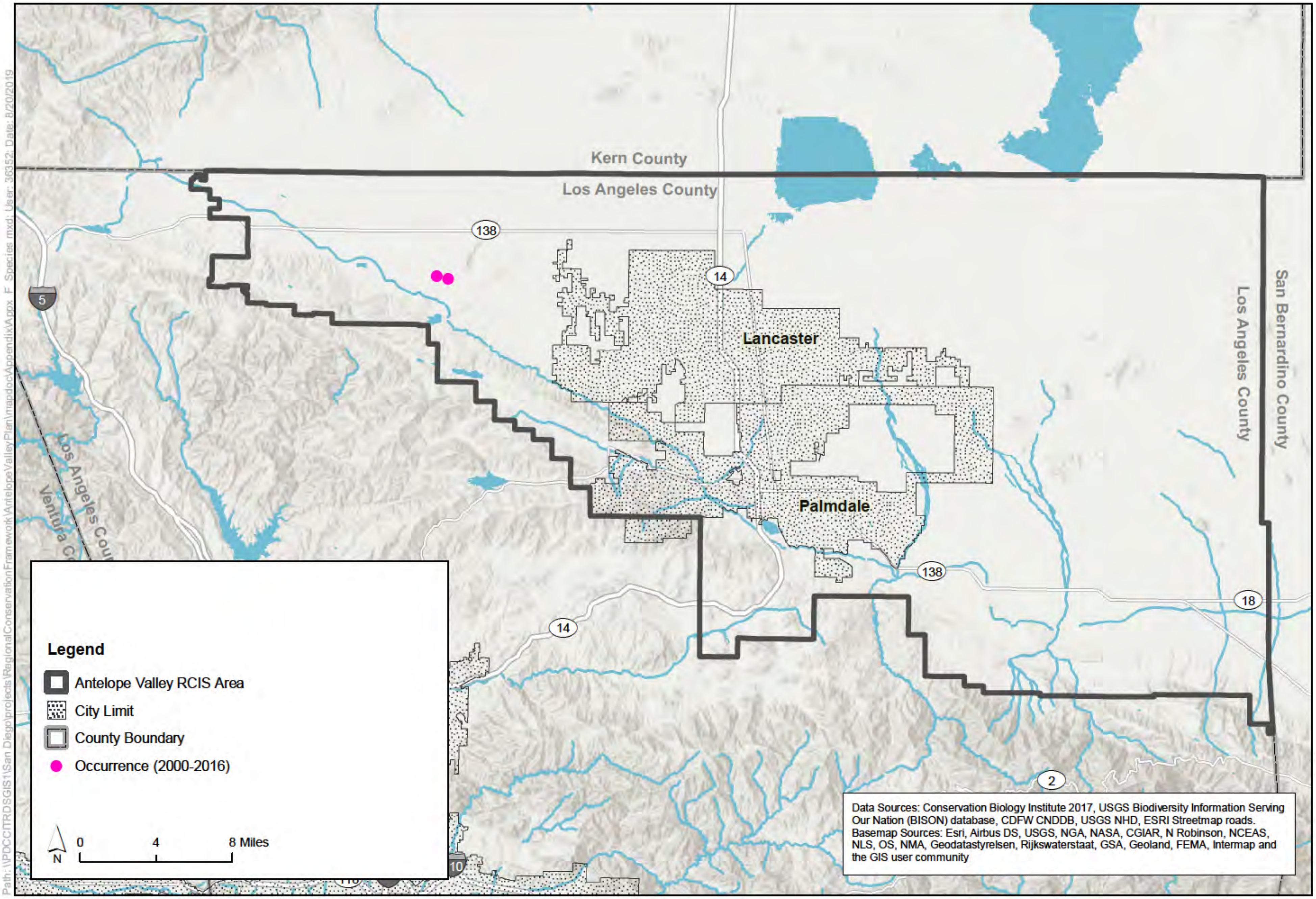


**Figure F-4**
**Spreading Navarretia Predicted Habitat Distribution in the RCIS Area**

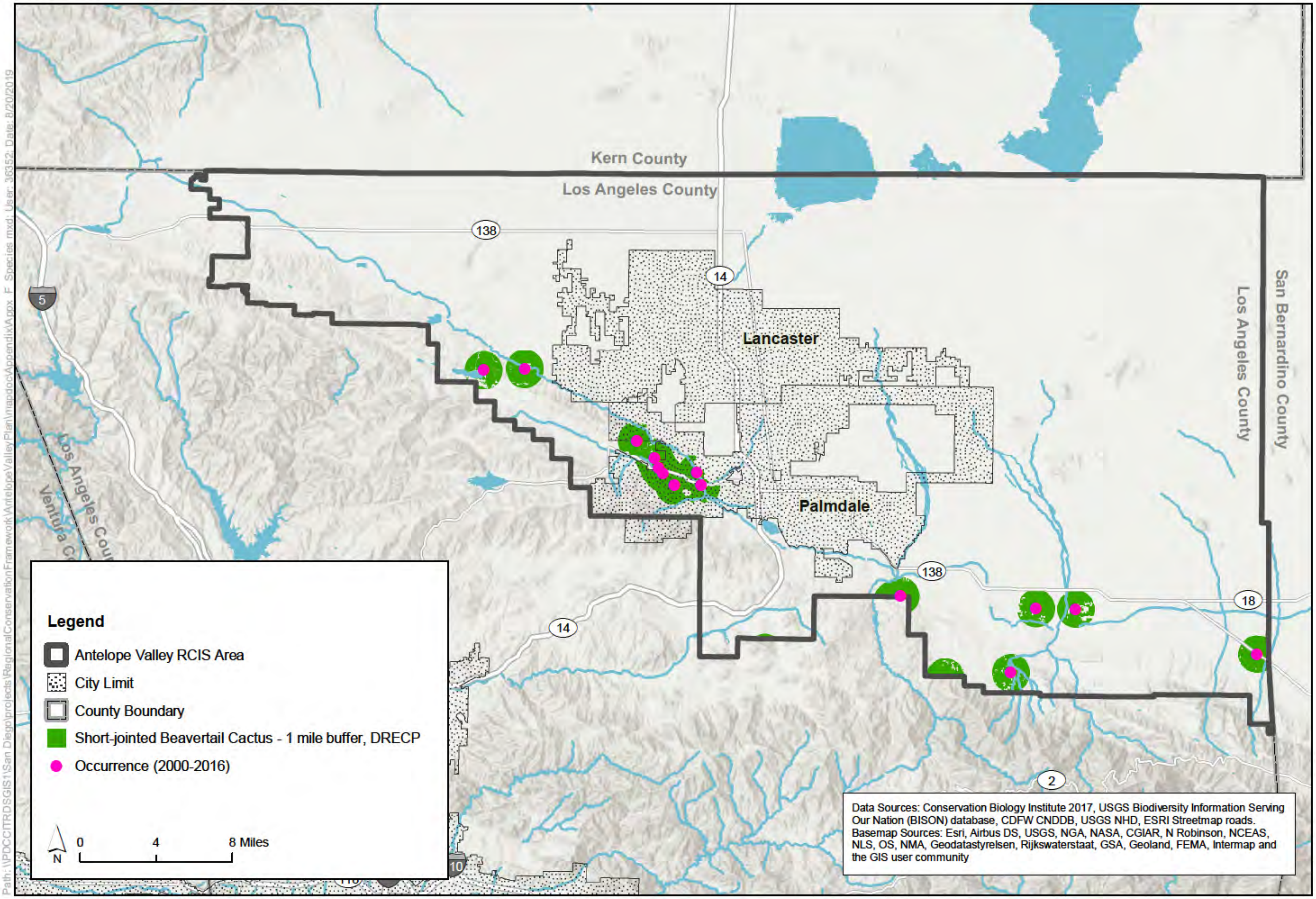


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**Figure F-5**
**Short-jointed Beavertail Cactus Predicted Habitat Distribution in the RCIS Area**

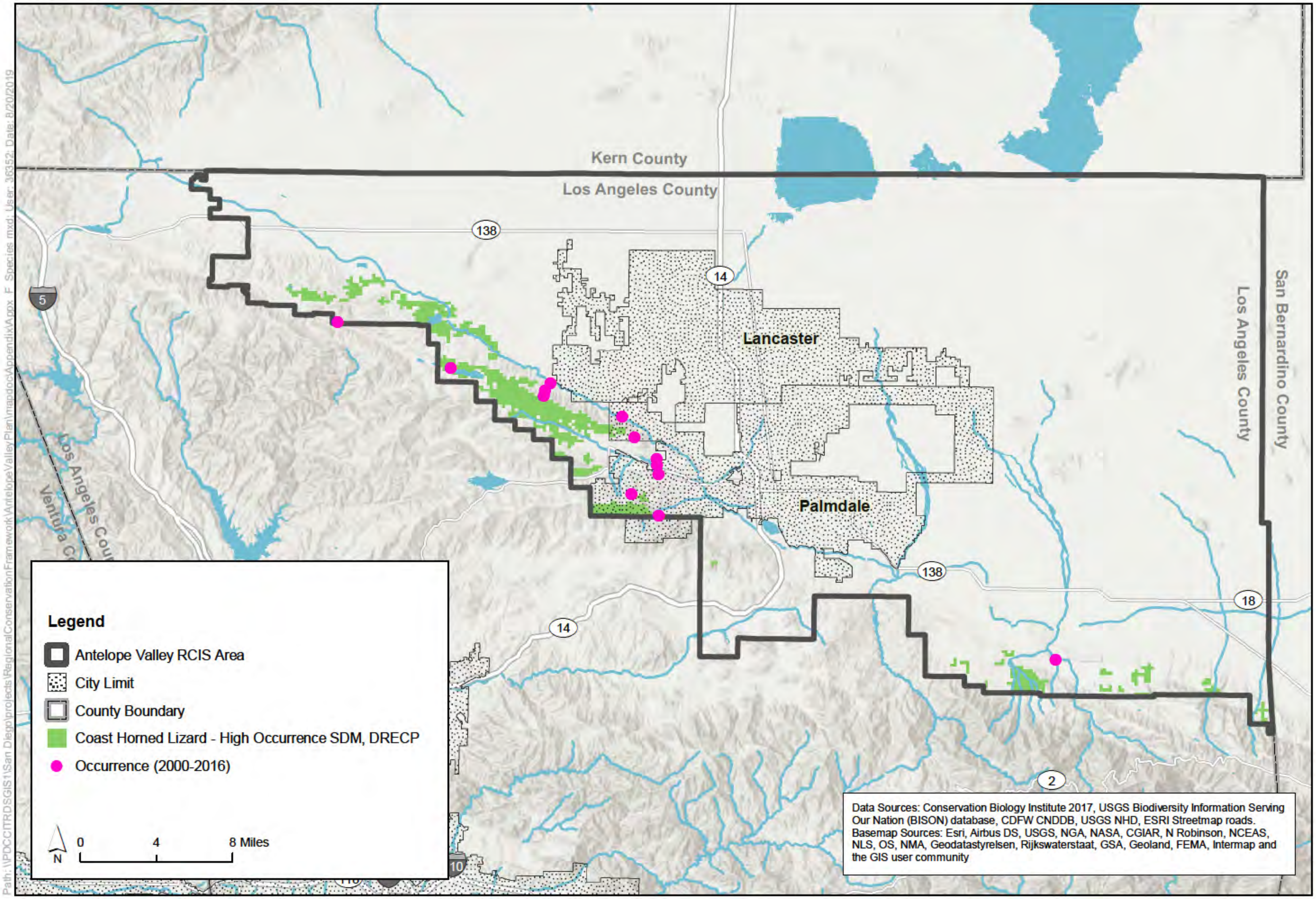



**Figure F-6**
**Coast Horned Lizard Predicted Habitat Distribution in the RCIS Area**

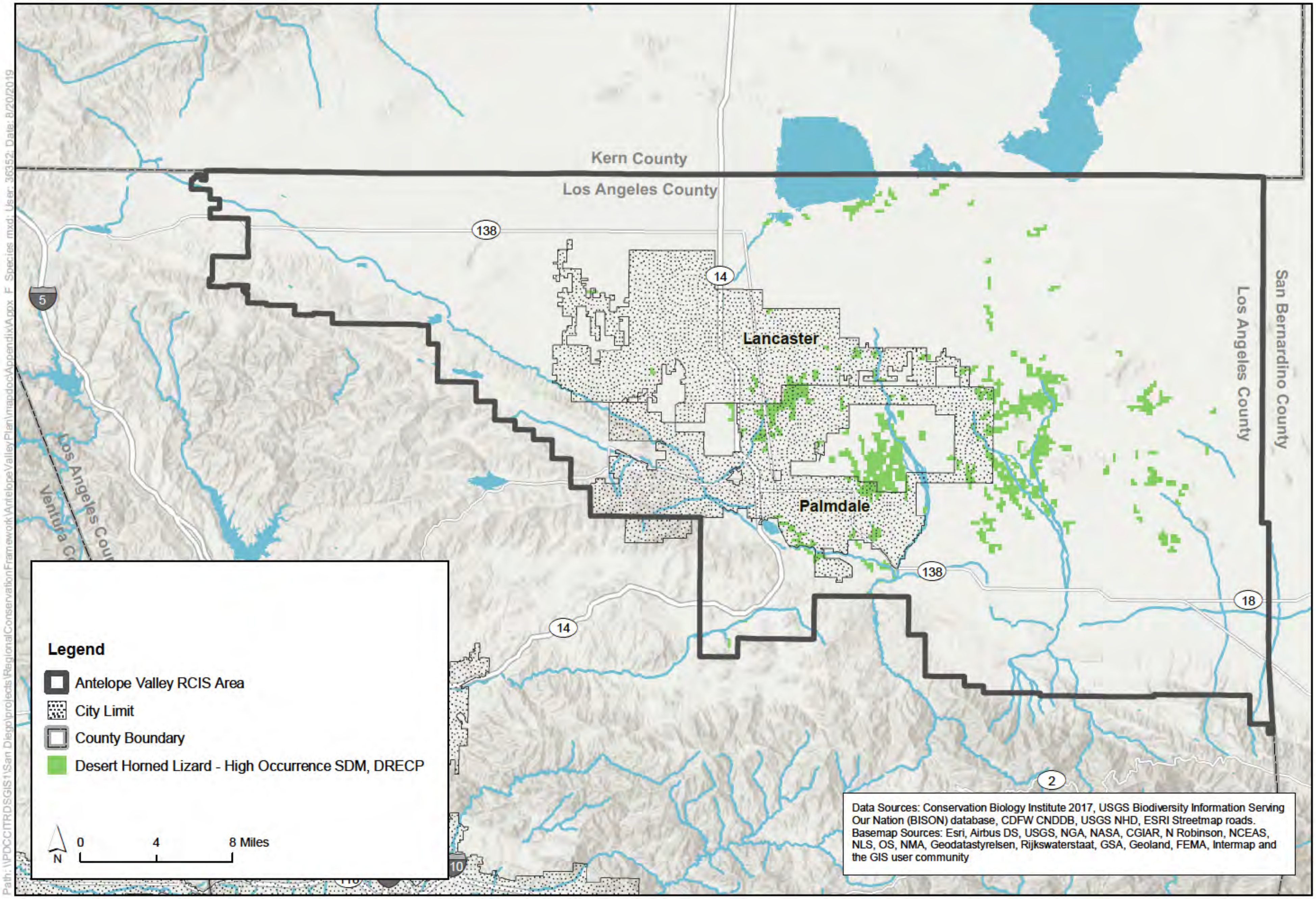



**Figure F-7**
**Desert Horned Lizard Predicted Habitat Distribution in the RCIS Area**

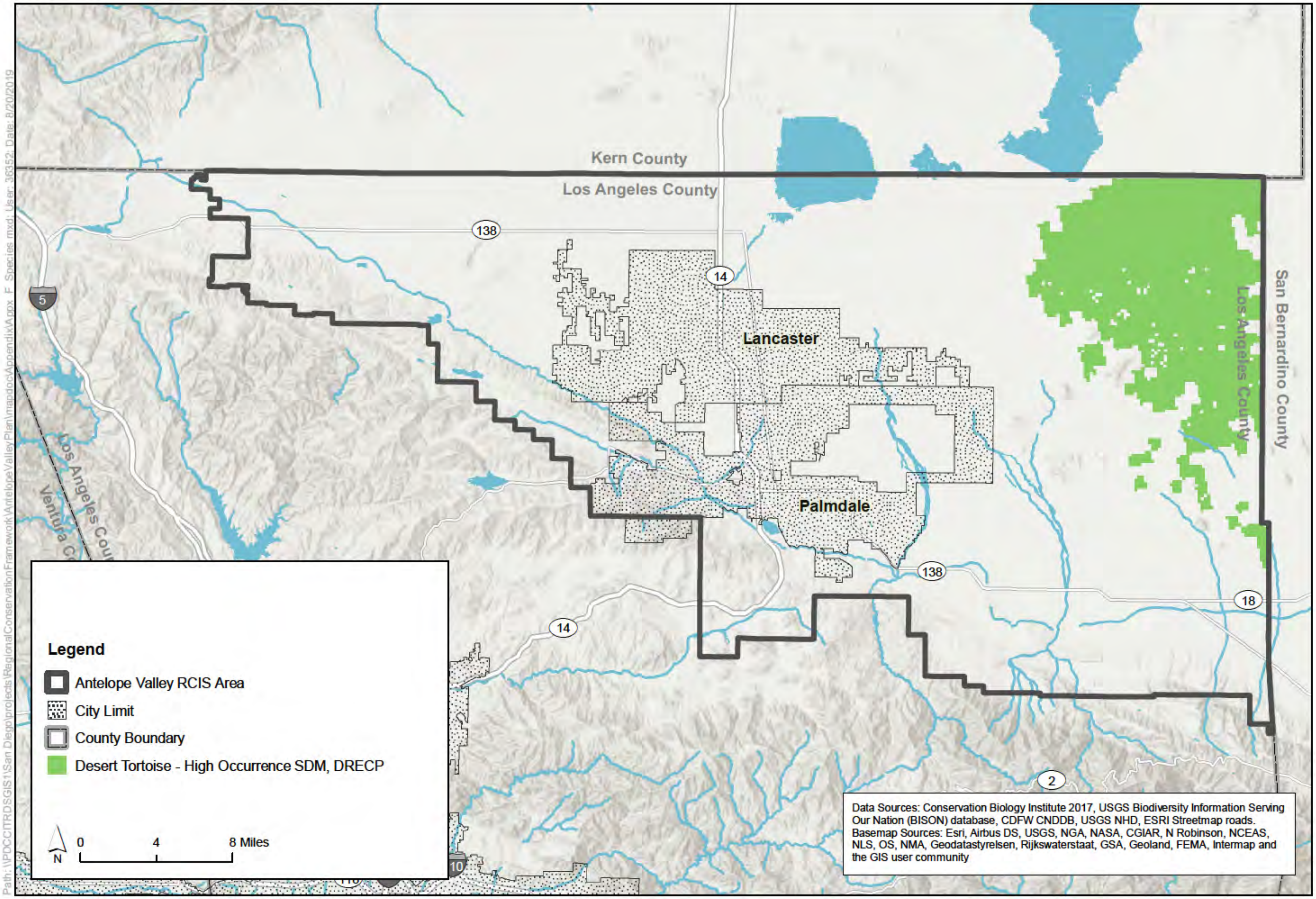
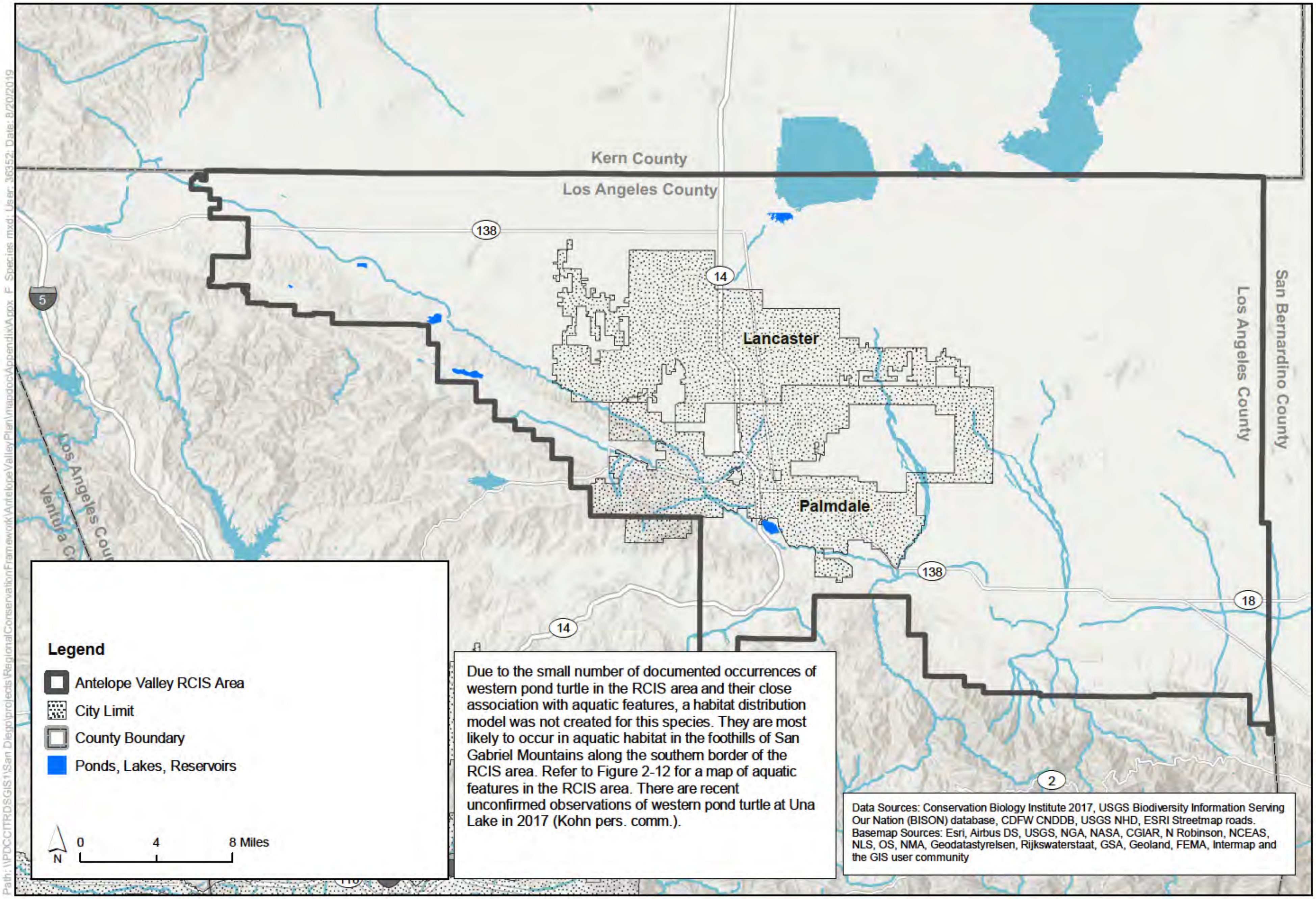



**Figure F-8**
**Desert Tortoise Predicted Habitat Distribution in the RCIS Area**




Due to the small number of documented occurrences of western pond turtle in the RCIS area and their close association with aquatic features, a habitat distribution model was not created for this species. They are most likely to occur in aquatic habitat in the foothills of San Gabriel Mountains along the southern border of the RCIS area. Refer to Figure 2-12 for a map of aquatic features in the RCIS area. There are recent unconfirmed observations of western pond turtle at Una Lake in 2017 (Kohn pers. comm.).

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**Figure F-9**
**Western Pond Turtle Predicted Habitat Distribution in the RCIS Area**

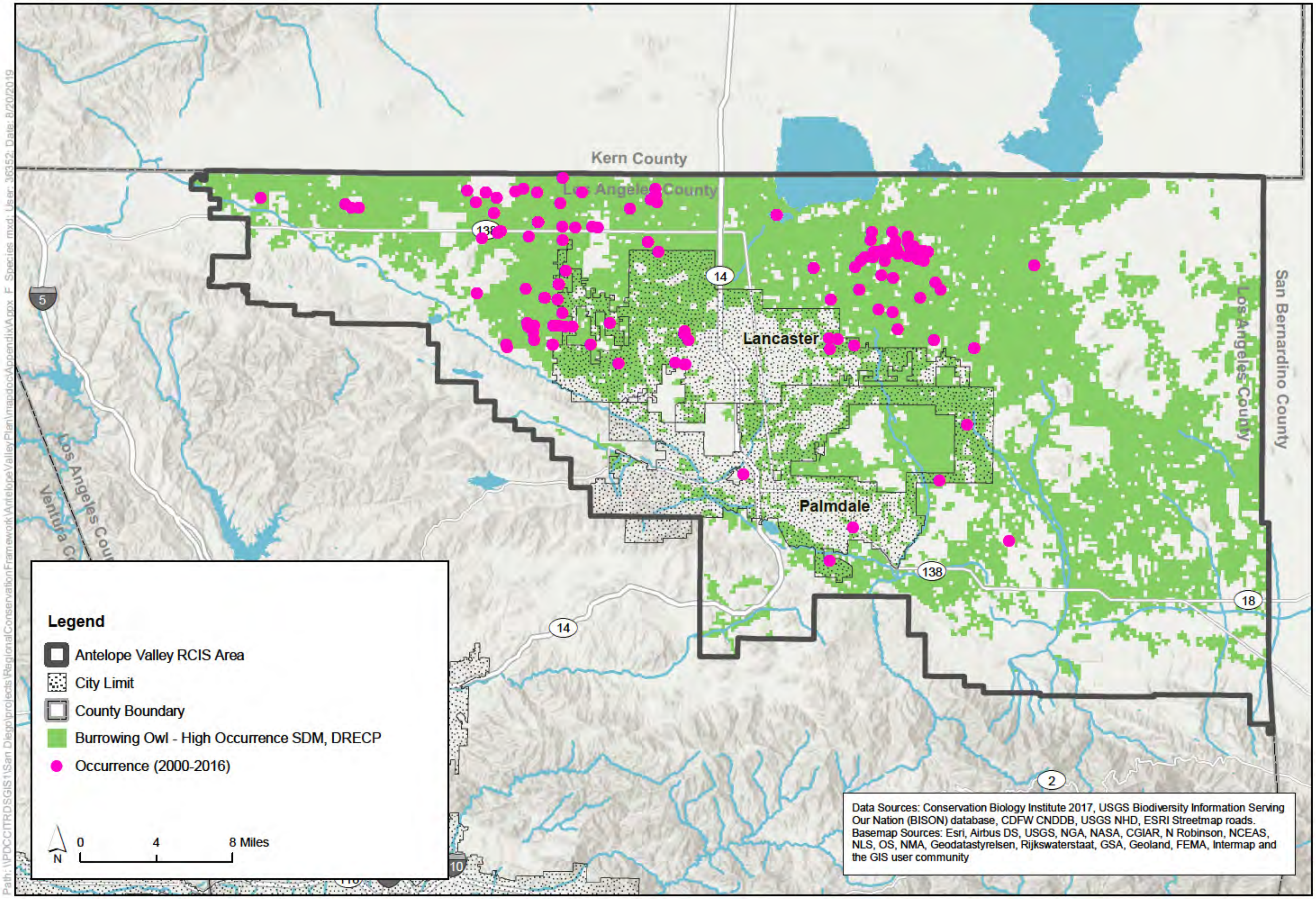


**Figure F-10**
**Burrowing Owl Predicted Habitat Distribution in the RCIS Area**

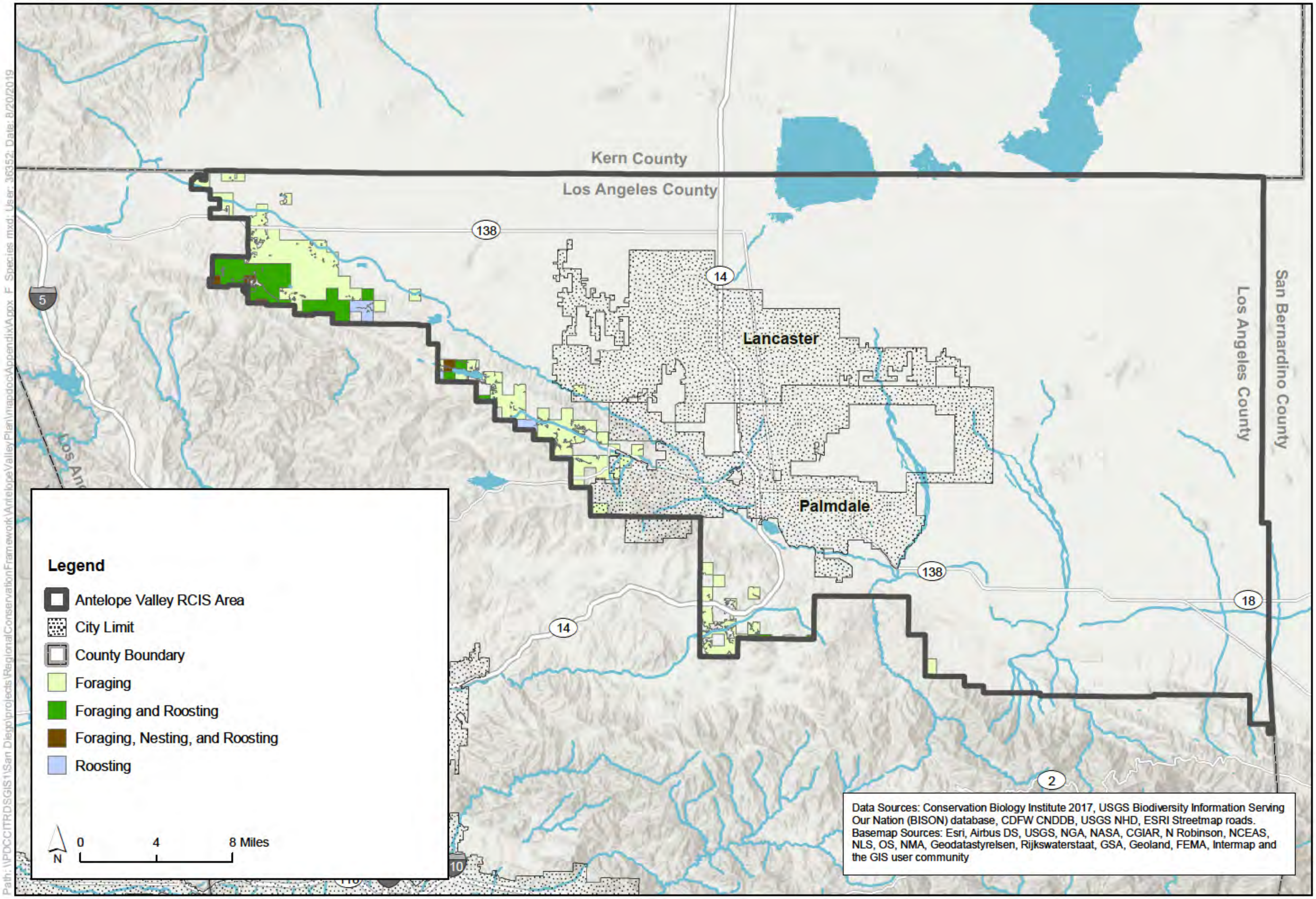


**Figure F-11**
**California Condor Predicted Habitat Distribution in the RCIS Area**

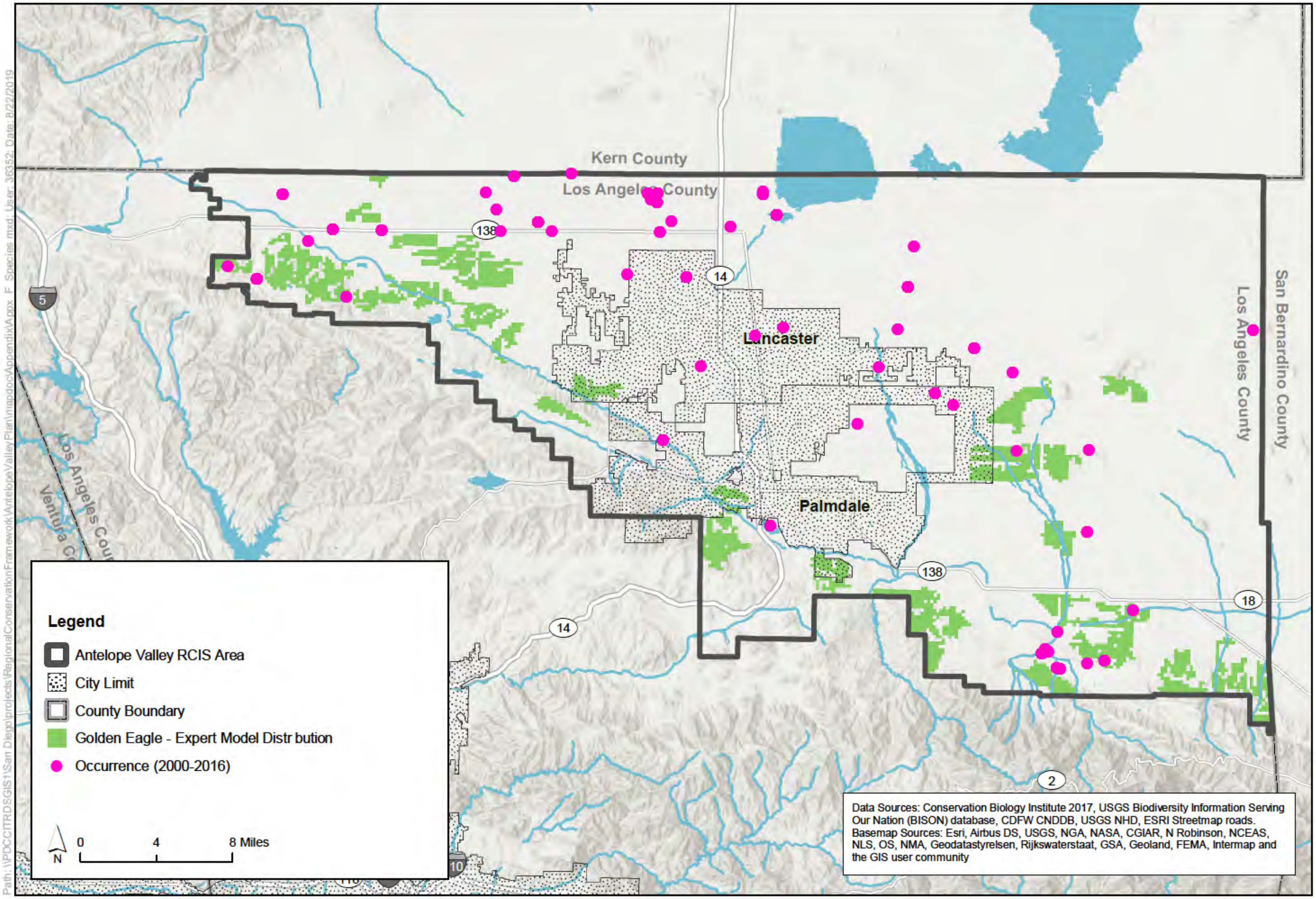


**Figure F-12**
**Golden Eagle Predicted Habitat Distribution in the RCIS Area**

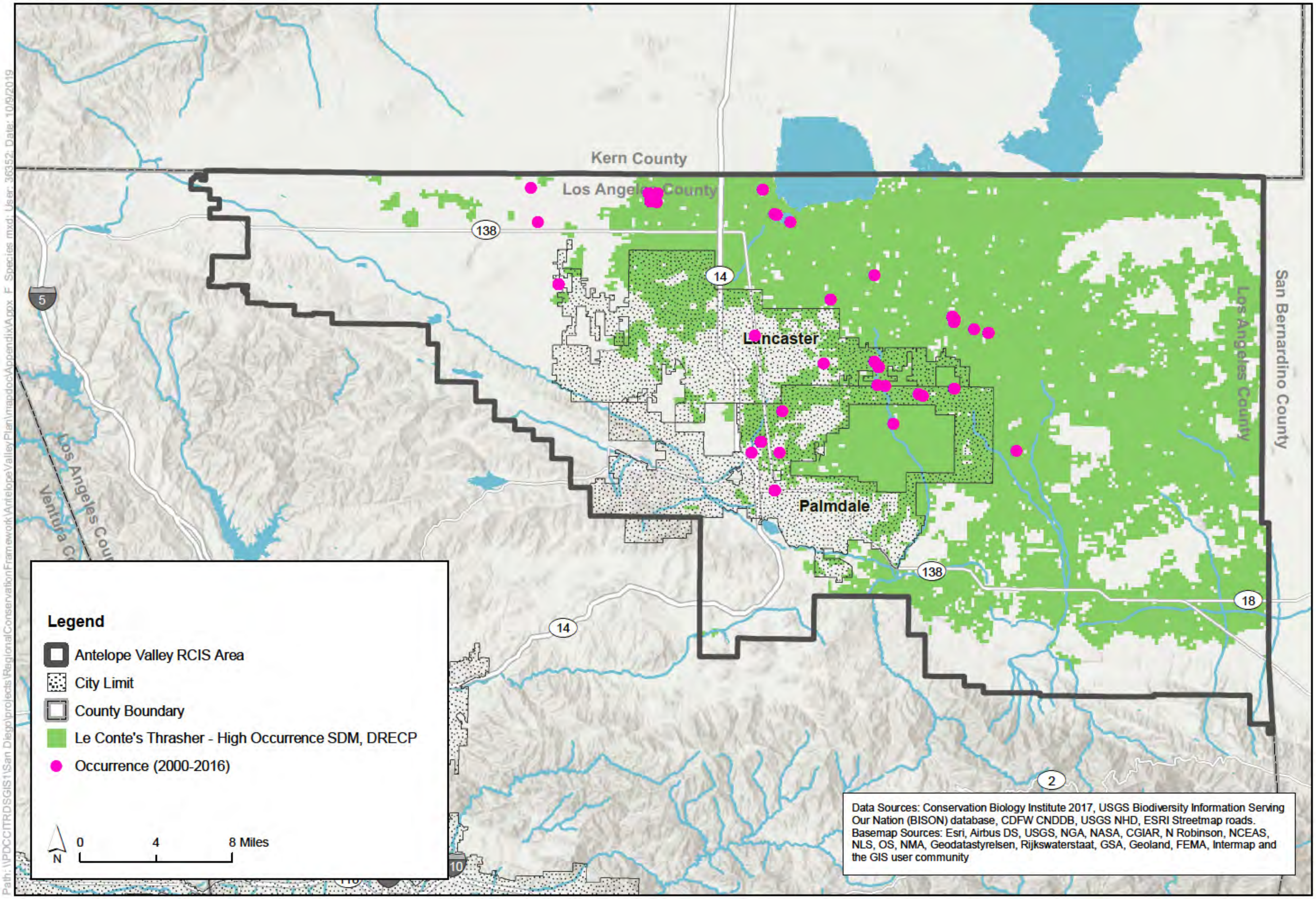


**Figure F-13**
**Le Conte's Thrasher Predicted Habitat Distribution in the RCIS Area**

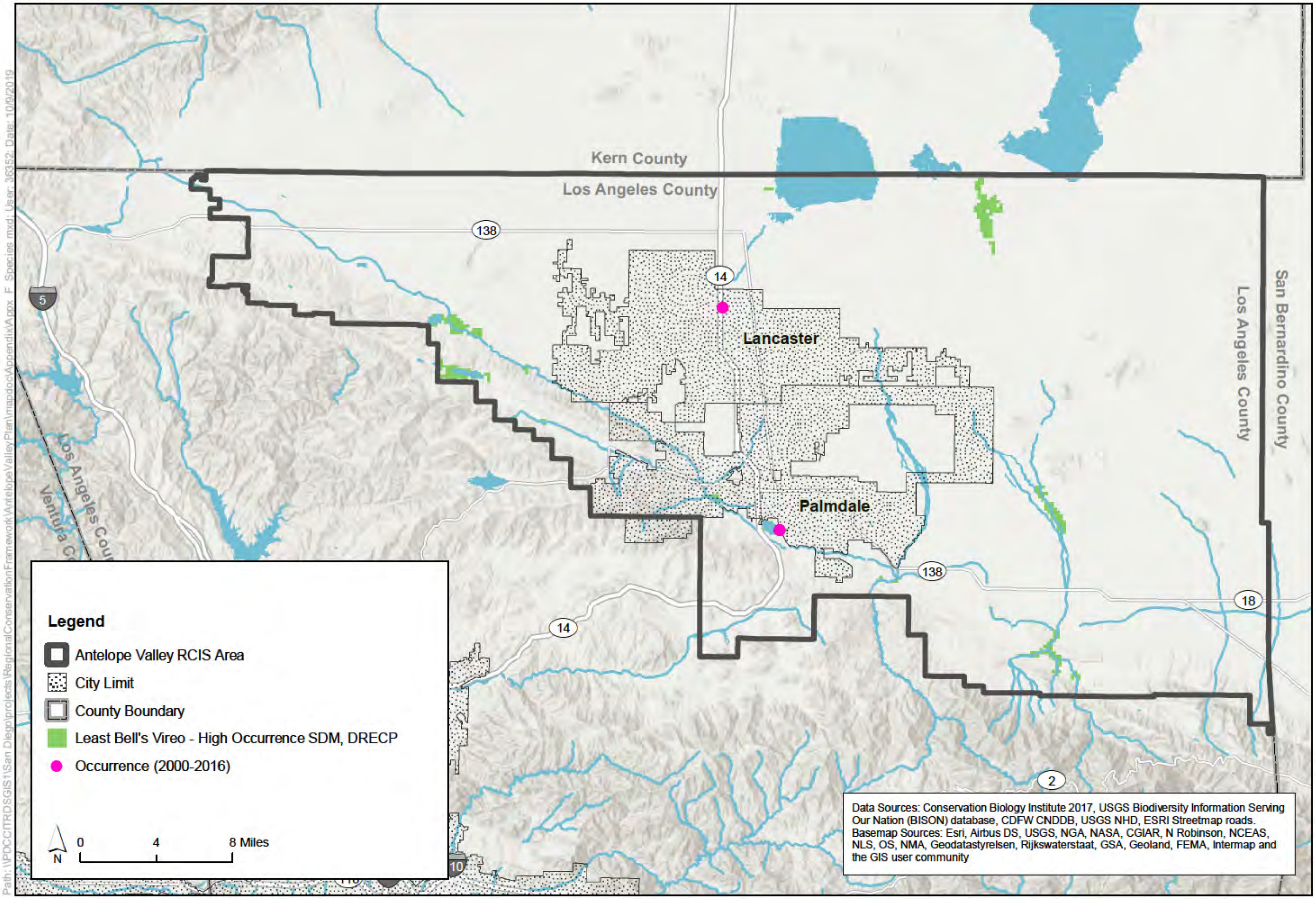


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**Figure F-14**
**Least Bell's Vireo Predicted Habitat Distribution in the RCIS Area**

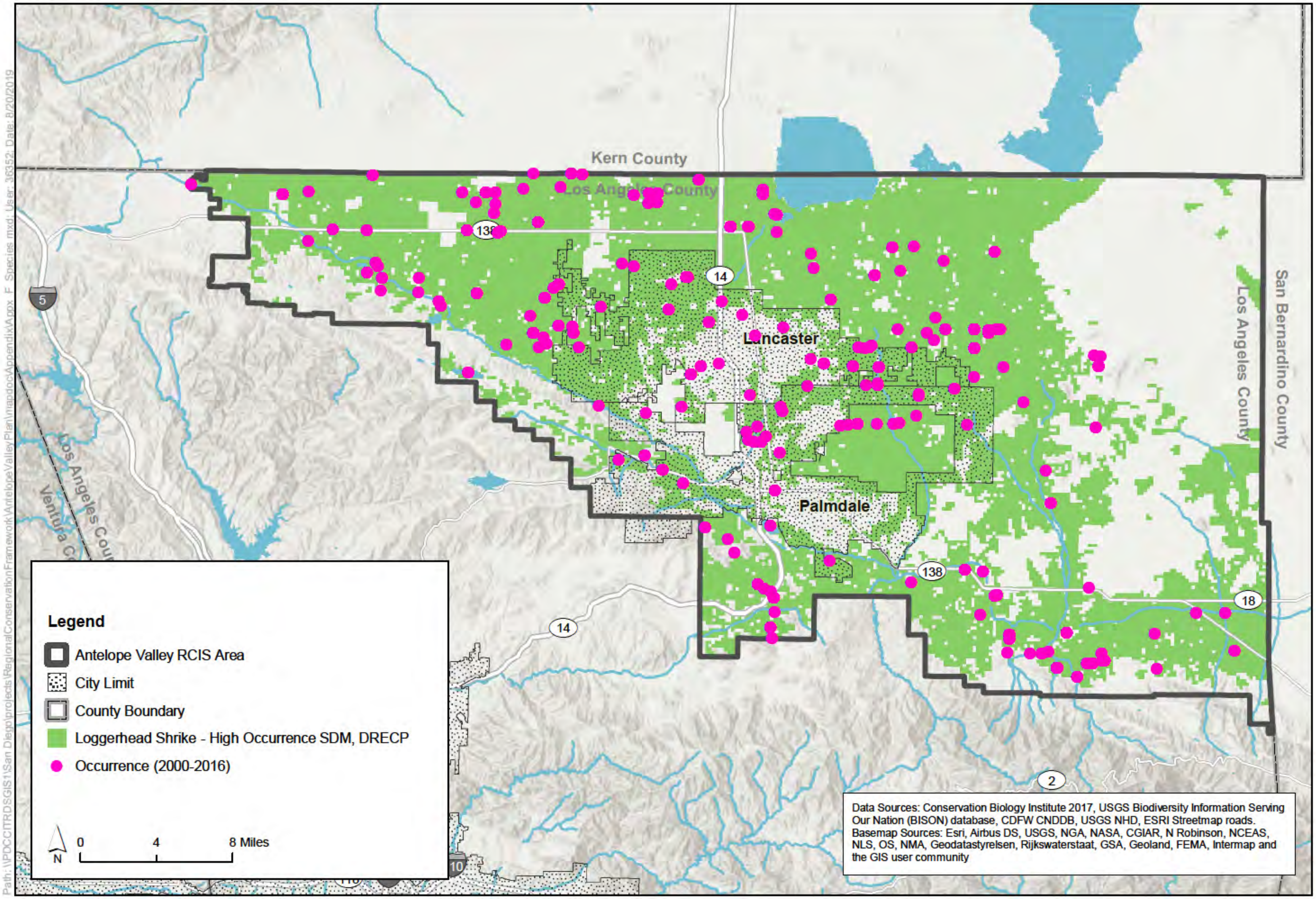


**Figure F-15**
**Loggerhead Shrike Predicted Habitat Distribution in the RCIS Area**

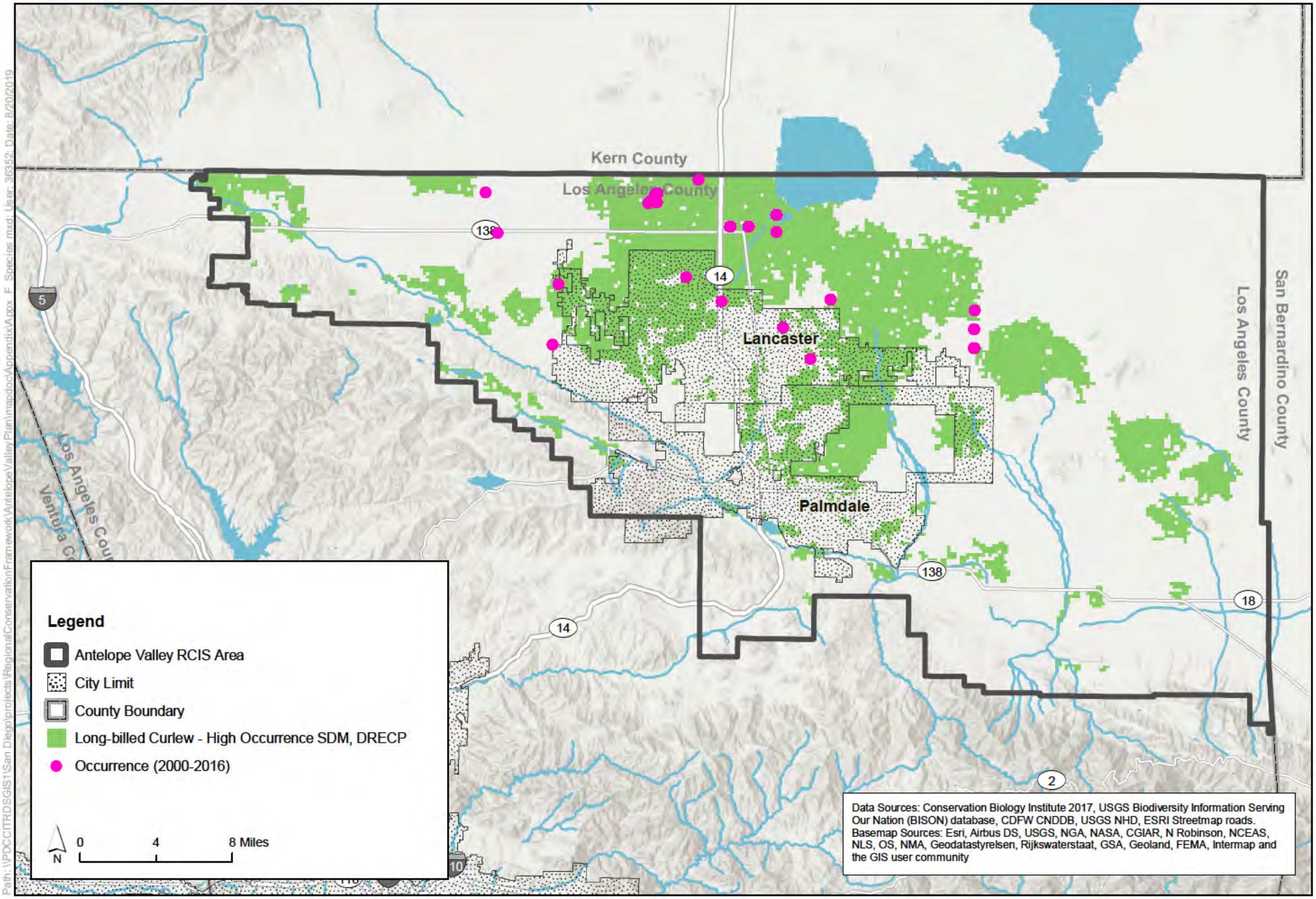


**Figure F-16**
**Long-Billed Curlew Predicted Habitat Distribution in the RCIS Area**

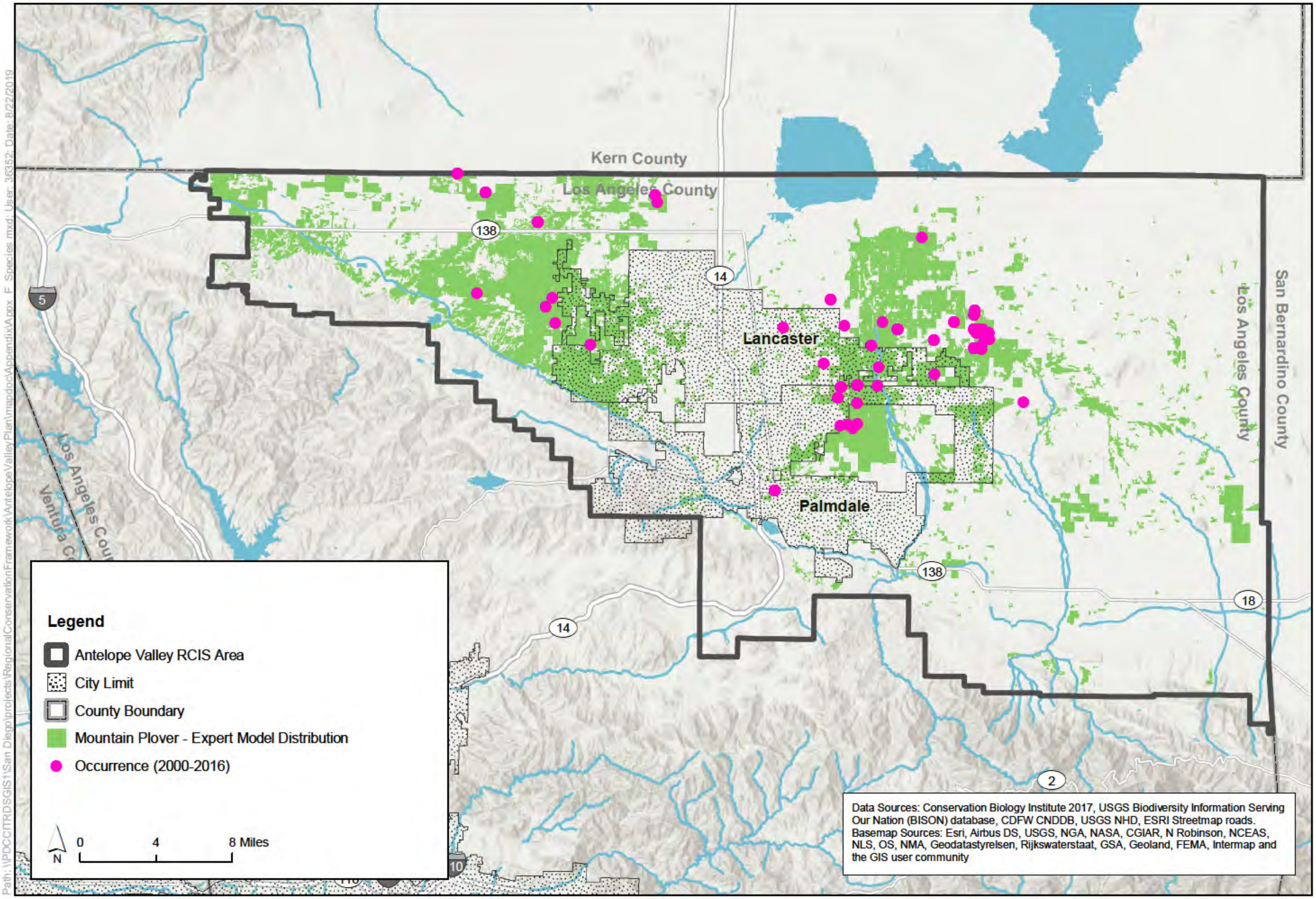


**Figure F-17**
**Mountain Plover Predicted Habitat Distribution in the RCIS Area**

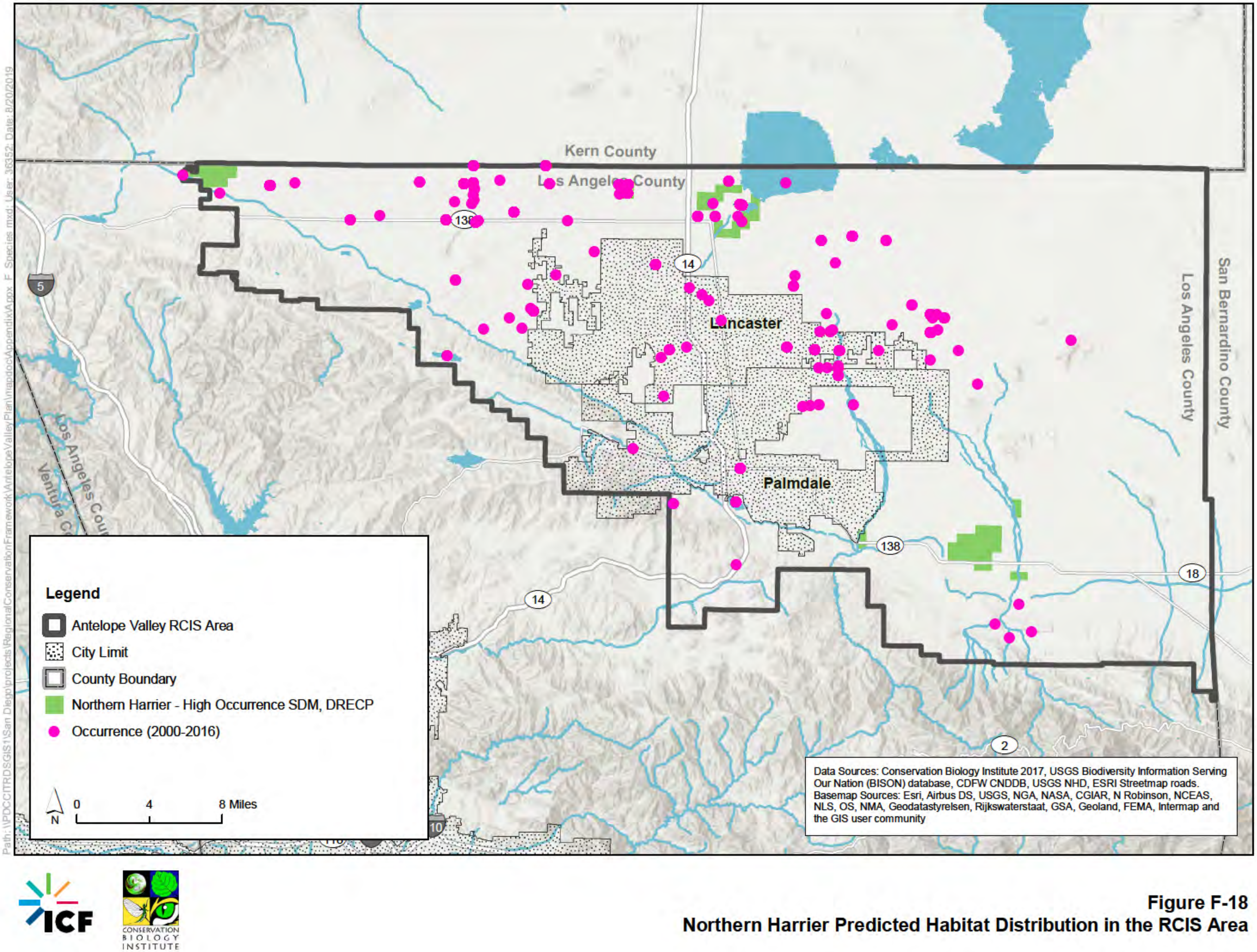


**Figure F-18**
**Northern Harrier Predicted Habitat Distribution in the RCIS Area**

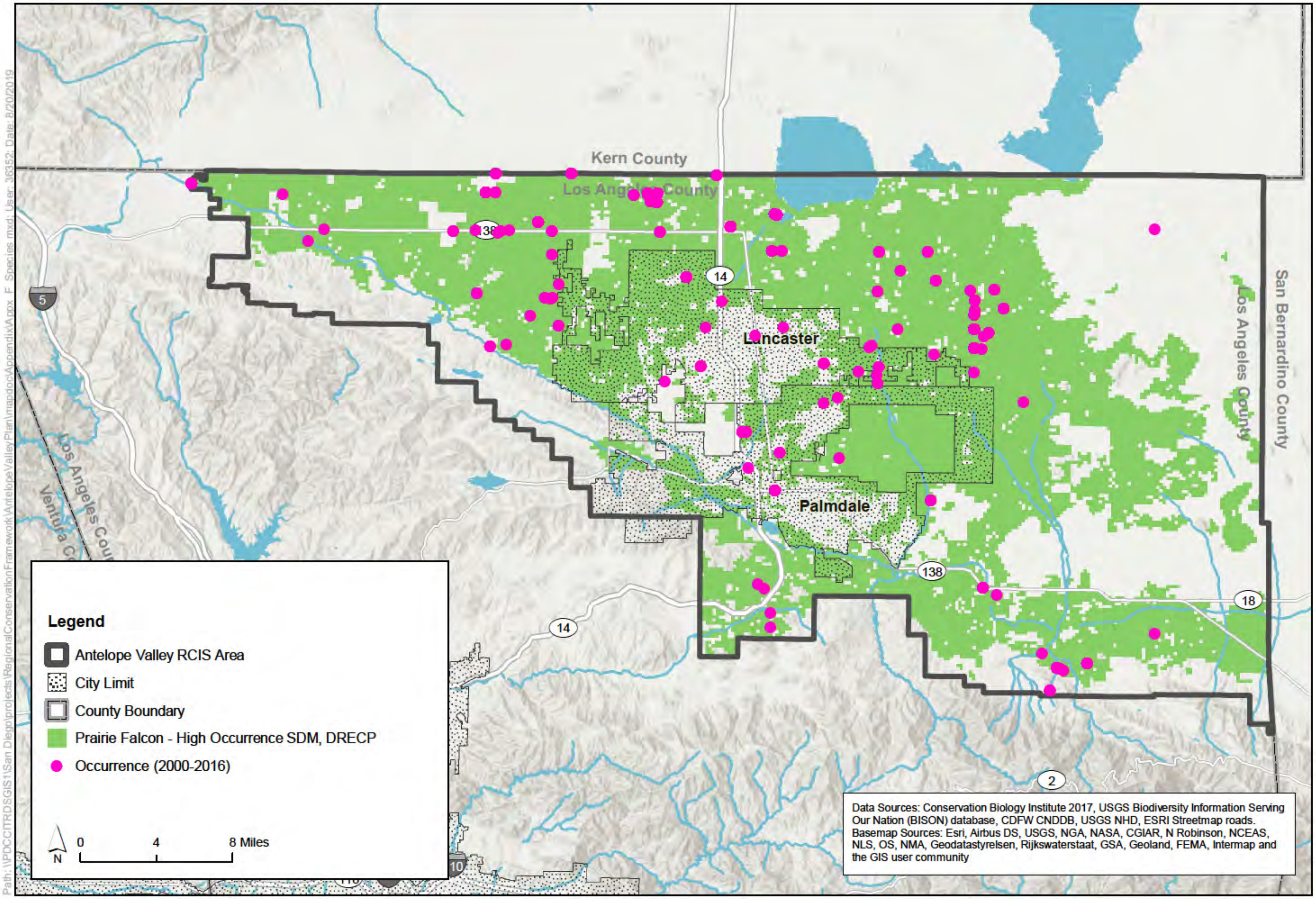


**Figure F-19**
**Prairie Falcon Predicted Habitat Distribution in the RCIS Area**

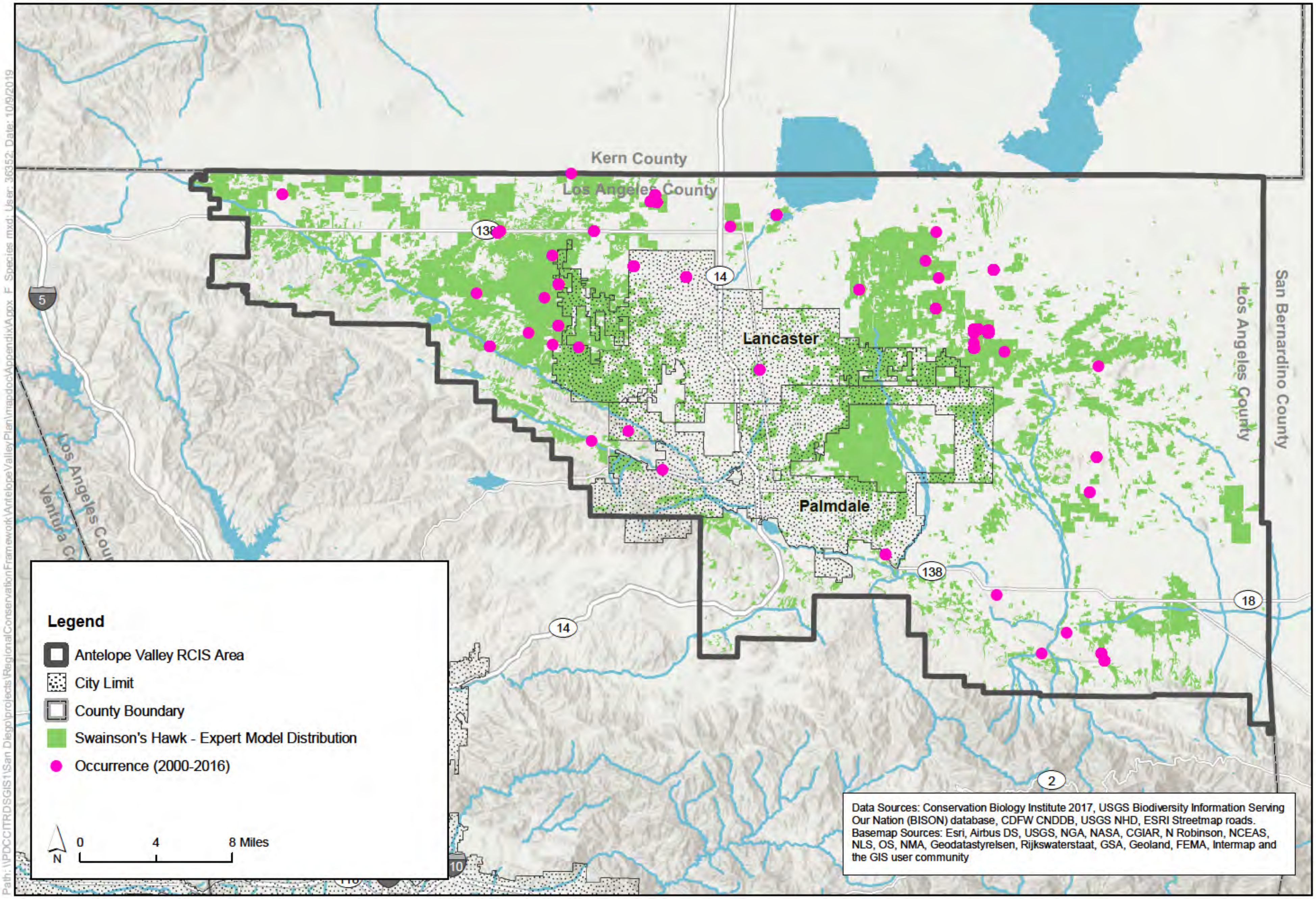


**Figure F-20**
**Swainson's Hawk Predicted Habitat Distribution in the RCIS Area**

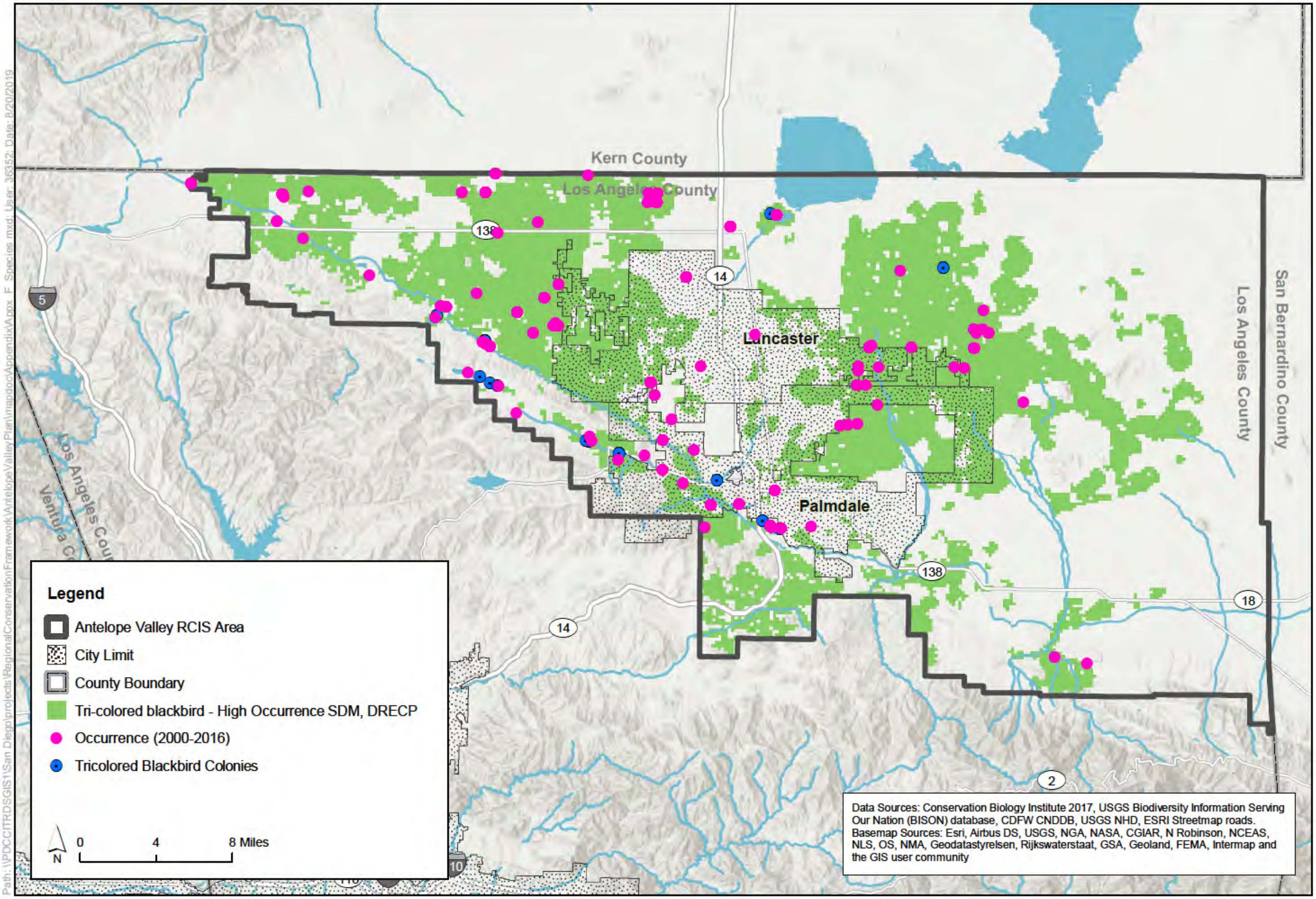


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**Figure F-21**
**Tri-colored Blackbird Predicted Habitat Distribution in the RCIS Area**

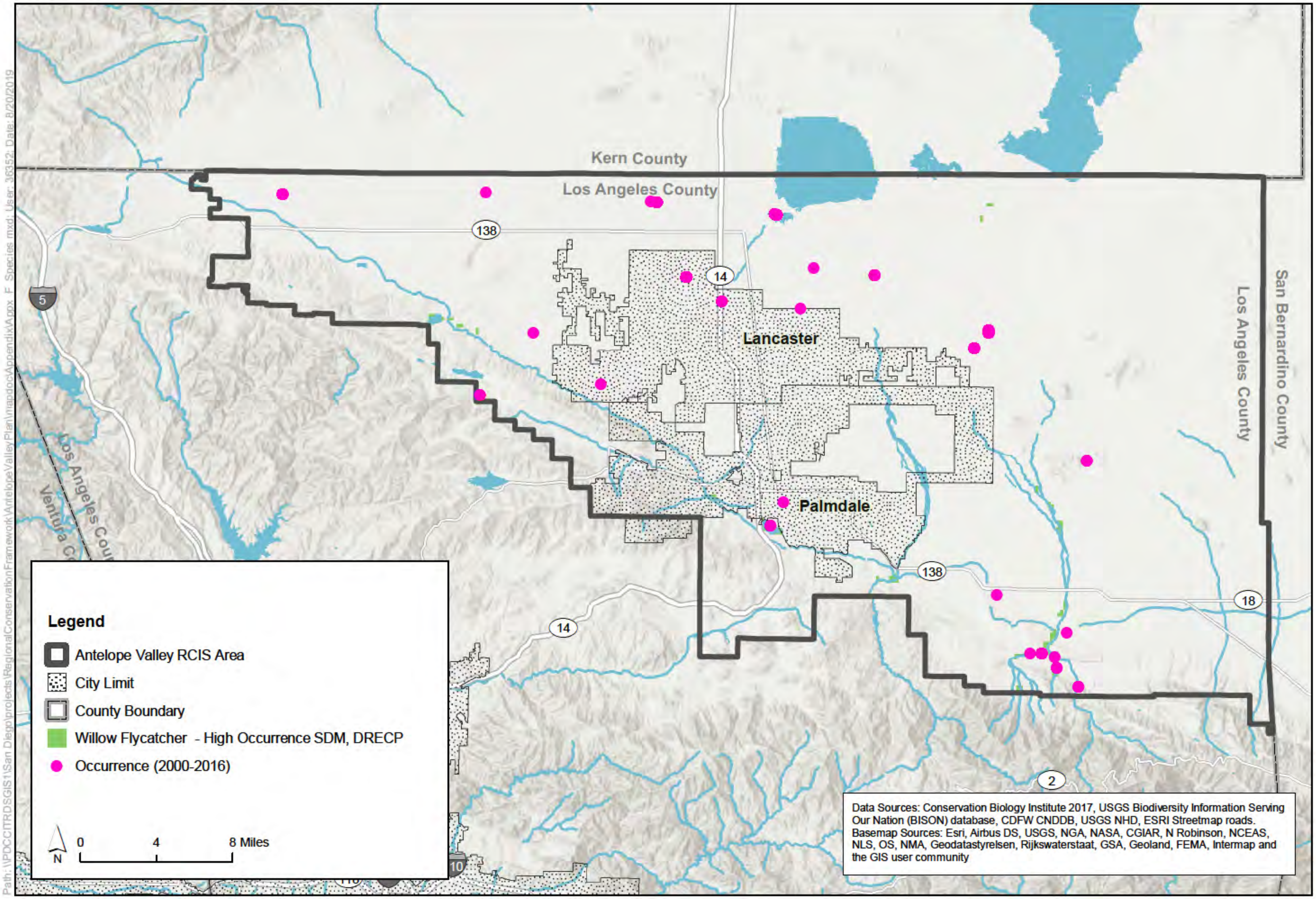


**Figure F-22**
**Willow Flycatcher Predicted Habitat Distribution in the RCIS Area**

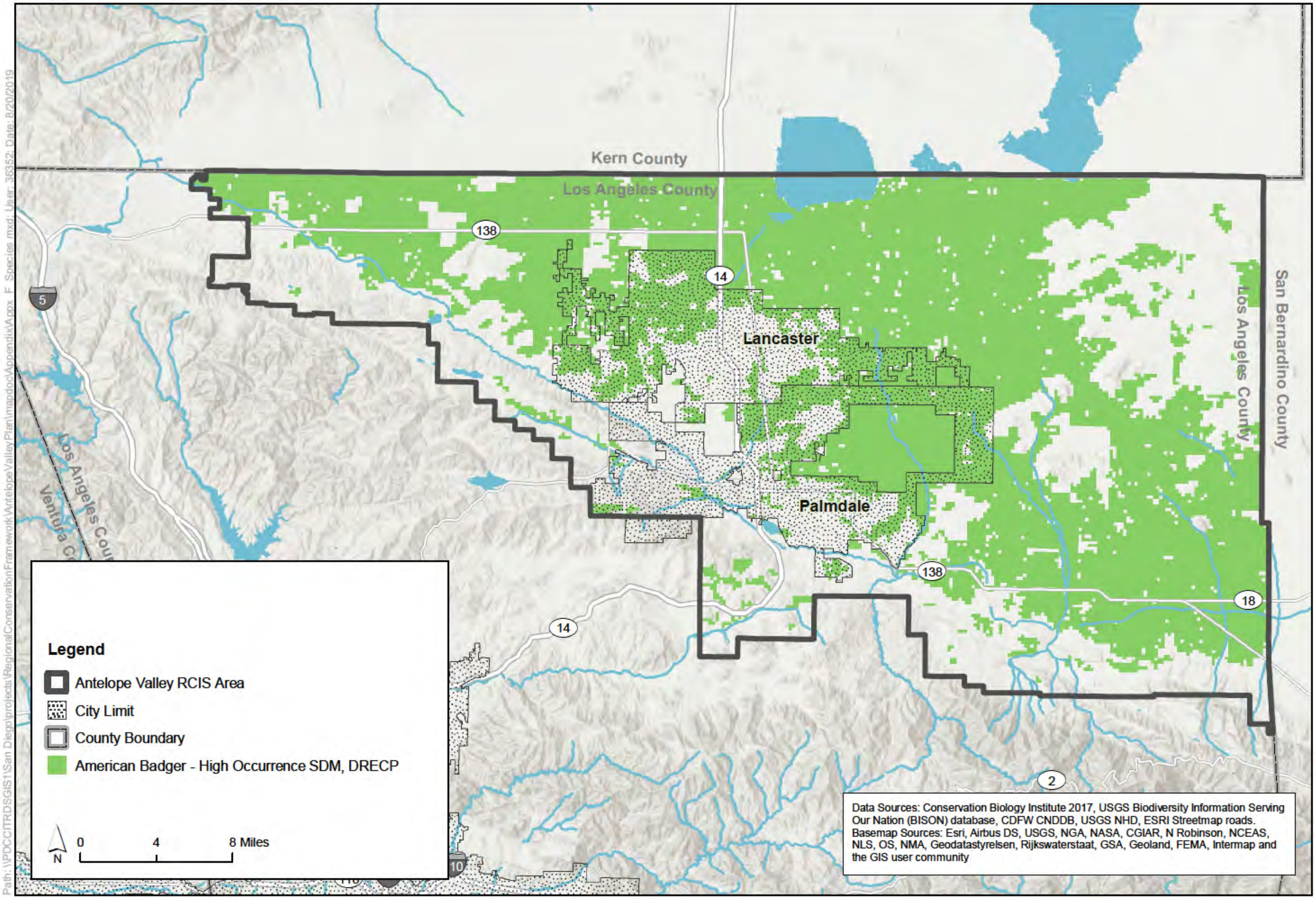


**Figure F-23**
**American Badger Predicted Habitat Distribution in the RCIS Area**

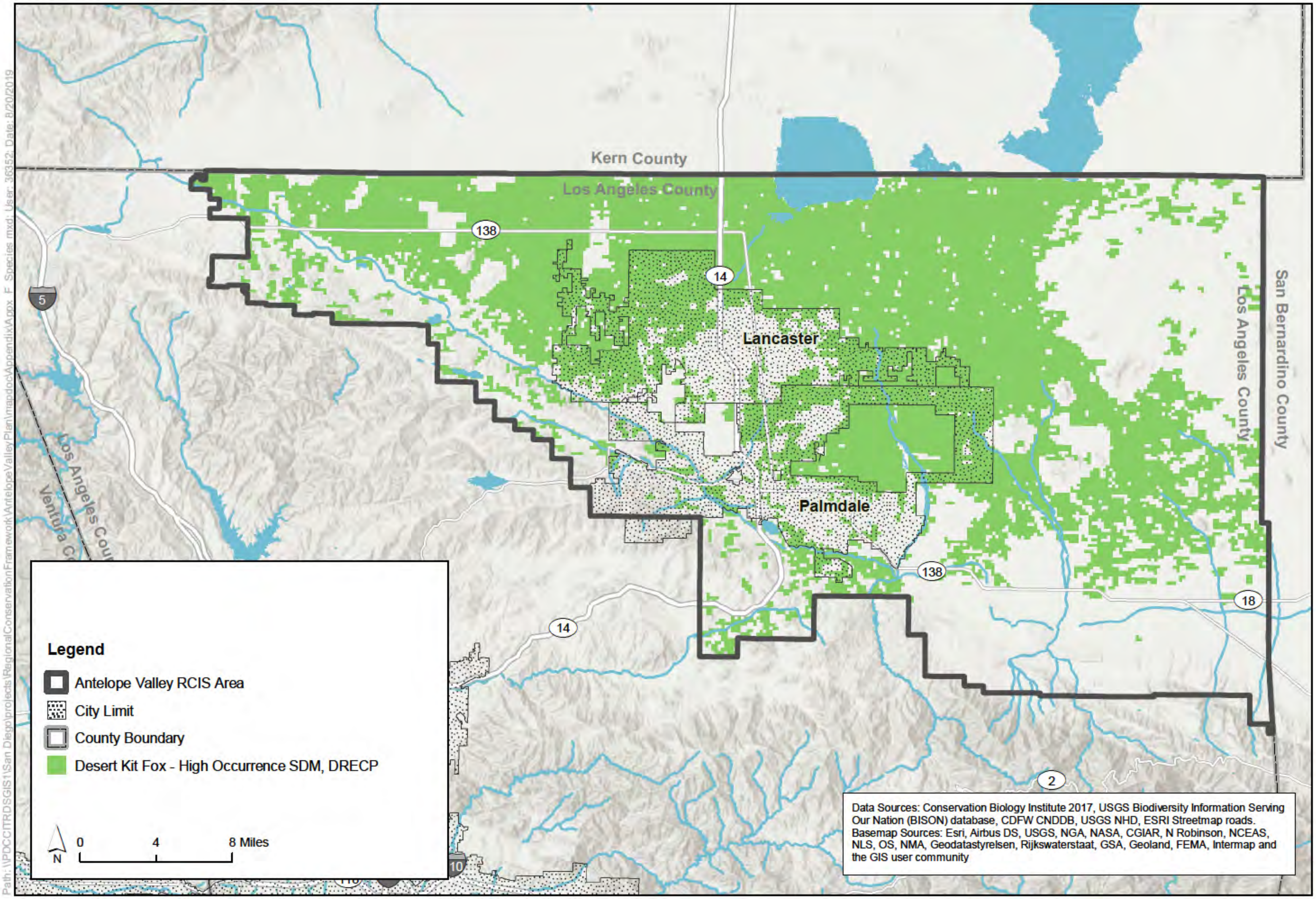


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**Figure F-24**
**Desert Kit Fox Predicted Habitat Distribution in the RCIS Area**

Path: \\PDCCITRDSGIS1\San Diego\projects\RegionalConservationFramework\AntelopeValleyPlan\mapdocs\Appendix\Appx_F_Species.mxd; User: 36352; Date: 8/20/2019

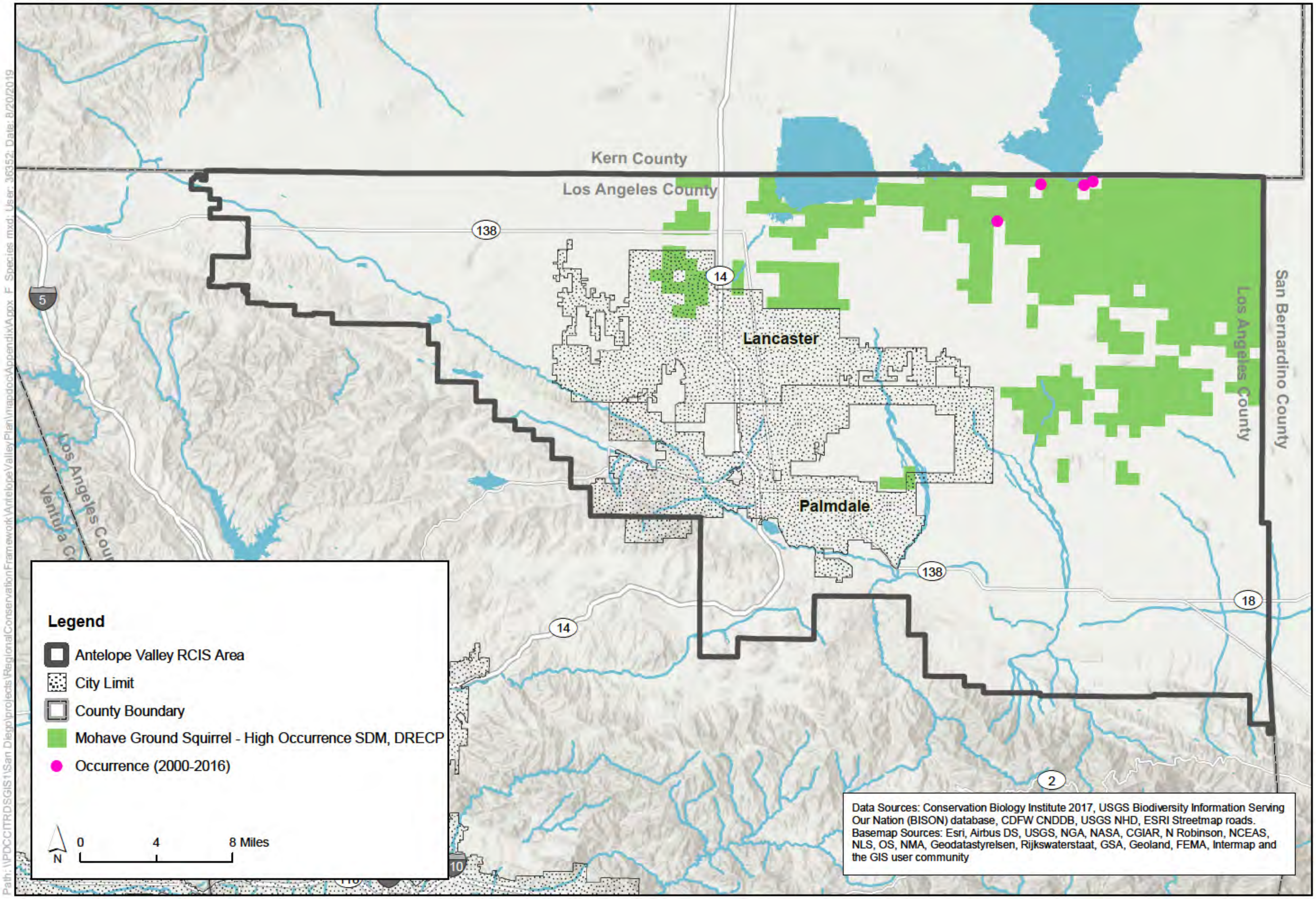


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**Figure F-25**
**Mohave Ground Squirrel Predicted Habitat Distribution in the RCIS Area**

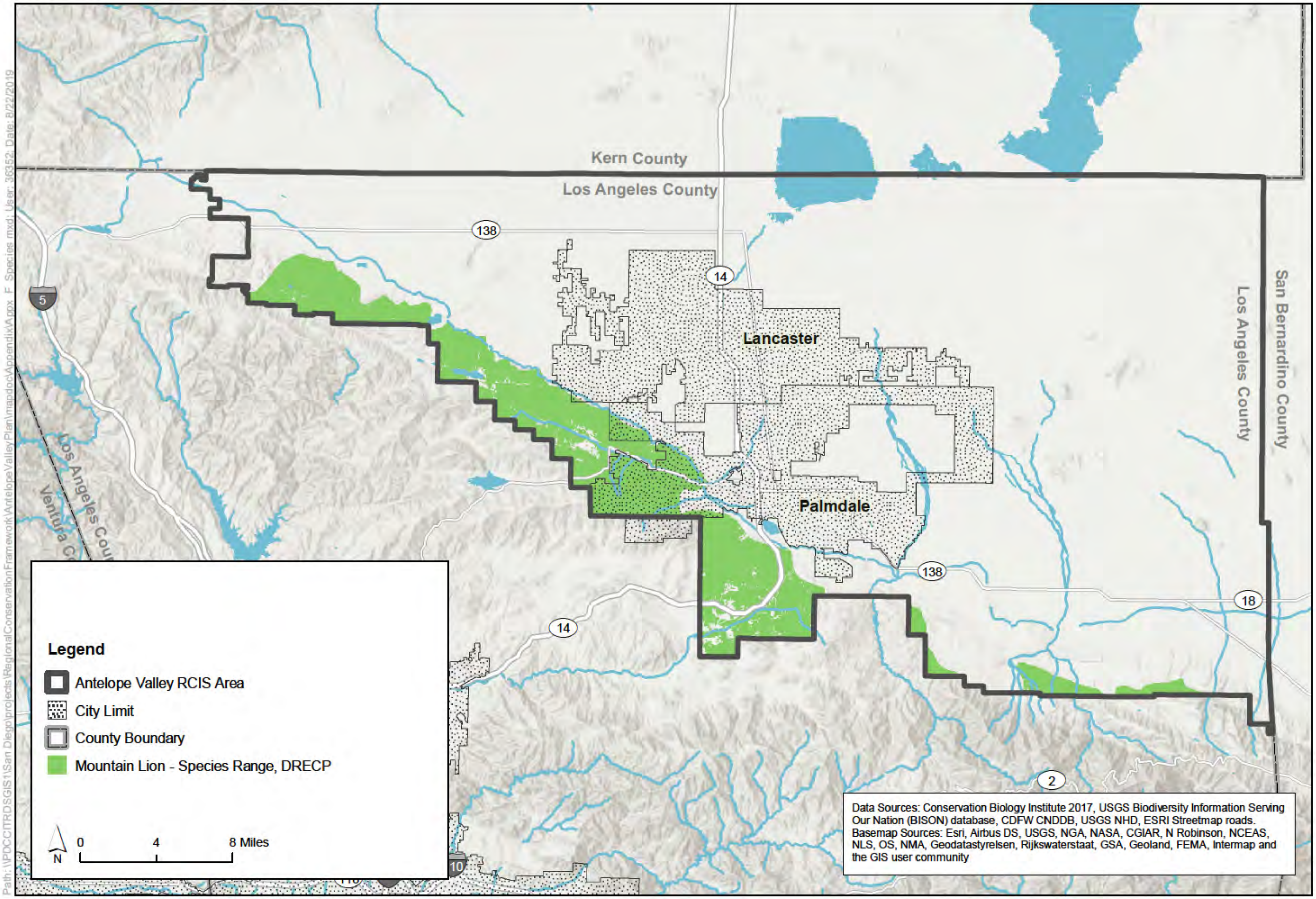


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**Figure F-26**
**Mountain Lion Predicted Habitat Distribution in the RCIS Area**

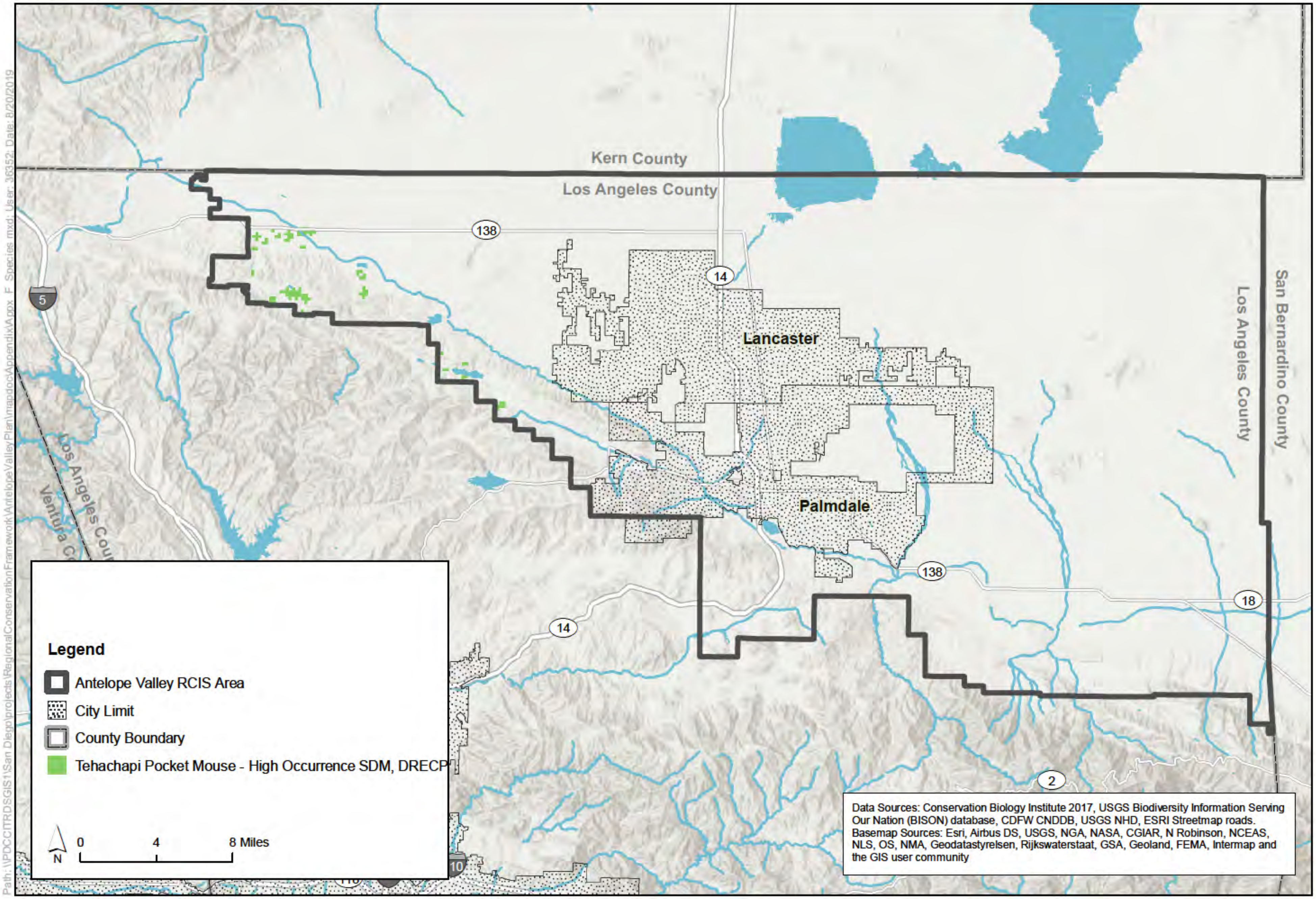


**Figure F-27**
**Tehachapi Pocket Mouse Predicted Habitat Distribution in the RCIS Area**

Appendix G

# Modeling Methodology

# Appendix G
# **Modeling Methodology**

The following sections describe the methodology of the spatial modeling conducted to inform the Antelope Valley Regional Conservation Investment Strategy. This modeling is explained in the following sections:

1. Species Distribution Models
2. Environmental Evaluation Modeling System
3. Terrestrial Landscape Intactness
4. Biological Value
5. Species Distribution Models

Table G-1 provides a summary of the species distribution models used for the Antelope Valley RCIS. The table notes provide source data for existing models used in the RCIS. Models developed as part of this RCIS are described in the sections below the table.

**Table G-1. Species Distribution Models for 24 Focal Species**

| Species | Model Type | Source |
|---|---|---|
| Alkali mariposa-lily<br>*Calochortus striatus* | Statistical | UCSB 2013 |
| American badger<br>*Taxidea taxus* | Statistical | UCSB 2013 |
| Burrowing owl<br>*Athene cunicularia hypugea* | Statistical | UCSB 2013 |
| California condor<br>*Gymnogyps californianus* | Expert | D’Elia et al. 2015 |
| California juniper<br>*Juniperus californica* | Mapped | CDFW 2013 |
| Coast horned lizard<br>*Phrynosoma blainvillii* | Statistical | UCSB 2013 |
| Desert horned lizard<br>*Phrynosoma platyrhinos calidiarum* | Statistical | CBI 2017 |
| Desert kit fox<br>*Vulpes macrotis arsipus* | Statistical | CBI 2017 |
| Desert tortoise<br>*Gopherus agassizii* | Statistical | Nussear et. al. 2009 |
| Golden eagle<br>*Aquila chrysaetos* | Expert | CBI 2017 |
| Joshua tree<br>*Yucca brevifolia* | Mapped | CDFW 2013 |
| Le Conte’s thrasher<br>*Toxostoma lecontei* | Statistical | UCSB 2013 |
| Least Bell’s vireo<br>*Vireo bellii pusillus* | Statistical | UCSB 2013 |

| Species | Model Type | Source |
|---|---|---|
| Loggerhead shrike *Lanius ludovicianus* | Statistical | UCSB 2013 |
| Long-billed curlew *Numenius americanus* | Statistical | CBI 2017 |
| Mohave ground squirrel *Spermophilus [Xerospermophilus] mohavensis* | Statistical | Inman et al. 2013 |
| Mountain lion *Felis concolor* | Expert | CDFG 2006 |
| Mountain plover *Charadrius montanus* | Expert | Dudek 2013 |
| Northern harrier *Circus cyaneus* | Statistical | Point Blue 2016 |
| Prairie falcon *Falco mexicanus* | Statistical | UCSB 2013 |
| Short-joint beavertail *Opuntia basilaris* var. *brachycladum* | Expert | CBI 2017 |
| Spreading navarretia *Navarretia fossalis* | Occurrence data only[1] | CNDDB 2016 |
| Swainson's hawk *Buteo swainsoni* | Expert | CBI 2017 |
| Tricolored blackbird *Agelaius tricolor* | Statistical | UCSB 2013 |
| Western pond turtle *Actinemys marmorata* | Occurrence data only[1] | CNDDB 2016 |
| Willow flycatcher *Empidonax traillii* | Statistical | UCSB 2013 |

[1] Two focal species, western pond turtle and spreading navarretia, lacked enough occurrence data to create species distribution models; therefore, evaluation of the species in the RCIS is based on occurrence data only.

Species distribution models for desert kit fox, desert horned lizard, and long-billed curlew in the Antelope Valley/West Mojave Desert were created with methods and data consistent with those used for models created by CBI for the DRECP in 2013.

The distribution program MaxEnt (Version 3.3.3k; Phillips et al. 2006) was used to estimate the relative habitat suitability for a species as a function of environmental predictor variables and observation records at 270m resolution. Observation records were obtained from Biodiversity Information Serving Our Nation (BISON)[1],and thinned so that no more than one occurred per 270m grid cell. Environmental predictor layers were provided to CBI by Frank Davis' Biogeography Lab at UC Santa Barbara, created for the CA Energy Commission's project "Cumulative Biological Impacts Framework for Solar Energy in the CA Desert."

We selected relevant predictors for each species from the following variables:

- WHR habitat rating: focal mean (25 m grid) of arithmetic mean of WHR ratings for cover, feeding, and reproduction calculated for area approximating the minimum habitat patch, nesting home range, or activity area for the species based on DRECP species biology notes and other sources. The resulting grid to be re-aggregated to 270m based on the median of cell scores in the block.

[1] http://bison.usgs.ornl.gov, 2016-08-1

- Integrated solar radiation (WH/m2, ESRI Spatial Analyst Area Solar Radiation). Derived from the interior of 30m NED DEM tiles buffered to 300m. Integrated from 2012-02-29 to 2012-05-30. Average integrated value in each 270m pixel.
- Topographic relief in the 270m cell estimated as the standard deviation of elevations from 30m digital elevation model.
- Soil thickness, produced by A. &. L. Flint.
- Soil water content at wilting point, produced by A. & L. Flint.
- Soil porosity, produced by A. & L. Flint.
- Soil available water storage (cm) from 0–50cm, derived from SSURGO or STATSGO where SSURGO was unavailable (The mapunit-area-weighted average of aws050wta in table muaggatt was used.)
- Soil field capacity (Mpa), produced by A. & L. Flint, derived from SSURGO or STATSGO where SSURGO was unavailable
- Soil pH (pH scale) from 0–50cm, derived from SSURGO or STATSGO where SSURGO was unavailable. The mapunit area weighted average of the soil component percent area weighted average of the soil component horizon depth weighted average of ph1to1h2o_r in table chorizon.
- Flow accumulation (ESRI Spatial Analyst Flow Accumulation), calculated from 90m HydroSHEDS flow direction rasters; 90m model data were log(x+1) transformed. We used the maximum of the transformed values in each 270m pixel.
- Perennial water features, as indicated by the USGS NHD feature codes 39004, 39009, 39010, 39011, 39012, 45800, 46006, and 46602. Categorical presence/absence, indicating the presence of any perennial water feature within each 270m pixel.
- Minimum temperature of coldest period (°C x 10)
- Maximum temperature of warmest period (°C x 10)
- Growing degree days above 5°C
- Temperature seasonality (C of V, x 100)
- Precipitation of warmest quarter (mm)
- Annual precipitation (mm)
- Aridity Index (FAO definition: annual precipitation (mm)/ potential evapotranspiration (mm/annual) x 100)

We used a step-wise variable elimination process to select the best fitting model for each species. We first removed correlated predictors, retaining the predictor with the highest mean permutation importance. We next removed any predictors with permutation importance < 1, and finally any predictors with permutation importance < 5. We selected the model with the highest cross-validated AUC (area under the curve).

MaxEnt was run using default feature types and 10-fold cross-validation. Models were calibrated within species-specific limited extents within the Mojave Desert ecoregion section, and then projected across the entire Mojave Desert ecoregion section. Areas outside the limited calibration extent should be interpreted with more caution.

Binary layers depicting predicted suitable habitat for each species were created using the MaxEnt maximum training sensitivity and specificity threshold.

The base or "current conditions" distribution model was created using climate data from 1981-2010. We also projected each species' selected model with climate futures data (Flint and Flint 2012 data used by F. Davis for DRECP). Species distributions were forecasted for the period 2040–2069 based on "business-as-usual" emission scenarios ($5^{th}$ assessment Coupled Model Intercomparison Project (CMIP5) rcp 8.5) and statistically downscaled outputs of three different global climate models: the Community Climate System Model (LBC_CCSM_binary), the Flexible Global Ocean-Atmosphere-Land System model (LBC_FGOALS_binary), and the Pierre Simon Laplace Institute (LBC_IPSL_binary). Areas with clamping values > 0 indicate areas of increased uncertainty; where variable values fall outside their training ranges and are likely to influence predicted suitability.

The desert kit fox model was calibrated within a 30 km buffer around 33 detection points from 1885 on. Historic detections intersecting currently developed land uses were removed. The final model was built with the following 4 environmental predictors in order of importance: topographic relief, precipitation of the warmest quarter, integrated solar radiation, and soil available water storage. This model had a 10-fold cross-validated test AUC score of 0.698 (standard deviation 0.119).

The desert horned lizard model was calibrated within ecoregion subsections containing 48 detection points from 1891 on. Historic detections intersecting currently developed land uses were removed. The final model was built with the following nine environmental predictors in order of importance: 1) topographic relief; 2) minimum temperature of coldest period; 3) annual precipitation; 4) distance to sand dunes; 5) soil porosity; 6) precipitation of the warmest quarter; 7) flow accumulation; 8) integrated solar radiation; and 9) soil field capacity. This model had a 10-fold cross-validated test AUC score of 0.648 (standard deviation 0.117).

The long-billed curlew model was calibrated within ecoregion subsections containing 86 detection points from 1990 on. The final model was built with the following six environmental predictors in order of importance: 1) distance to perennial water features; 2) topographic relief; 3) precipitation of the warmest quarter; 4) minimum temperature of coldest period; 5) soil field capacity; and 6) soil thickness. This model had a 10-fold cross-validated test AUC score of 0.917 (standard deviation 0.038).

# Constraining, Masking, and Adding Climate-based Range Expansion and Stable Areas to SDMs

## Threshold SDMs

Areas of highest species' probability of occurrence (SDM constrained threshold) folder: https://databasin.org/groups/d922a65dec404217b356562a4a31665c/content#expand=127714%2C127969.

We used the continuous values and the Maximum Sensitivity and Specificity (MSS) value to threshold the layer showing predicted distributions. From here, we took values higher than the MSS threshold and classified them into two classes, which divided the total predicted area into two equal areas. The higher valued class was used to identify areas with a higher probability as compared to the MSS value.

We applied a mask to remove urban, playas, disturbed areas, solar footprints, and the Salton Sea. This dataset has been simplified by removing small polygons.

# EEMS Logic Modeling

The Biological Values and Terrestrial Landscape Intactness Models for the AV RCIS were created using EEMS (Environmental Evaluation Modeling System) software. EEMS, which is an open-source analytical package developed by the Conservation Biology Institute, uses a logic modeling tree-based framework to address complex, mappable concepts that include disparate spatial datasets (Sheehan and Gough 2016). EEMS is an open source alternative to EMDS (Ecosystem Management Decision Support) software package (Reynolds 1999, Reynolds 2001).

With EEMS, spatial data from different sources and different numerical domains can be combined to answer complex questions concerning a landscape's conservation value, its ecological condition, or its vulnerability to climate change. Unlike conventional GIS applications that use Boolean logic (1s and 0s) or scored input layers, logic models rely on fuzzy logic. Simply put, fuzzy logic allows the user to assign shades of gray to thoughts and ideas, rather than restricting one to completely black (false) and white (true) determinations (Figure G-1). All data inputs (regardless of the type—ordinal, nominal, or continuous) are assigned relative values between -1 (false) and +1 (true) up to six decimal places.

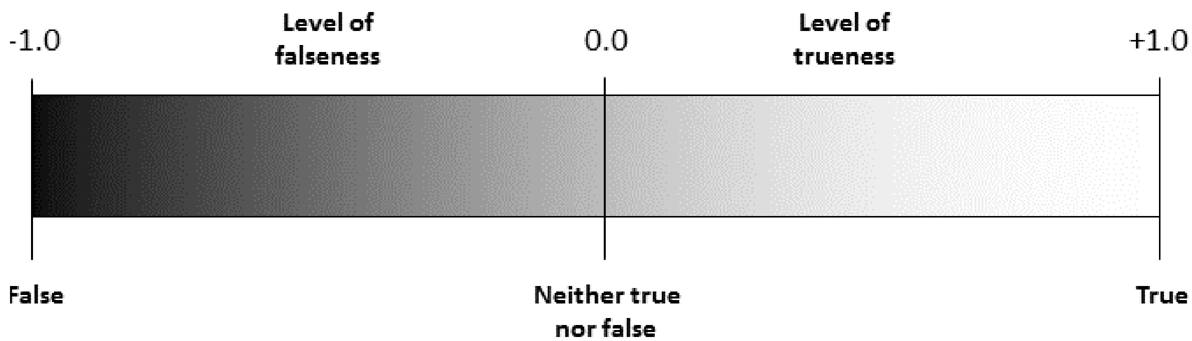


**Figure G-1. Basic Diagram Showing a Typical Fuzzy Logic Truth Continuum Used for Each Input in an EEMS Model**

The many advantages of this approach include: (1) the model is based on a normalized continuum of inputs that allows for greater realism; (2) the model is highly transparent and its process is easy to visualize; (3) the multiple map products (final and intermediate layers) generated provide greater value over single-map modeling methods; (4) the model can be easily edited to test different assumptions; (5) the model can be easily updated as new data become available; and (6) future scenarios can be tested with forecast data.

A tree-based model is constructed starting with any number of spatial data input layers that form the foundation of the model (Figure G-2). The logic of answering a question depends upon a number of design features: (1) location and arrangement of the various inputs (inputs higher up the tree diagram demonstrate greater influence on the final outcome); (2) fuzzy thresholds set for each input; (3) logic operator chosen at each node (blue dots) that directs the model how to treat the inputs below it; and (4) weighting of some inputs if desired.

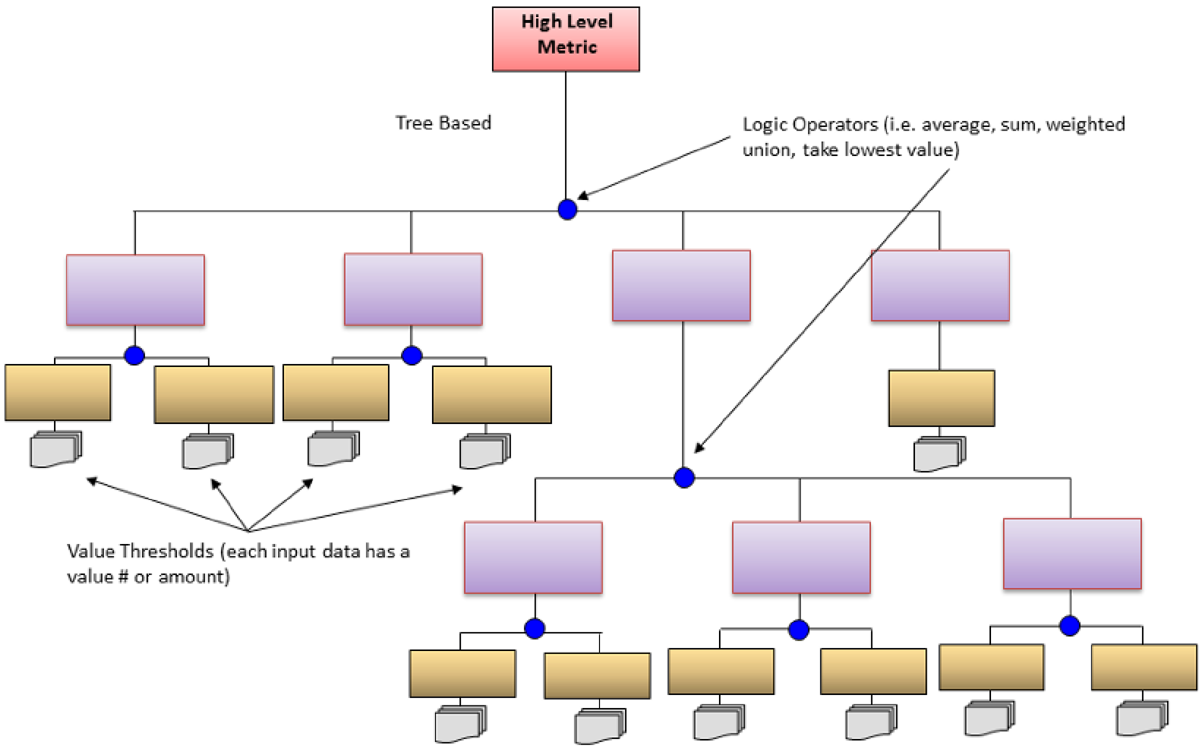


**Figure G-2. Basic EEMS Tree-based Diagram Showing the layout of the Main Question Being Addressed (red box), Intermediate Map Results (purple boxes), Normalized Inputs (gold boxes), and Raw Spatial Inputs (gray folders)**

## The Modeling Process

There were four phases to the conservation value modeling process: 1) Preprocess Data; 2) Prepare Inputs; 3) Summarize by Reporting Unit; and 4) EEMS Logic Model Execution. These phases were carried out using ArcGIS and a set of models developed in Model Builder in conjunction with custom Python scripts. Table G-2 provides an overview of the functions of each phase.

**Table G-2. Steps Used in the EEMS Modeling Process**

| Steps/Phase | Model Overview |
|---|---|
| Preprocess Data | Clips all input datasets to the study area and projects data to UTM Zone 11N NAD83. |
| Prepare Inputs | Aggregates datasets from multiple sources as needed, and select and isolate features of interest. |
| Summarize by Reporting Unit | Calculates a count or density value for all components of the EEMS model. Appends counts and values from separate datasets to the reporting unit dataset. |
| EEMS Logic Model Execution | Applies fuzzy logic based on the structure within the EEMS model framework. Calculates results based on input data, operators used, thresholds, and weightings applied. |

## Logic Modeling Thresholds and Operators

During the last phase of the modeling process, logic model performance is achieved in several ways. For each model component, the user determines how to assign the range of values along a truth continuum when converting to fuzzy space. See the details on input thresholds for the Biological Value Models and Terrestrial Landscape Intactness Model in the designated sections below.

As part of the model construction, a series of logic operators are used on the raw inputs or on the fuzzy results to control how to integrate the inputs to answer a question. The current list of possible EEMS logic operators is provided in Table G-3. These logic operators provide the necessary instructions about how to treat the various inputs as the model runs from the bottom of the tree-based design to the top.

**Table G-3. Logic Operators Available in the EEMS Software Package**

| Operator | Input Data | Description |
|---|---|---|
| AND | Fuzzy | Finds the EMDS AND value of the inputs (maximum value). The formula is min + [(mean–min) * (min + 1) / 2] |
| CONVERT TO FUZZY | Raw | Converts a field's values into fuzzy values. |
| DIFFERENCE | Raw | Computes the difference sum for each row of the inputs. |
| MAX | Raw | Finds the maximum for each row of the input fields. |
| MEAN | Raw | Finds the mean for each row of the input fields. |
| MIN | Raw | Finds the minimum for each row of the input fields. |
| NOT | Fuzzy | Reverses the sign of values of the input field. TRUEness and FALSEness are swapped. |
| OR | Fuzzy | Returns the TRUEest of the inputs. |
| ORNEG (NEGATIVE OR) | Fuzzy | Returns the FALSEest of the inputs values. |
| SELECTED UNION | Fuzzy | Finds the union (mean) of the specified number of TRUEest or FALSEest inputs. |
| SUM | Raw | Arithmetic addition of two or more inputs. |
| UNION | Fuzzy | Returns the mean of the inputs. |
| WEIGHTED AND | Fuzzy | Finds the weighted EMDS AND value of the inputs (maximum value). The formula is min + [(mean–min) * (min + 1) / 2] where the mean is weighted. |
| WEIGHTED MEAN | Fuzzy | Finds the weighted mean for each row of the input fields. |
| WEIGHTED SUM | Fuzzy | Finds the weighted sum for each row of the input fields. Multiplies each field by its weight before adding. Like a weighted mean without the division. |
| WEIGHTED UNION | Fuzzy | Finds the weighted union (mean) for each row of the input fields. |
| XOR | Fuzzy | Finds the fuzzy EXCLUSIVE OR value of the inputs by comparing the two truest values. If both are fully true or fully false, false is returned. Otherwise it applies the formula: (truest value–second truest value) / (full true–full false) |

# Antelope Valley RCIS: Terrestrial Landscape Intactness

*Intactness*, an estimate of naturalness, is based on the level of human disturbance for an area, quantified by available spatial data. Terrestrial intactness is high in places where anthropogenic impacts, such as urban development and natural resource extraction, are low, and native vegetation fragmentation is low.

The term *terrestrial intactness*, which is used as a quantifiable state descriptor, has been largely applied to forested landscapes (Lee et al. 2002; Heilman et al. 2002; Strittholt et al. 2006; Potapov et al. 2008), but many of the same principles apply to any natural landscape, including desert ecosystems. The state (or condition) of the natural ecosystem may be viewed and quantified as the ecological stage upon which the actors (species) and the play itself (ecological processes) are carried out over time. Intactness considers an assemblage of spatially explicit indicators that helps define the condition of the natural landscape. Different species may possess different tolerances to these conditions, but natural assemblages of species and natural patterns and processes are increasingly compromised as human influences intensify.

For this study, a terrestrial intactness model was created at the $1km^2$ level to use as a foundation against which the ecological condition of species' habitats and areas planned for development can be quantitatively evaluated. The Antelope Valley RCIS study area boundary was used to clip out the results for this statewide product (Figure G-3). The logic model constructed that generated the current statewide result is provided in Figure G-4.

The model contains three main components, including 1) Level of Human Development; 2) Vegetation State Condition; and 3) Natural Landscape Fragmentation. Thirty-four different spatial data layer inputs from various authoritative sources were included in the EEMS model, which are listed and described in the Data Source section below. Fuzzy logic thresholds for the main model components are provided in Table G-4. Logic operators used to manage the various inputs are indicated on the model diagram at each node. Note: Inputs for the fragmentation component were generated using FRAGSTATS (McGarigal and Marks 1995) and three outputs—1) number of patches; 2) mean nearest neighbor; and 3) percent natural core area—were included as the terrestrial landscape intactness EEMS model. This most recent version of this model (December 2016) addresses the over-estimation of fragmentation impacts that were seen in previous versions, which stemmed from the treatment of invasive vegetation and fire effects in the FRAGSTATS geoprocessing. New fragmentation metrics shift focus to anthropogenic development. Invasive vegetation is also now compartmentalized within the logic model, which influences the condition score to a lesser extent.

The input data, intermediate layers, and final results of this analysis can be explored via the EEMS Explorer of Data Basin[2], where they are accessible as online interactive maps showing the signature of human impact across the landscape.[3]

[2] http://databasin.org

[3] https://databasin.org/datasets/e3ee00e8d94a4de58082fdbc91248a65

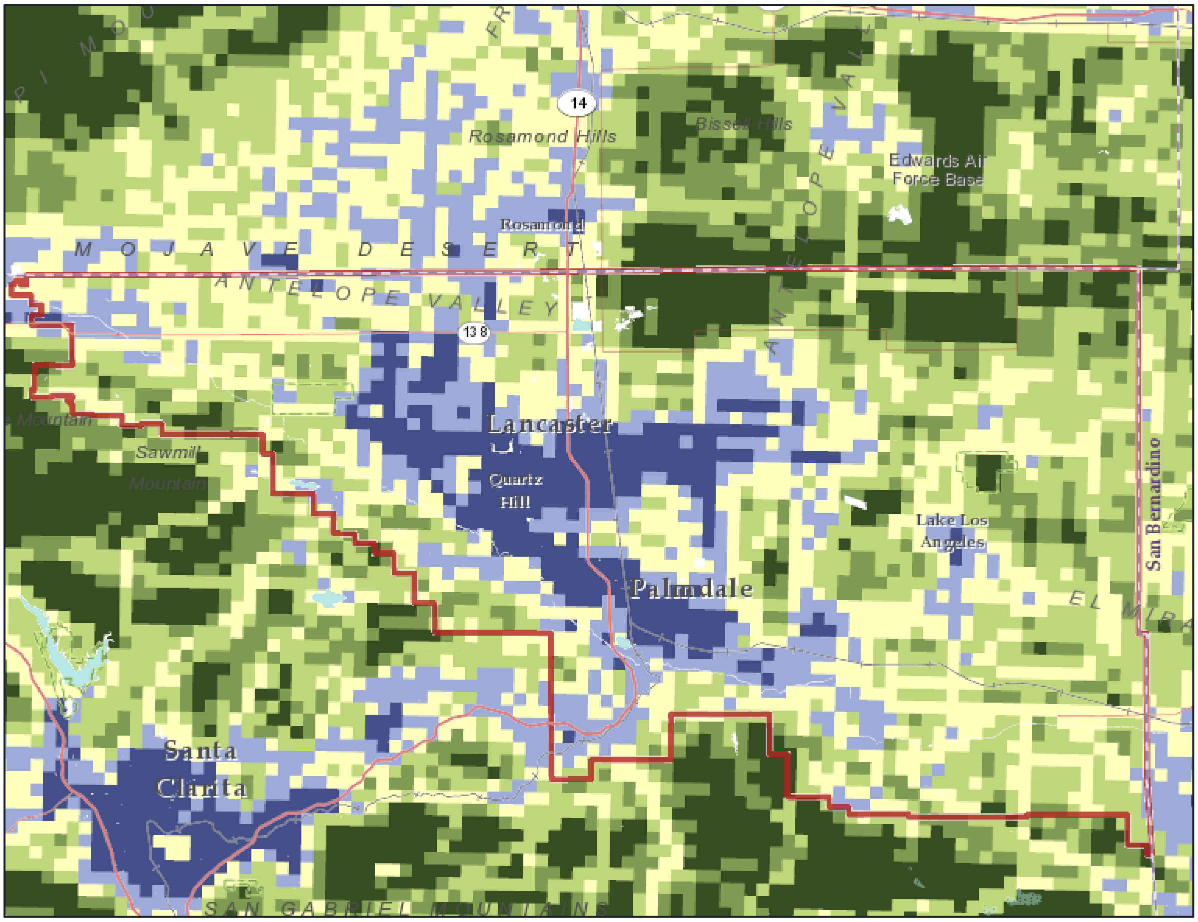


**Figure G-3. Terrestrial Landscape Intactness (Dec 2016) Results for the Antelope Valley RCIS Area and Surrounding Region**

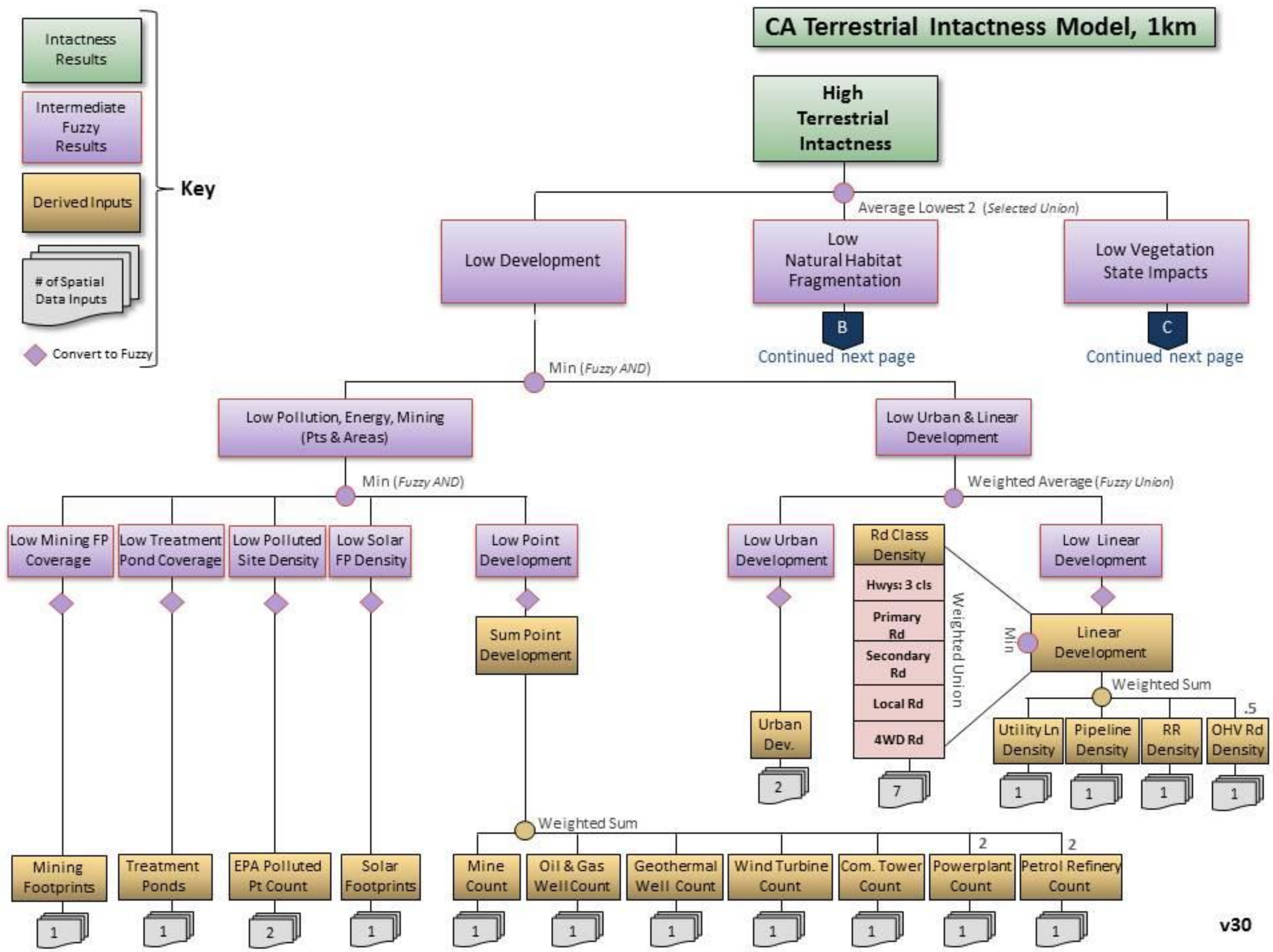


**Figure G-4. Logic Model for Terrestrial Landscape Intactness (v30) for California (page 1 of 2)**

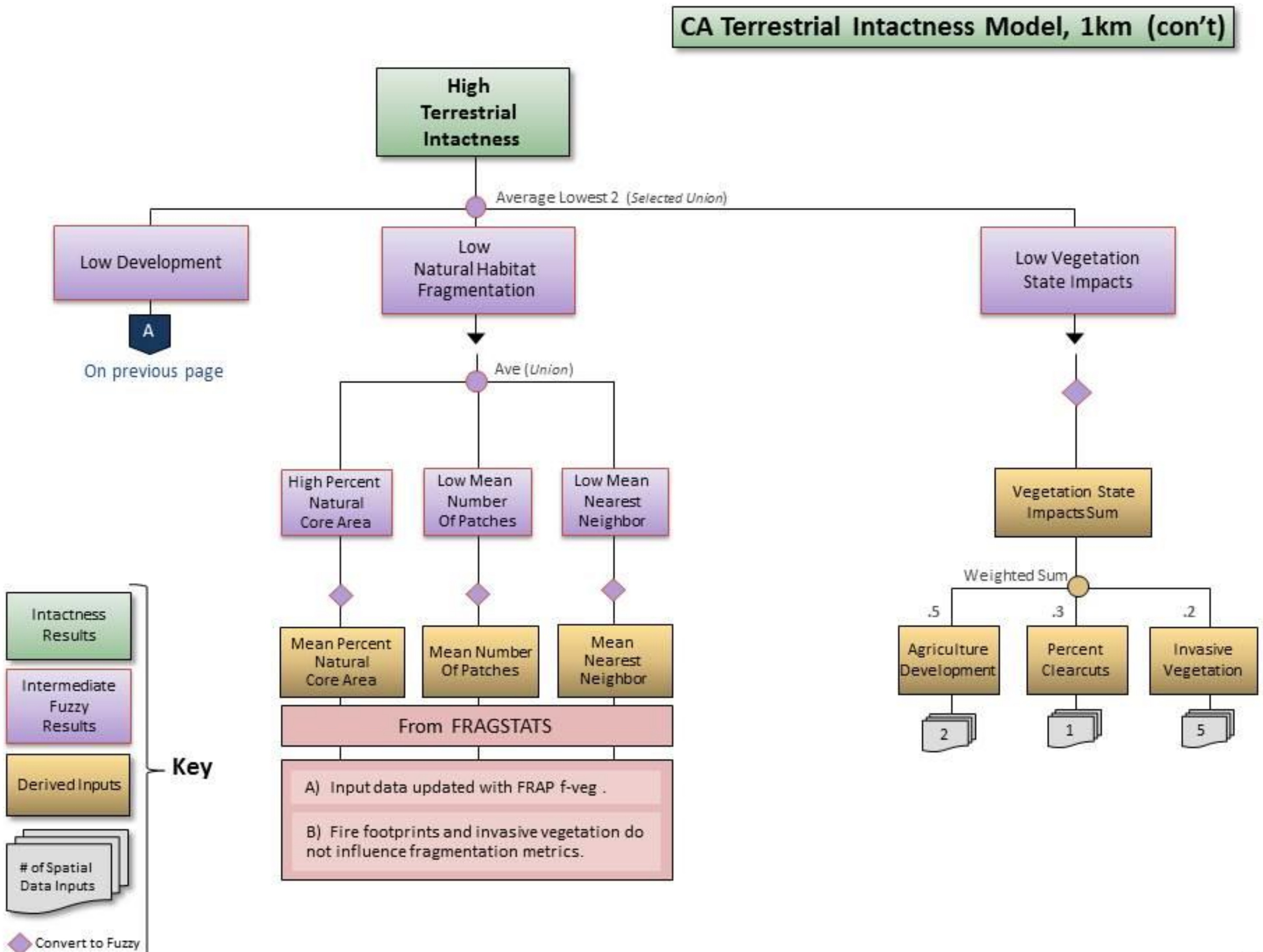


**Figure G-4. Logic Model for Terrestrial Landscape Intactness (v30) for California (page 2 of 2)**

**Table G-4. List of Fuzzy Logic Data Inputs for the California Terrestrial Landscape Intactness Model (v30), Showing Data Type, Range of Values, and True and False Modeling Thresholds for each Item at 1 km$^2$ Resolution**

| Input | Range | Mean | Standard Deviation | Data Type | 1 km True Threshold | 1 km False Threshold |
|---|---|---|---|---|---|---|
| Urban Development | 0–100 | 10.5 | 21.0 | Percent Cover | 0 | 20[2] |
| *Linear Road Class Development (km/km$^2$) | 0–724.0 | 4.5 | 10.1 | Density | 0 | 10[3,2] |
| *Other (non-Rd Class) Linear Development (km/km$^2$) | 0–42.4 | 0.3 | 0.7 | Density | 0 | 4[3,2] |
| Energy & Mining Point Development (pts/km$^2$) | 0–1,062 | 0.6 | 8.8 | Count | 0 | 12[2] |
| Polluted Sites (pts/km$^2$) | 0–72 | 0.004 | 0.2 | Count | 0 | 2[2] |
| Treatment Pond Polygons | 0–100 | 0.04 | 1.7 | Percent Cover | 0 | 80[2] |
| Large Mine Footprints | 0–100 | 0.06 | 2.0 | Percent Cover | 0 | 70[2] |
| Large Solar Footprints | 0–100 | 0.05 | 1.6 | Percent Cover | 0 | 70[2] |
| Number of Patches | 1–416 | 20.7 | 29.3 | Count | 0 | 50[2] |
| Mean Nearest Neighbor (m) | 60–3,903 | 82.6 | 116.0 | Distance | 59 | 90[2] |
| Percent Natural Core Area | 0–90 | 47.8 | 28.8 | Percent Cover | 90 | 0[2] |
| Vegetation State Impacts | 0–70 | 7.6 | 14.8 | Percent Cover | 0 | 70[1] |

1. Used full range or full range with outliers ignored
2. Expert opinion/heuristics, guided by statistical distribution of the data
3. Taken from the literature

# Terrestrial Landscape Intactness Source Data

Data used as input to the terrestrial intactness model were acquired from multiple sources. Data were downloaded directly from the source, acquired from partner agencies, or created by analysts at CBI. Table G-5 lists all the input data used in the analysis, as well as data type and originator.

It was often necessary to compare several datasets for a particular theme to determine those that were most appropriate for the modeling effort. Consequently, many more datasets were prescreened and evaluated than were actually used in the modeling. Several datasets were provided either without metadata or limited amounts of metadata. In these cases, the data were either not used or efforts were made to contact the data originators in order to obtain information about the data. In total, 34 data layers were used to generate the final results.

The input data used to create this version range in currency from 2011–2015; the majority of data portray the more recent condition of the landscape.

The model integrates agriculture development (from FRAP Vegetation FVEG and CDL Cropscape), urban development (from LANDFIRE EVT and NLCD Impervious Surfaces), polluted areas (from NHD treatment ponds and EPA Superfund and Brownfield sites), linear development (OHV routes from owlsheadgps.com, roads from TIGER (broken down by type), utility lines, railroads, and pipelines (from various state and BLM sources), point development (communication towers from the FCC), energy and mining development (from the state's Office of Mine Reclamation mine dataset, larger mine footprints, state geothermal wells, USGS wind turbines, solar footprints, renewable projects in development, oil refineries and state oil/gas wells), clear cuts (from Statewide Timber Harvest Plans), invasive vegetation (compiled from multiple sources including LANDFIRE EVT, NatureServe Landcover, and NISIMS BLM database), and measures of natural vegetation fragmentation calculated using FRAGSTATS analysis of FRAP Vegetation FVEG and built features described above (percent natural core area, number of patches, and nearest neighbor). Terrestrial landscape intactness results are dependent on the quality of available input data for a given area.

**Table G-5. Source Data Inputs for the Terrestrial Landscape Intactness Model**

| Input | Data Type | Originator |
|---|---|---|
| Cropland Data Layer (CDL), Cropscape 2014 | Raster | USDA National Agricultural Statistics Service |
| FRAP Vegetation (FVEG), 2015 | Raster | CAL FIRE |
| Impervious Surfaces, National Landcover Dataset (NLDC) 2011 | Raster | U.S. Geological Survey (USGS) |
| LANDFIRE Existing Vegetation Type (EVT) v1.3 | Raster | LANDFIRE |
| LANDFIRE Vegetation Departure (VDEP) v1.3 | Raster | LANDFIRE |
| LANDFIRE Succession Class (SCLASS) v1.2 | Raster | LANDFIRE |
| NatureServe Landcover (Terrestrial Ecological Systems) v3 | Raster | NatureServe |
| Forest Practice GIS Timber Harvest Plan Clearcuts, 2000–2016 | Polygon | California Department of Forestry and Fire Protection (CAL FIRE) |
| Modeled Tamarisk Coverage | Raster | Catherine Jarnevich et al. |
| Modeled Sahara Mustard Coverage | Raster | Conservation Biology Institute (CBI) |
| Tamarisk Lines | Line | TMAP, C. Jarnevich |
| Off-Highway Vehicle (OHV) Routes, 2015 | Line | Owlshead GPS |
| CA Solar Facility Footprints, 2015 | Polygon | Digitized from solar project maps and best available imagery by CBI |
| 2015 Tiger Roads[1] | Line | U.S. Census Bureau TIGER database |
| CA Electric Transmission Lines, 110-500 kV | Line | CEC, Scott Flint |
| CA Power Plants | Point | U.S. Energy Information Administration |
| California Rail Network | Line | CalTrans |
| CA Large Mine Footprints, 2015 | Polygon | Digitized from best available imagery by CBI |
| CA Mine Sites | Point | CA Office of Mine Reclamation |
| California Natural Gas Pipelines | Line | CEC, Scott Flint |
| CA Petroleum Refineries | Point | U.S. Energy Information Administration |

| Input | Data Type | Originator |
|---|---|---|
| California Oil and Gas Wells, 2016 | Point | CA Department of Conservation, Division of Oil, Gas and Geothermal Resources |
| FCC Communication Towers | Point | Federal Communications Commission, WFDSS |
| Onshore Industrial Wind Turbines, 2014 | Point | USGS |
| CA Geothermal Resources | Table | CA DOC, Division of Oil, Gas and Geothermal Resources |
| EPA, Brownfield Sites | Point | Environmental Protection Agency (EPA),Facility Registry System (FRS) |
| EPA, Superfund Sites | Point | Environmental Protection Agency (EPA),Facility Registry System (FRS) |
| National Hydrography Dataset, Treatment & Tailing Ponds | Polygon | USGS, High Resolution National Hydrography Dataset (NHD) |

[1.] The TIGER roads dataset was created by merging multiple county level datasets.

# Antelope Valley RCIS: Biological Value Models

Mapping High Biological Value Areas was achieved using EEMS modeling software and included four major inputs: 1) Focal Species Habitat (modeled species distributions); 2) Natural Communities; 3) Habitat Connectivity; and 4) Sensitive Species Occurrences. Separate EEMS models were constructed for each of the focal species major habitat groupings—1) foothills/riparian; 2) agriculture/grasslands; and 3) desert. Results from these models were later combined with the terrestrial landscape intactness results to determine overall conservation value and for defining conservation priority areas. The general logic model diagram for High Biological Value (Figure G-5) shows the relationship of the various inputs.

The species included in each of the three focal species models are presented in Table G-6. Note that some species were included in more than one major habitat grouping. Species distribution models for each focal species were added together (or *stacked*) before including the results into the EEMS Biological Value models (Figure G-6). These species stacks highlighted locations within the study area where higher concentrations of focal species are most likely to occur. The remaining three model components remained identical in each model.

**Table G-6. List of Focal Species Included**

| Foothills/Riparian[1] | Agriculture/Grasslands[2] | Desert[3] |
|---|---|---|
| • Beavertail cactus (short-joint)<br>• California condor<br>• California juniper<br>• Coast horned lizard<br>• Golden eagle<br>• Least Bell's vireo<br>• Mountain lion surrogate<br>• Tehachapi pocket mouse<br>• Southwestern willow flycatcher<br>• Swainson's hawk | • American badger<br>• Burrowing owl<br>• Desert kit fox<br>• Joshua tree<br>• Le Conte's thrasher<br>• Loggerhead shrike<br>• Long-billed curlew<br>• Mountain plover<br>• Northern harrier<br>• Prairie falcon<br>• Swainson's hawk<br>• Tricolored blackbird | • Alkali mariposa lily<br>• American badger<br>• Desert horned lizard<br>• Desert kit fox<br>• Desert tortoise<br>• Golden eagle<br>• Joshua tree<br>• Le Conte's thrasher<br>• Mohave ground squirrel |

https://databasin.org/datasets/721b5f19712542a192447aa9b09d12e1
https://databasin.org/datasets/d82f54b61ee446cc8a1b0d7ce5652165
https://databasin.org/datasets/07dd30314ada4478acc0767813bcb804

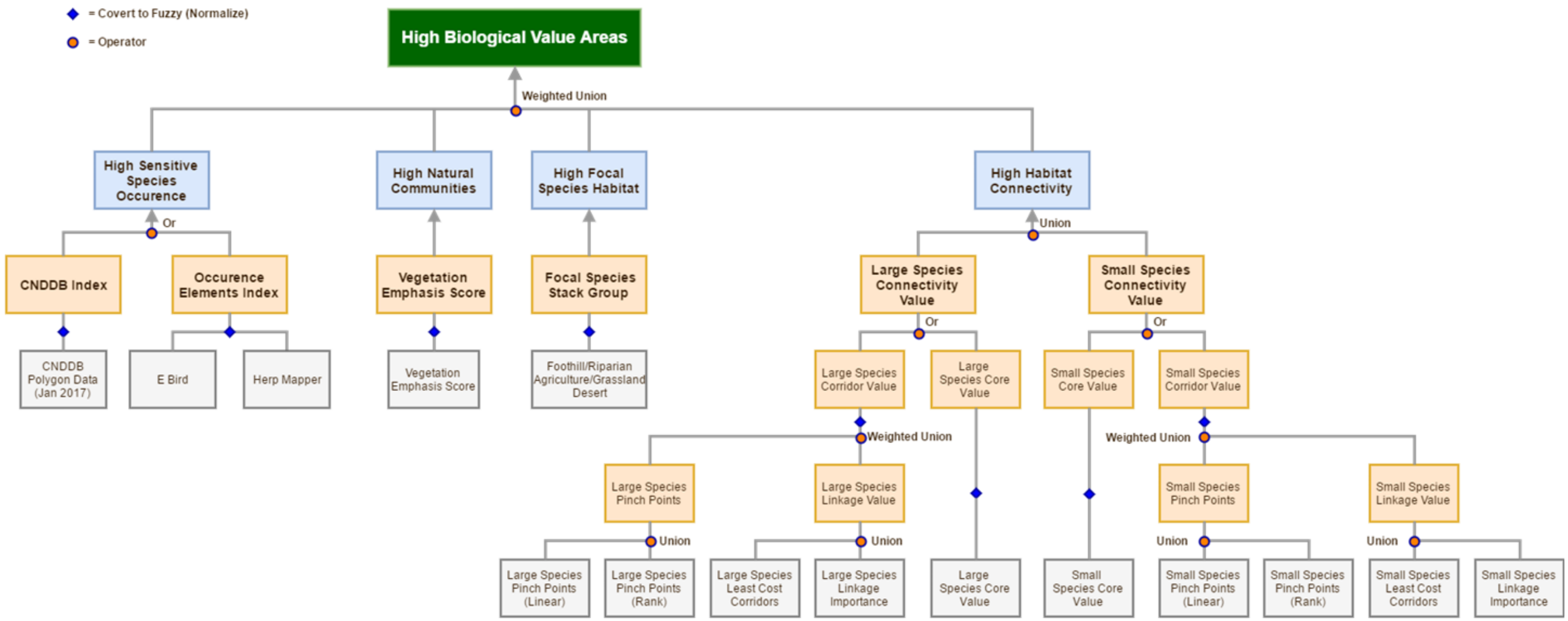


**Figure G-5. EEMS Logic Model Diagram for Biological Value for the AV RCIS. Input Spatial Data Layers in Gray Boxes; Normalized Inputs in Orange Boxes; High-level Intermediate Results in Blue Boxes; and the Biological Value Result in Green Box**

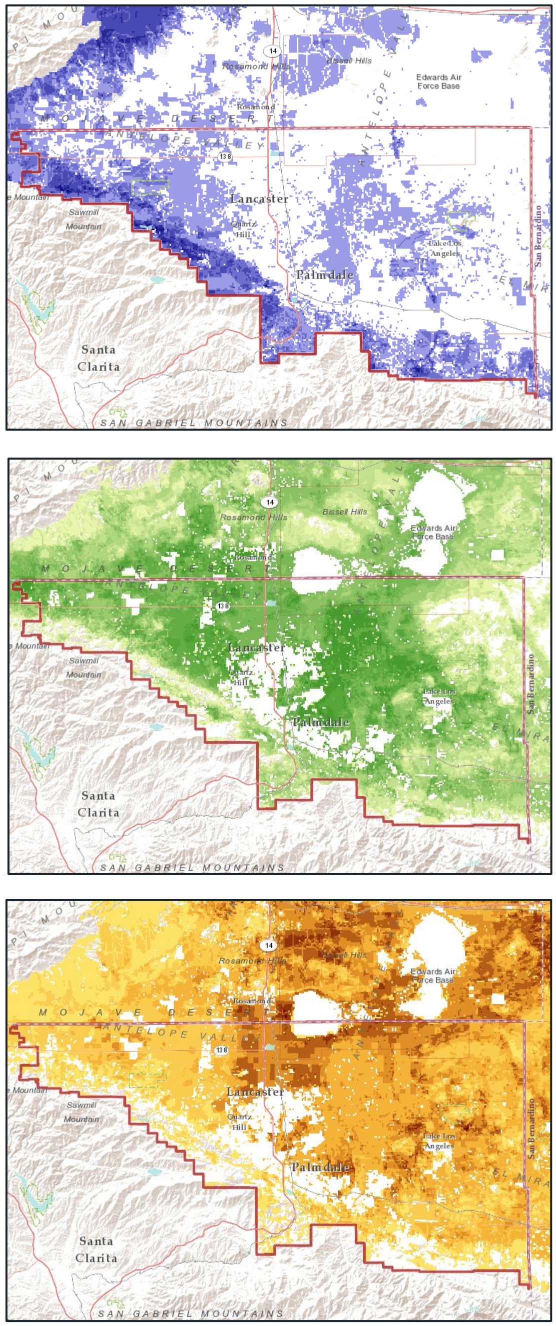


**Figure G-6. Focal Species Stack Results for Each Major Habitat Grouping. Top: Foothills/Riparian; Middle: Agriculture/Grasslands; Bottom: Desert. Darker Colors Denote Higher Concentrations of Focal Species**

# High Habitat Connectivity

Habitat connectivity was evaluated using a combination of least-cost corridor outputs and pinch points (Linkage Mapper), circuit theory (Circuitscape or Centrality Mapper), and a hybridized graph theory (a Linkage Mapper Priority Mapper Add-on) at 270m resolution. Figure G-7 summarizes how the data flowed through the various analysis tools (symbolized by the engine icons) and provided inputs to the EEMS Biological Value models. Two different types of model runs were performed: one from the perspective of a large species, which we assumed display greater tolerance to habitat fragmentation, and another from the perspective of smaller species, which we assumed show greater sensitivity to habitat fragmentation. In both cases, climate variables were used to generate results. As shown in the diagram, core areas, resistance surfaces, and climate variables are all major categories and fundamentally important as model inputs.

# Defining Core Areas

The large species core areas were selected from the 1km resolution Statewide Terrestrial Landscape Intactness layer. All grid cell values > 0.5 were selected and results resampled to 270m resolution. All resulting polygons > 10 sq. km were selected as potential core areas for large species. The large playas in the RCIS area possessed high intactness, but these areas do not serve many species and are often natural landscape barriers themselves; therefore, playas were erased from the core areas. For small species, the same process was followed, except the minimum patch size was lowered to 4 square km.

# Resistance Surfaces

For the large species model, we used the Human Modification dataset (Conservation Science Partners 2016) as the resistance surface modified by increasing resistance of the large playas in the region. For the smaller species model, we modified the California Statewide Intactness model by running the model at 270m, versus the original 1km resolution, removing the non-infrastructure components (e.g., invasive species) and weighting the road network by type. The Structural Resistance Surface Basemap was then modified by the playas data as described above. A comparison of the large species resistance surface and small species resistance surface inputs along with playas can be viewed in Figures G-8 and G-9, respectively.

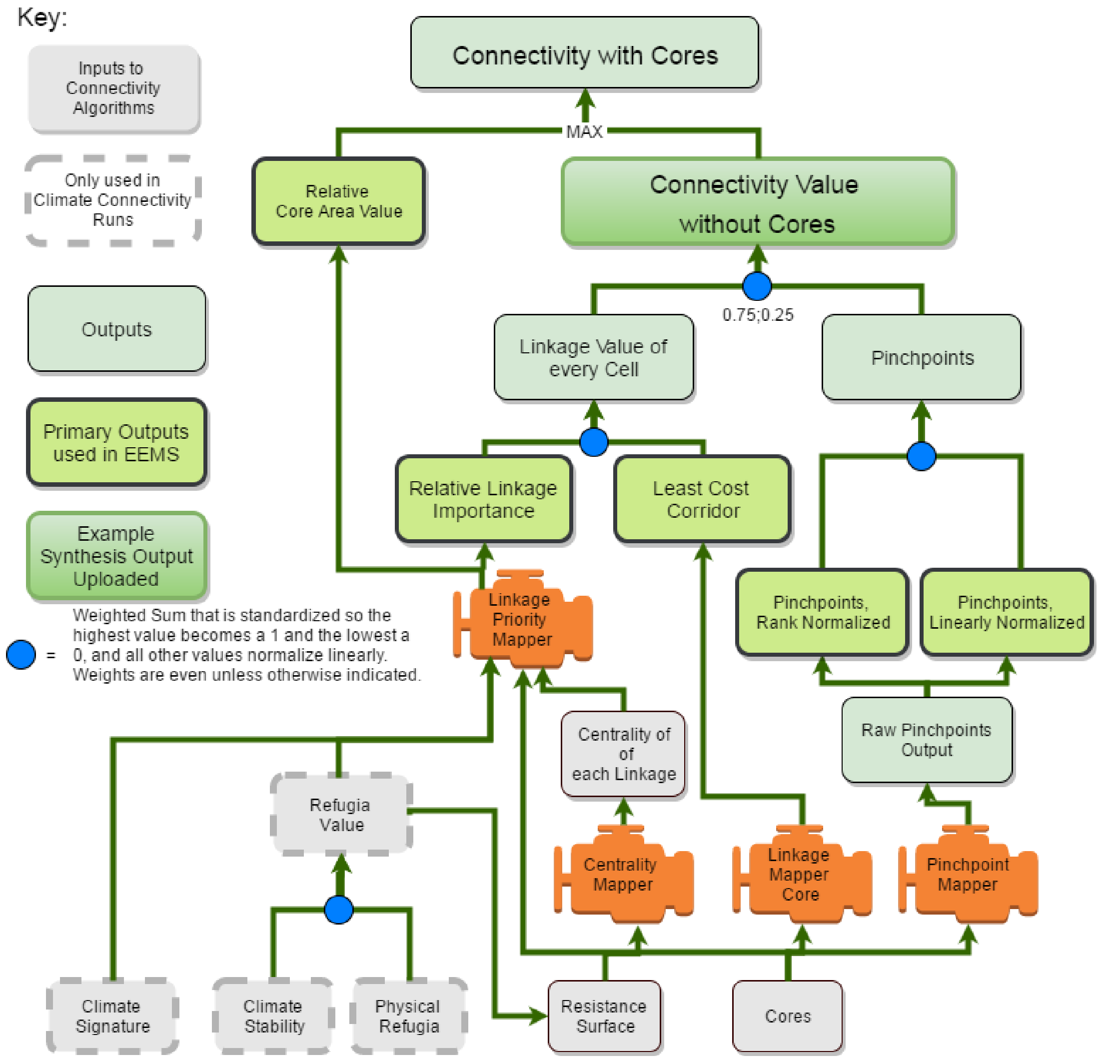


**Figure G-7. Habitat Connectivity Model Diagram; Inputs to the Biological Value Models Are Labeled as Primary Outputs used in EEMS (Medium-Green Boxes)**

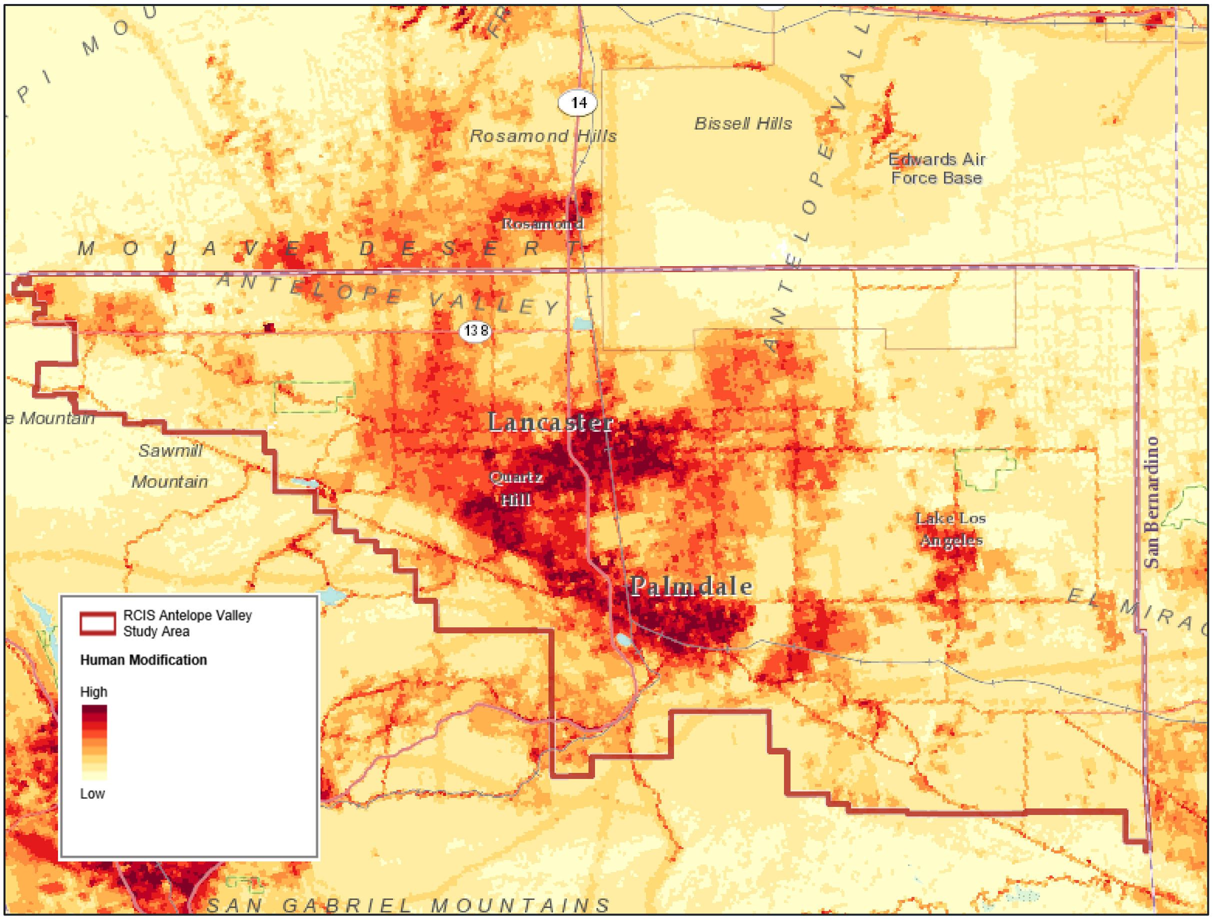


**Figure G-8. Resistance Surface for Large Species Connectivity Model for the Antelope Valley RCIS Area and Surrounding Region**

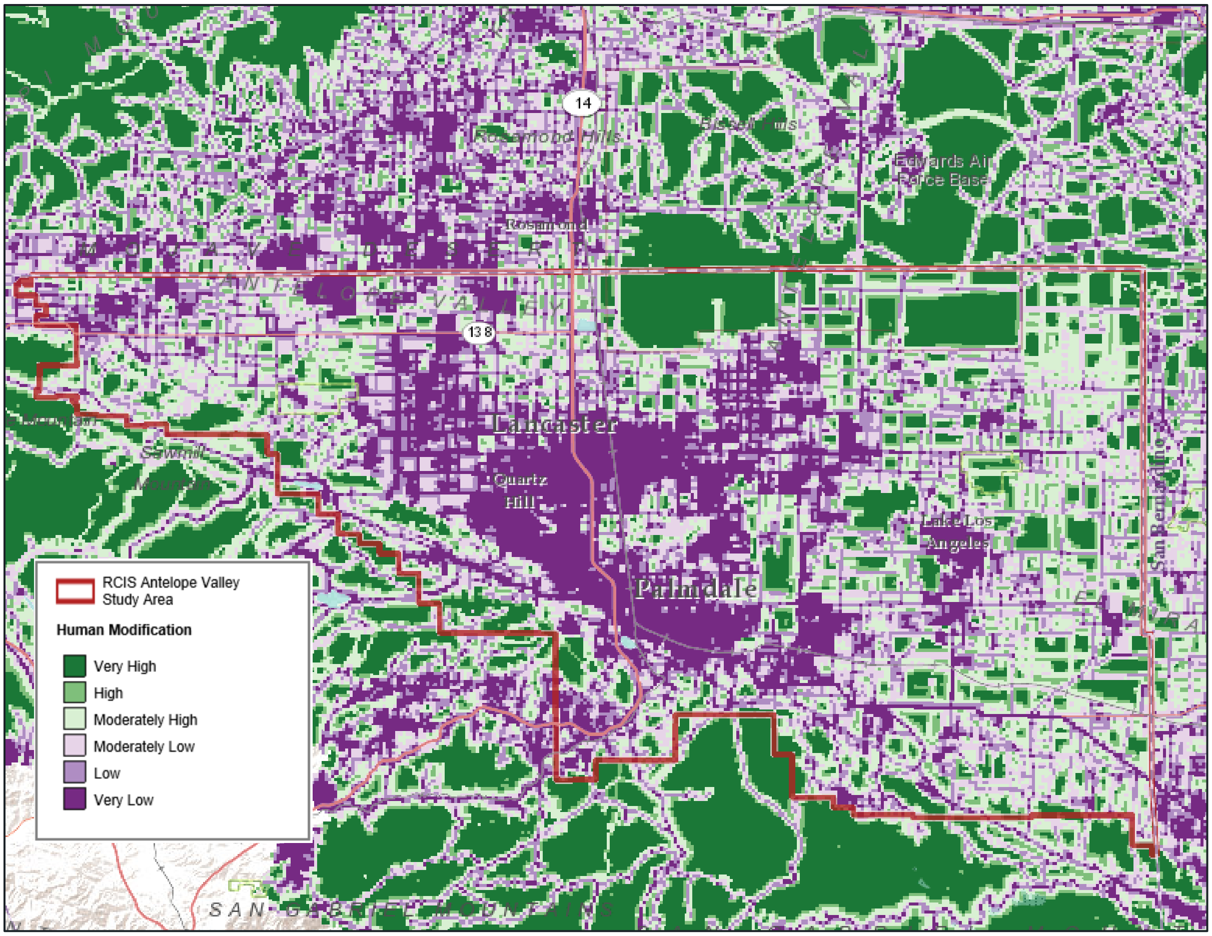


**Figure G-9. Resistance Surface for Small Species Connectivity Model for the Antelope Valley RCIS Area and Surrounding Region**

## Effects of Climate Change on Connectivity

Three major inputs were used to incorporate climate futures into the habitat connectivity models for the Antelope Valley RCIS study area.

***Climate stability*** is the first component of the climate module for the habitat connectivity models developed for both small and large species. Climate stability is essentially an inverted expression of climate exposure and summarized at 270m resolution (Figure G-10). California Climate Exposure Ensemble, 2046–2075 is an EEMS model based on aridity, maximum temperature, minimum temperature, and precipitation on a seasonal and annual basis. Change was calculated with input from three climate projections (CCSM4, CanESM2, and MIROC 5) plus the ensemble and two future time periods, 2016–2045 and 2046–2075, compared to the historical period, 1971–2000. Only the later future time period was used to derive climate stability. Temperature and precipitation differences were normalized using the standard deviation over the historical period via the following formula:

$$d = \frac{x_f - x_h}{\sigma_{x_h}}$$

where d is the difference, $x_f$ is the mean of the variable in the future period, $x_h$ is the mean of the variable in the historical period, and $\sigma_{xh}$ is standard deviation of the variable in the historical period. Change in aridity was calculated as the percent change from the historical period. Projected future change is very high for temperatures and aridity. The EEMS logic model used to generate the climate exposure dataset shows the integration of the various climate components (Figure G-11).

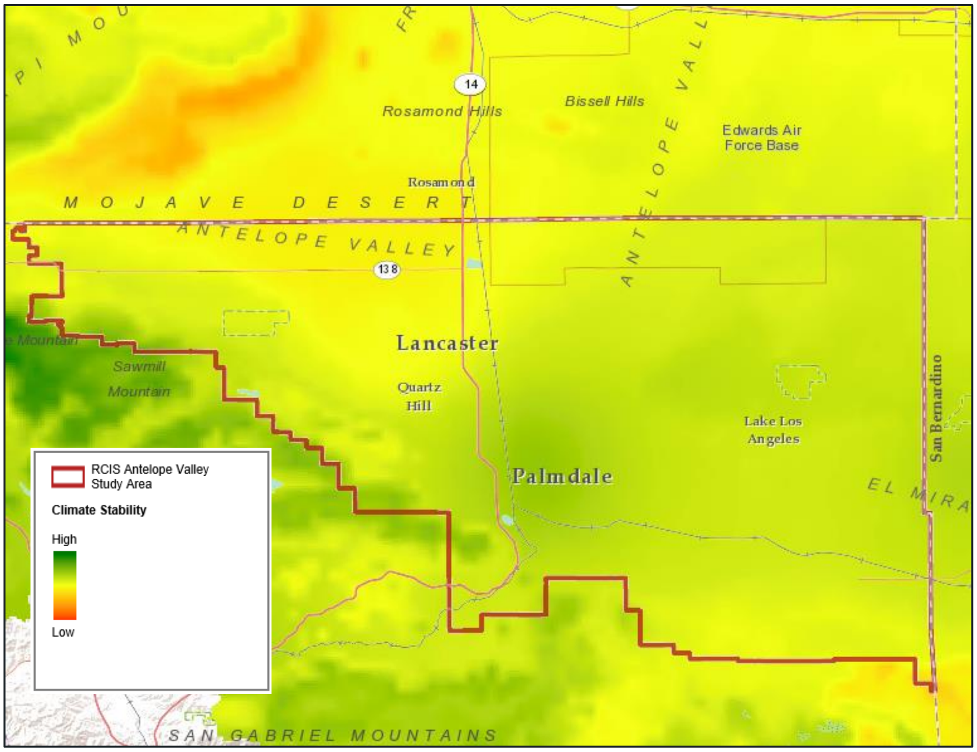


**Figure G-10. Climate Stability for the Antelope Valley RCIS Study Area and Surrounding Region**


**Figure G-11. EEMS Logic Model Diagram for California Climate Exposure Ensemble (2046–2079)**

A ***physical refugia*** dataset was another major input to the climate change module for the habitat connectivity models (Figure G-12). This is also an EEMS generated model created at 270m resolution and attempts to assemble those landscape features that can serve to buffer climate impacts that operate more generally over landscapes. Physical refugia model inputs included: terrain ruggedness, solar radiation, riparian vegetation, water bodies, distance to water, and spring locations.

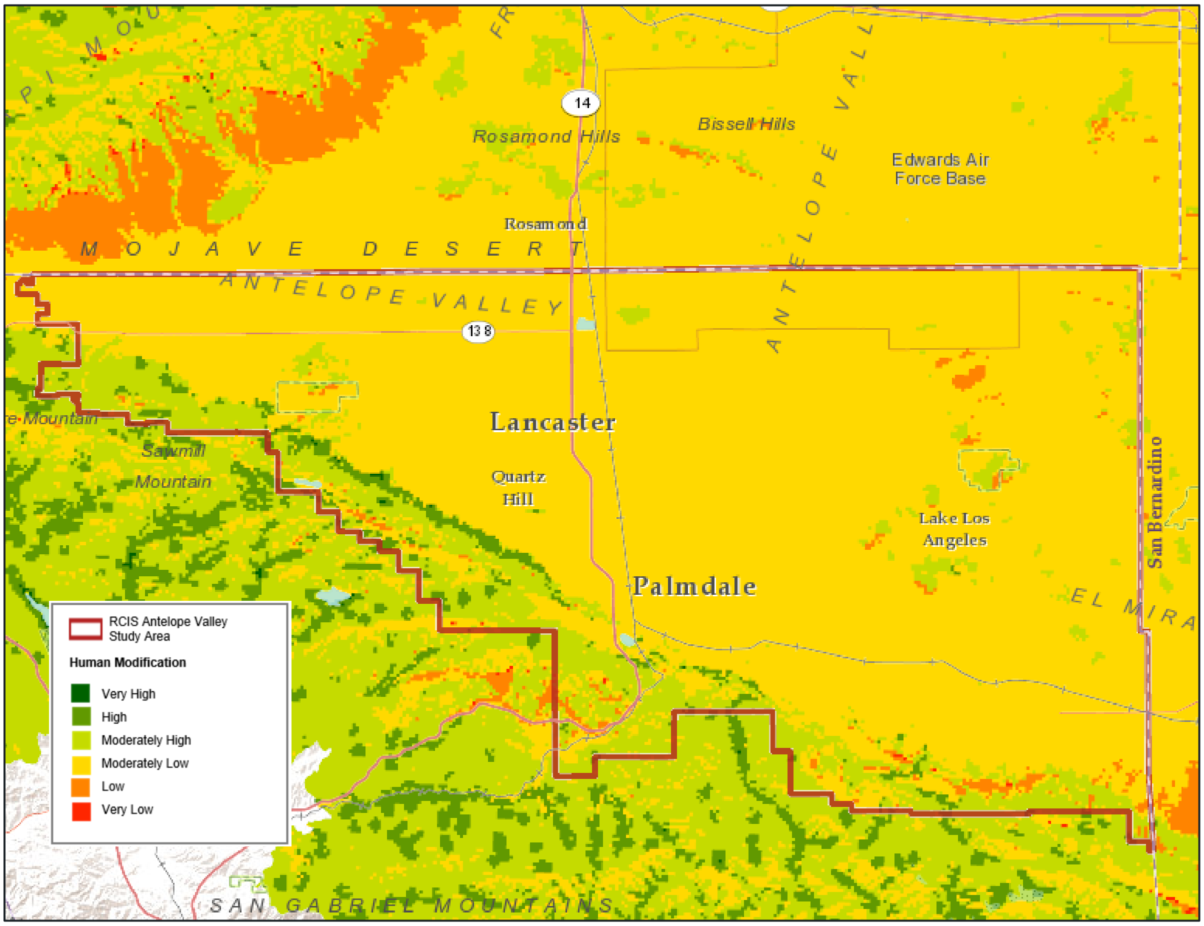


**Figure G-12. Climate Physical Refugia for the Antelope Valley RCIS Study Area and Surrounding Mojave Ecoregion**

The final input to the climate module for the habitat connectivity models was ***climatic water deficit*** (also referred to as *climate signature*) using a California Basin Characterization Model (BCM) (Flint and Flint 2012). Climatic water deficit is one of several parameters generated from the BCM approach and calculated as potential evapotranspiration (PET) minus actual evapotranspiration (AET).

## Biological Value Models Thresholds and Source Data

Thresholds for each of the primary inputs into the Biological Value EEMS models are provided in Table G-7 and list of data sources provided in Table G-8.

**Table G-7. List of Fuzzy Logic Data Inputs for the AV RCIS Biological Values Models, Showing Range of Values, and True and False Modeling Thresholds for Each Item at 270m Resolution**

| Input | Range | Mean | Standard Deviation | True Threshold | False Threshold |
|---|---|---|---|---|---|
| Foothills/Riparian Focal Species Stack | 0–6 | 0.643 | 0.873 | 2.0 | 0.0 |
| Agriculture/Grasslands Focal Species Stack | 0–11 | 4.383 | 3.233 | 8.0 | 0.0 |
| Desert Focal Species Stack | 0–7 | 2.092 | 1.544 | 5.0 | 0.0 |
| Occurrence Elements Index | 0–7 | 0.039 | 0.306 | 7.0 | 0.0 |
| CNDDB index | 0–4.5 | 0.353 | 0.532 | 1.5 | 0.0 |
| Vegetation Emphasis Score | 1–12 | 4.771 | 2.405 | 9.0 | 1.0 |
| Large Species Relative Core Value | 0–0.8 | 0.059 | 0.191 | 1.2 | 0.0 |
| Large Species Connectivity Value | 0–0.758 | 0.271 | 0.235 | 0.758 | 0.0 |
| Small Species Relative Core Value | 0–0.8 | 0.079 | 0.219 | 1.2 | 0.0 |
| Small Species Connectivity Value | 0–0.815 | 0.246 | 0.241 | 0.815 | 0.0 |

**Table G-8. Source Data Inputs with Online Hyperlinks, Data Type, and Data Originator for the AV RCIS Biological Value Models**

| Input | Data Type | Originator |
|---|---|---|
| Foothills/Riparian Focal Species Stack | Raster | Composite of Species Distribution Models[1] |
| Agriculture/Grasslands Focal Species Stack | Raster | Composite of Species Distribution Models[2] |
| Desert Focal Species Stack | Raster | Composite of Species Distribution Models[3] |
| Vegetation Emphasis Score | Polygon | See Table 3-24 in Section 3 |
| California Native Diversity Database 1/2017 | Polygon | California Department of Fish and Wildlife |
| eBird Occurrences | Points | Cornell Lab of Ornithology and Audubon |
| HerpMapper Occurrences | Points | HerpMapper[4] |
| Large Species Core Value | Raster | CBI Linkage Mapper |
| Large Species Least Cost Corridors | Raster | CBI Linkage Mapper |
| Large Species Relative Linkage Importance | Raster | CBI Linkage Mapper |
| Large Species Ranked Pinch Points | Raster | CBI Linkage Mapper |
| Large Species Linear Pinch Points | Raster | CBI Linkage Mapper |
| Small Species Core Value | Raster | CBI Linkage Mapper |
| Small Species Least Cost Corridors | Raster | CBI Linkage Mapper |
| Small Species Relative Linkage Importance | Raster | CBI Linkage Mapper |
| Small Species Ranked Pinch Points | Raster | CBI Linkage Mapper |
| Small Species Linear Pinch Points | Raster | CBI Linkage Mapper |

[1] Short-joint beavertail cactus (location points, California Department of Fish and Wildlife); California condor (statistical model, US Geological Survey and US Fish and Wildlife Service); California juniper (mapped, California Department of Fish and Wildlife); coast horned lizard (statistical model, UC Santa Barbara); golden eagle (expert model, Conservation Biology Institute); least Bell's vireo (statistical model, UC Santa Barbara); mountain lion surrogate (CWHR for mule deer, California Department of Fish and Wildlife); Tehachapi pocket mouse (statistical model, Conservation Biology Institute); southwestern willow flycatcher (statistical model, UC Santa Barbara); Swainson's hawk (expert model, Conservation Biology Institute).

[2] American badger (statistical model, UC Santa Barbara); burrowing owl (statistical model, Conservation Biology Institute); desert kit fox (statistical model, Conservation Biology Institute); Joshua tree (mapped, California Department of Fish and Wildlife); Le Conte's thrasher (statistical model, UC Santa Barbara); loggerhead shrike (statistical model, UC Santa Barbara); long-billed curlew (statistical model, Conservation Biology Institute); mountain plover (expert model Dudek); northern harrier (statistical model, Point Blue); prairie falcon (statistical model, UC Santa Barbara); Swainson's hawk (expert model, Conservation Biology Institute); tricolored blackbird (statistical model, UC Santa Barbara).

[3] Alkali mariposa lily (statistical model, UC Santa Barbara); American badger (statistical model, UC Santa Barbara); desert horned lizard (statistical model, Conservation Biology Institute); desert kit fox (statistical model, Conservation Biology Institute); desert tortoise (statistical model, US Geological Survey); golden eagle (expert model, Conservation Biology Institute); Joshua tree (mapped, California Department of Fish and Wildlife); Le Conte's thrasher (statistical model, UC Santa Barbara); Mohave ground squirrel (statistical model, US Geological Survey).

[4] Original vegetation data comprised of three inputs: VegCAMP ds745 by California Department of Fish and Wildlife, CalVeg, and DRECP Land Cover.

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Appendix H

# Species Conservation Value Maps and Graphs

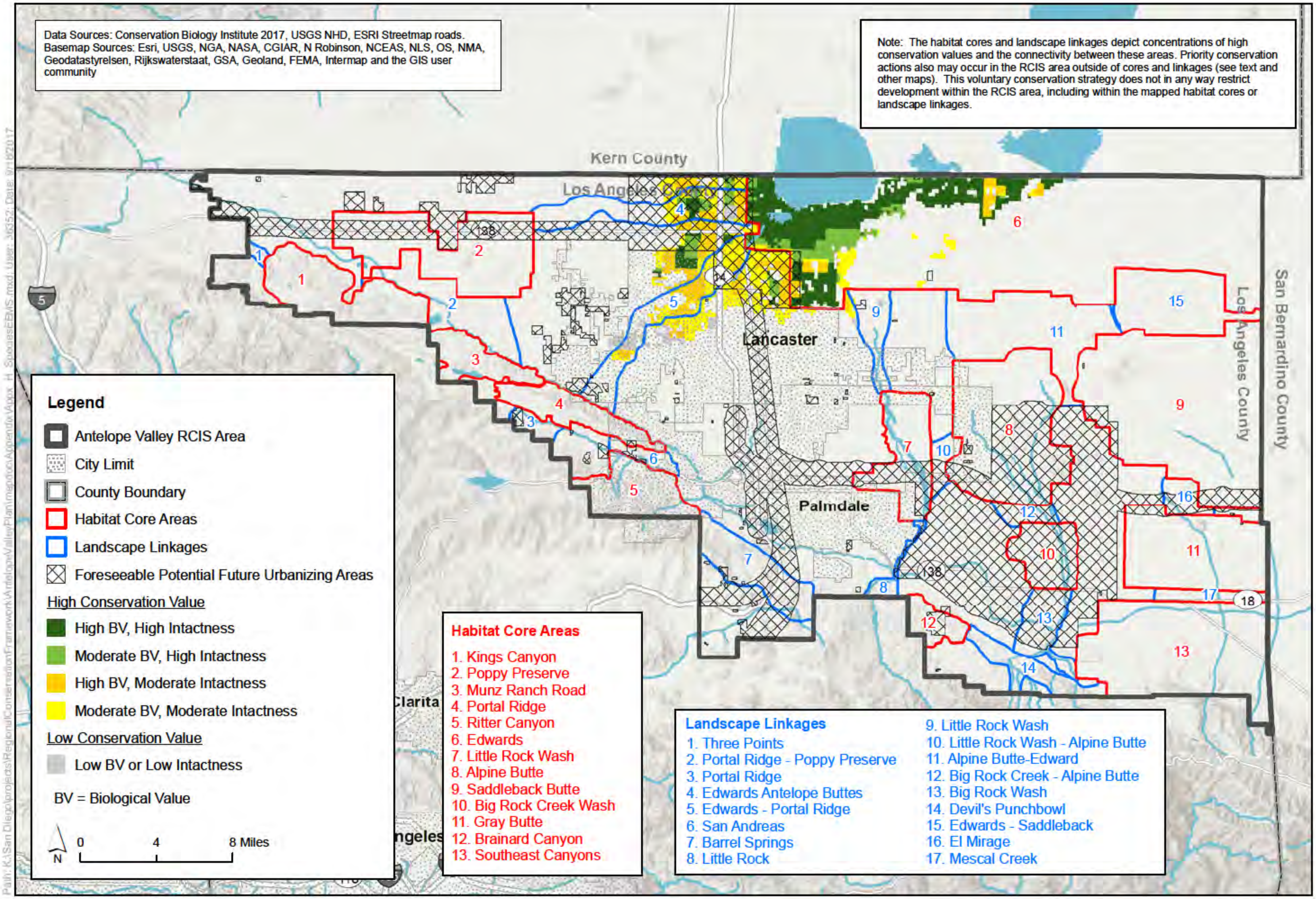


**Figure H-1**
**Alkali Mariposa-Lily High Conservation Value Habitat (Desert Species Group)**

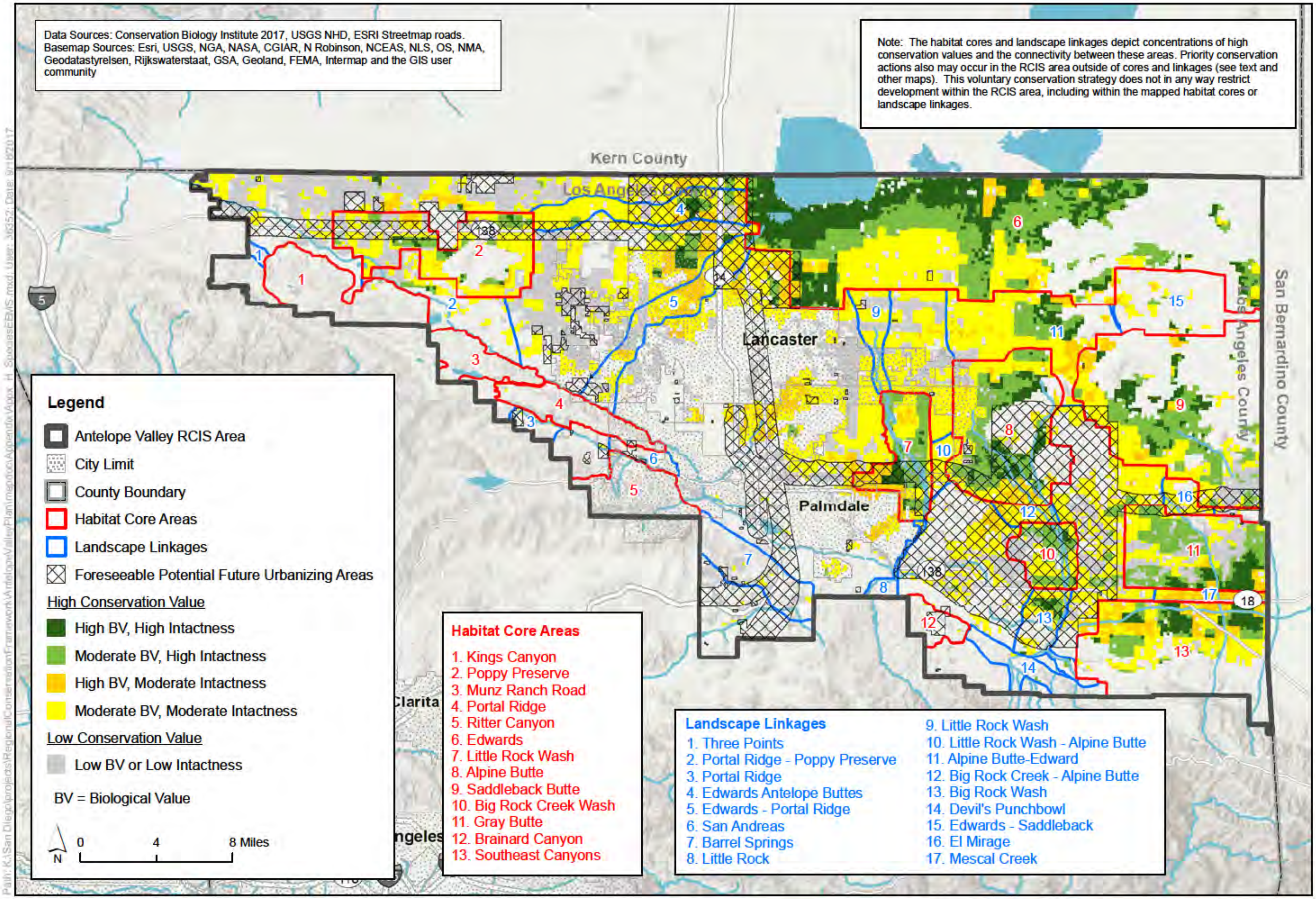


**Figure H-23a**
**American Badger High Conservation Value Habitat (Desert Species Group)**

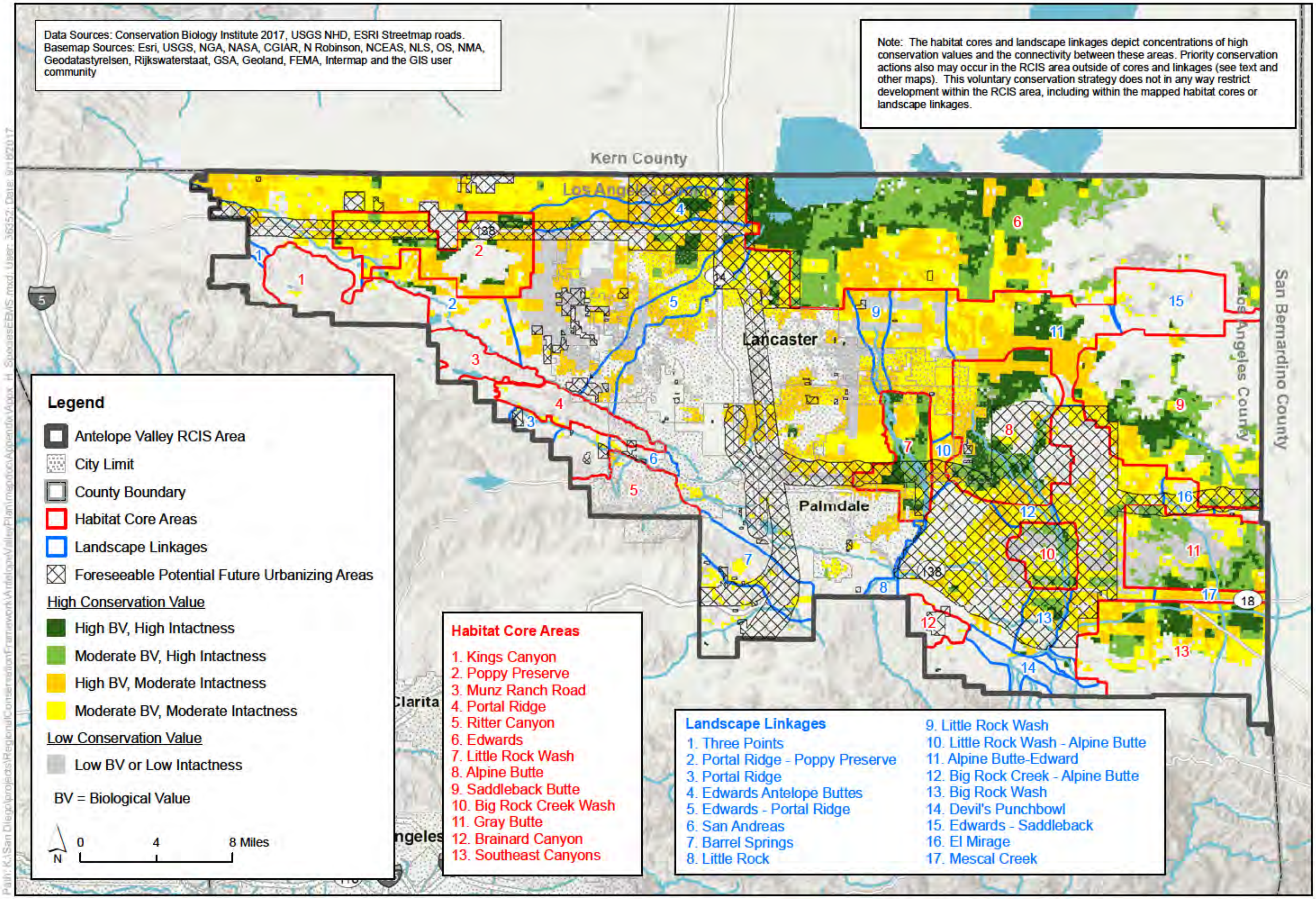


**Figure H-23b**
**American Badger High Conservation Value Habitat (Agriculture and Grassland Species Group)**

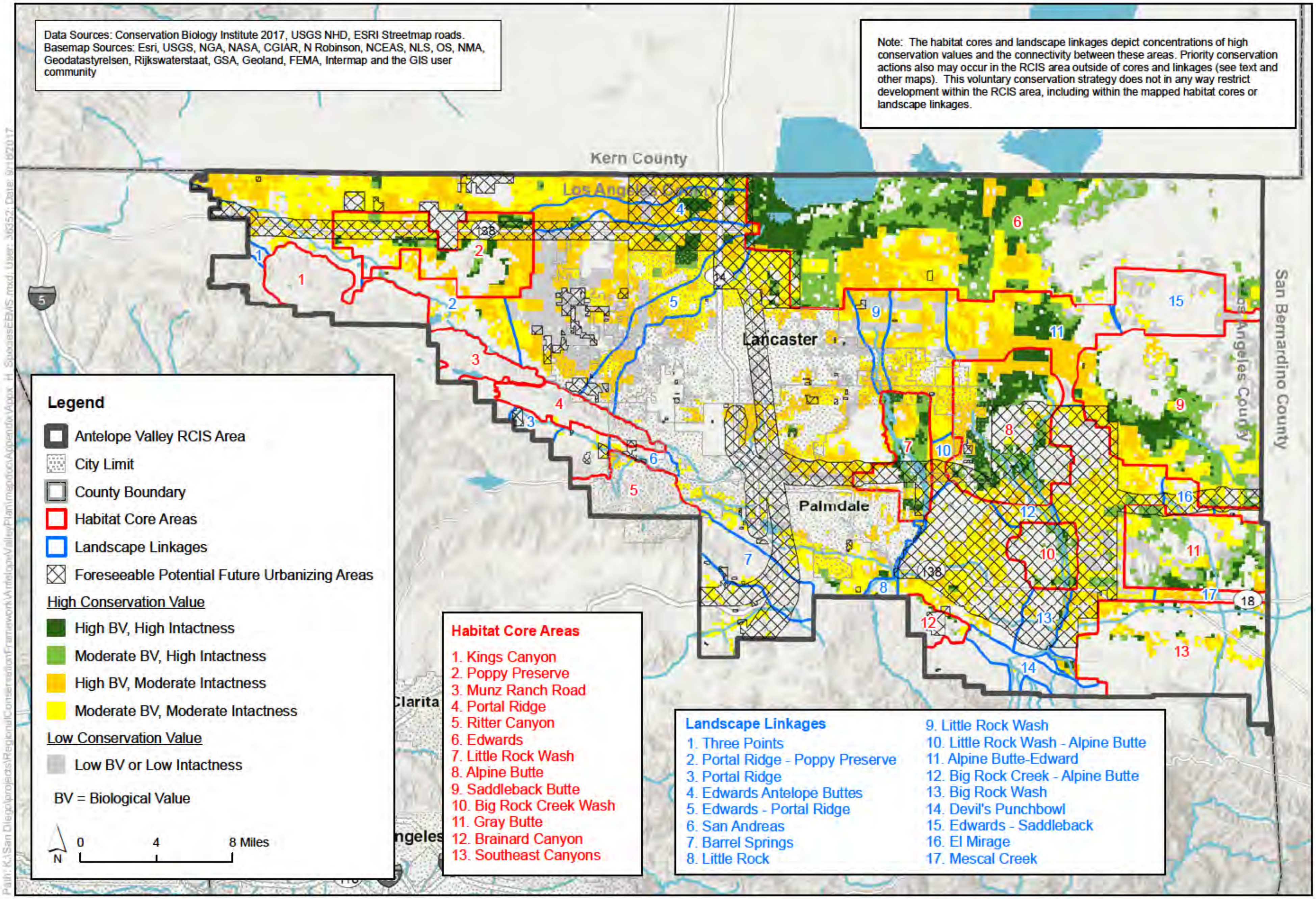


**Figure H-10**
**Burrowing Owl High Conservation Value Habitat (Agriculture and Grassland Species Group)**

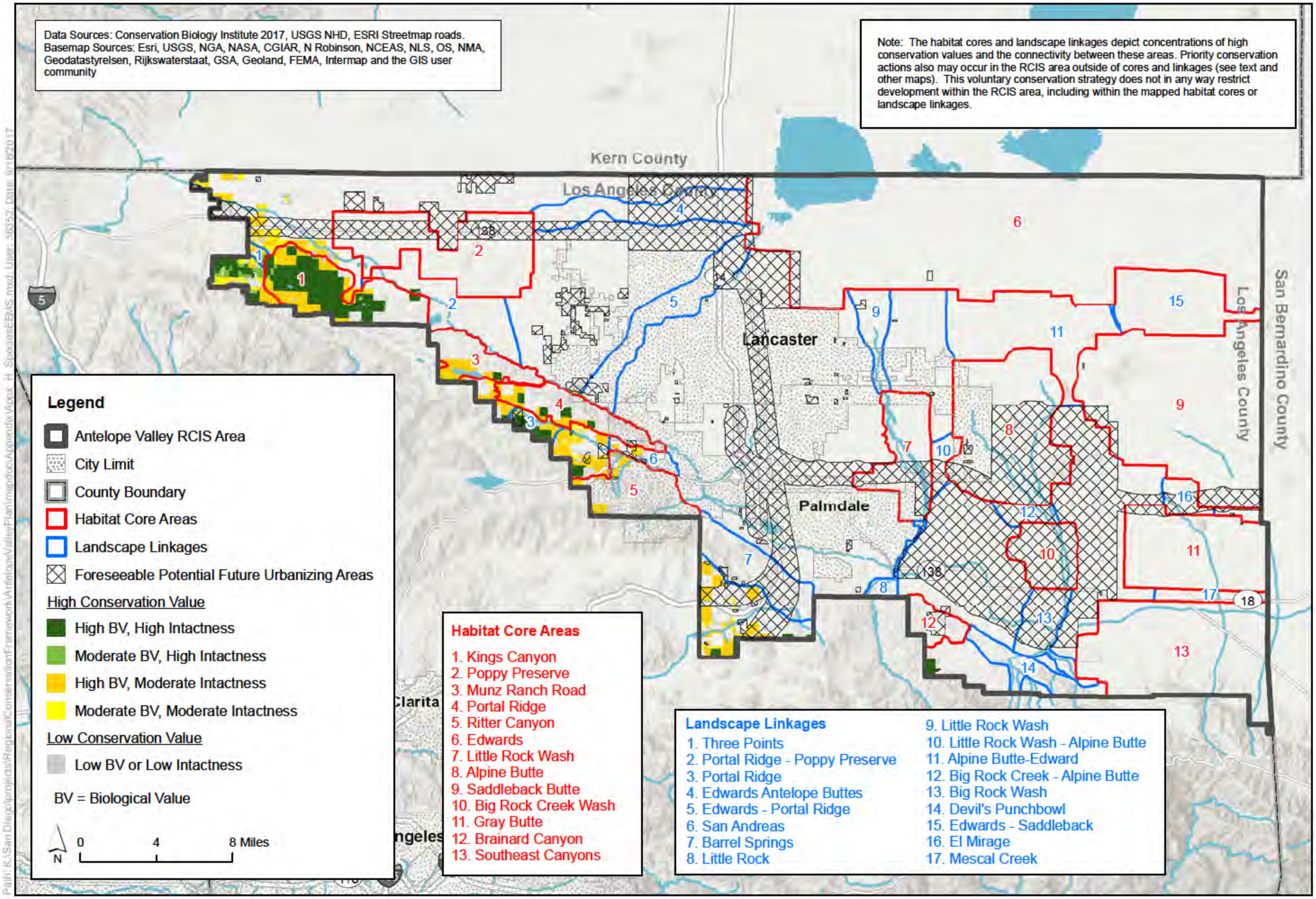


**Figure H-11**
**California Condor High Conservation Value Habitat (Foothill and Riparian Species Group)**

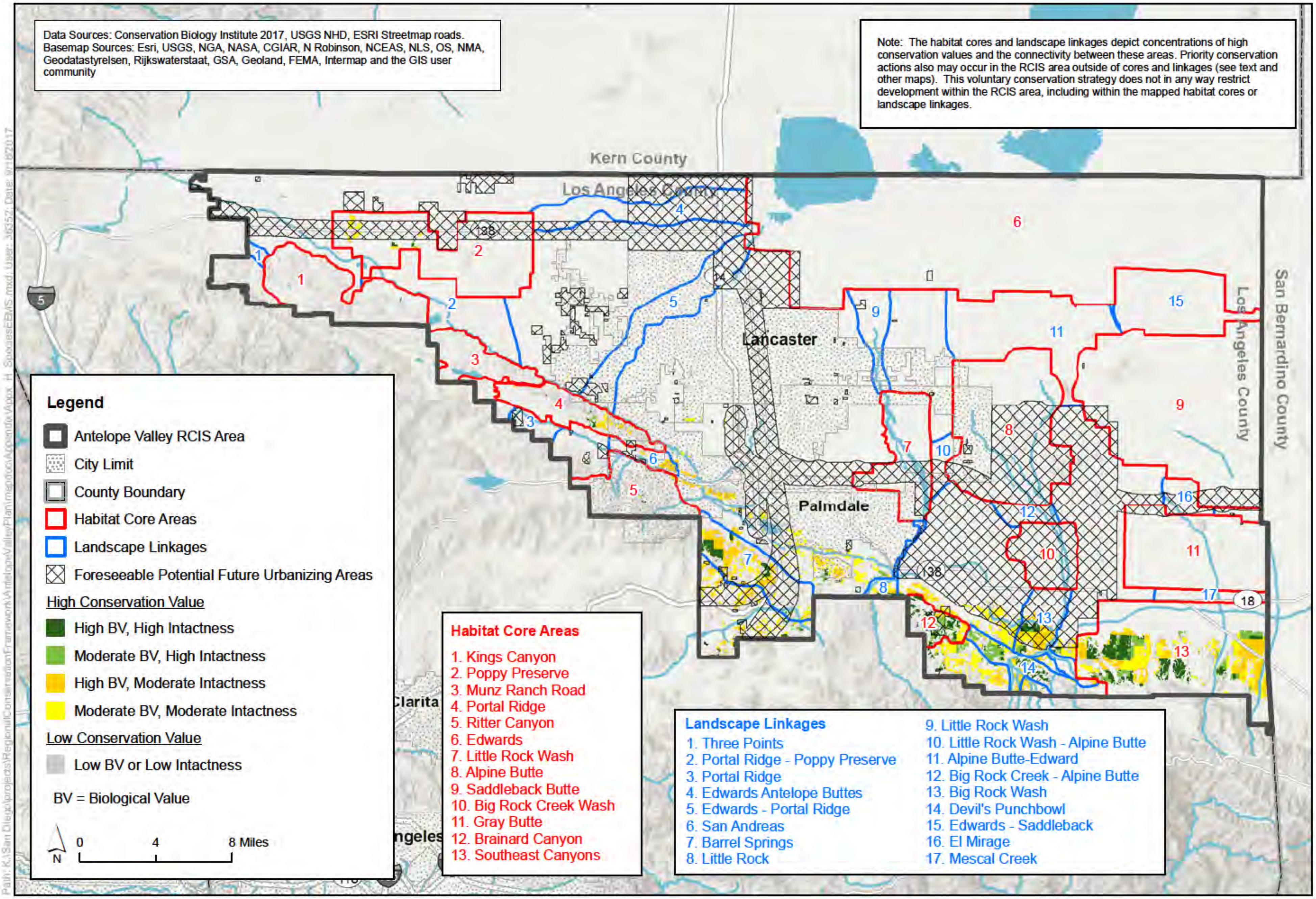


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**Figure H-2**
**California Juniper High Conservation Value Habitat (Foothill and Riparian Species Group)**

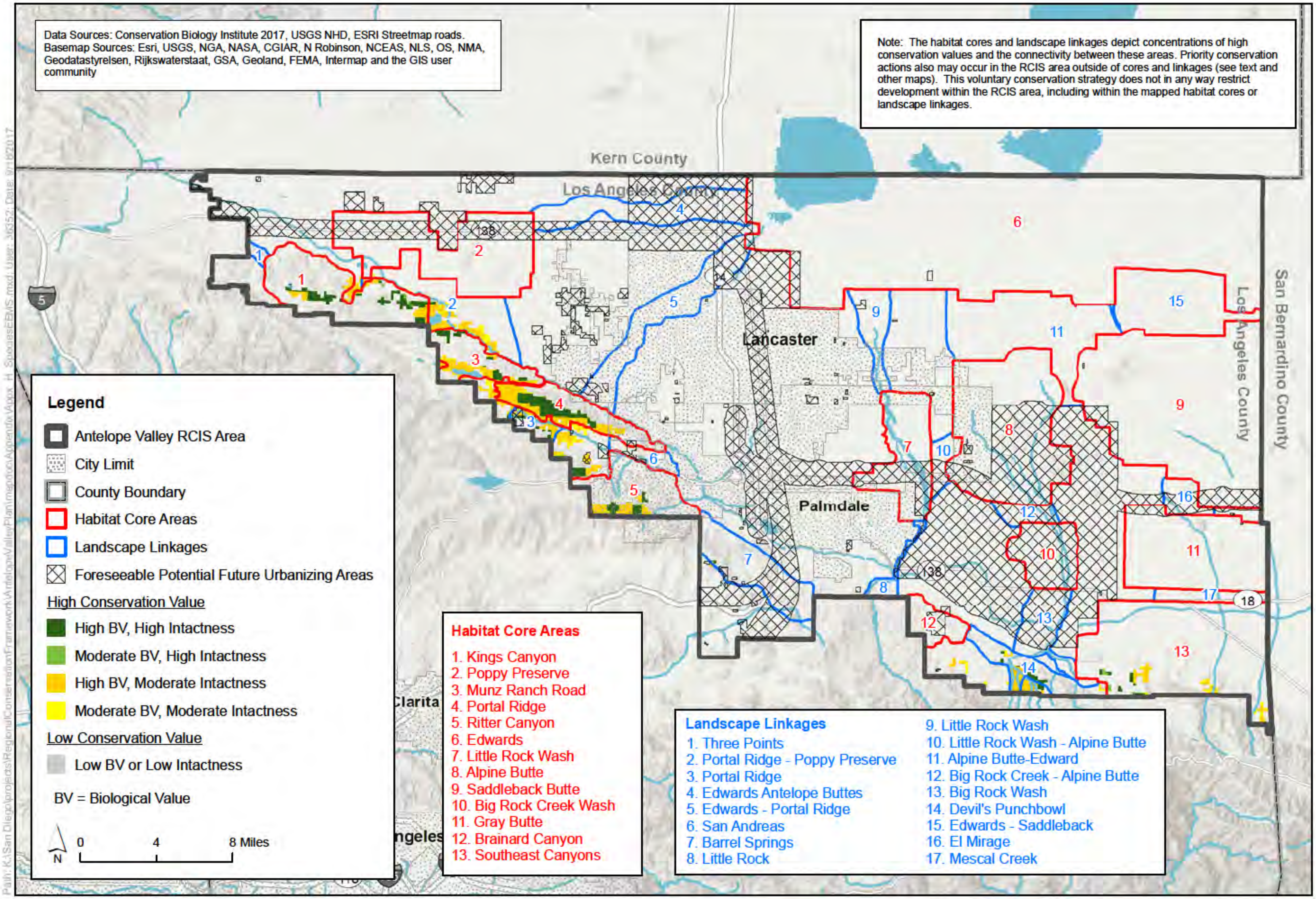


**Figure H-6**
**Coast Horned Lizard High Conservation Value Habitat (Foothill and Riparian Species Group)**

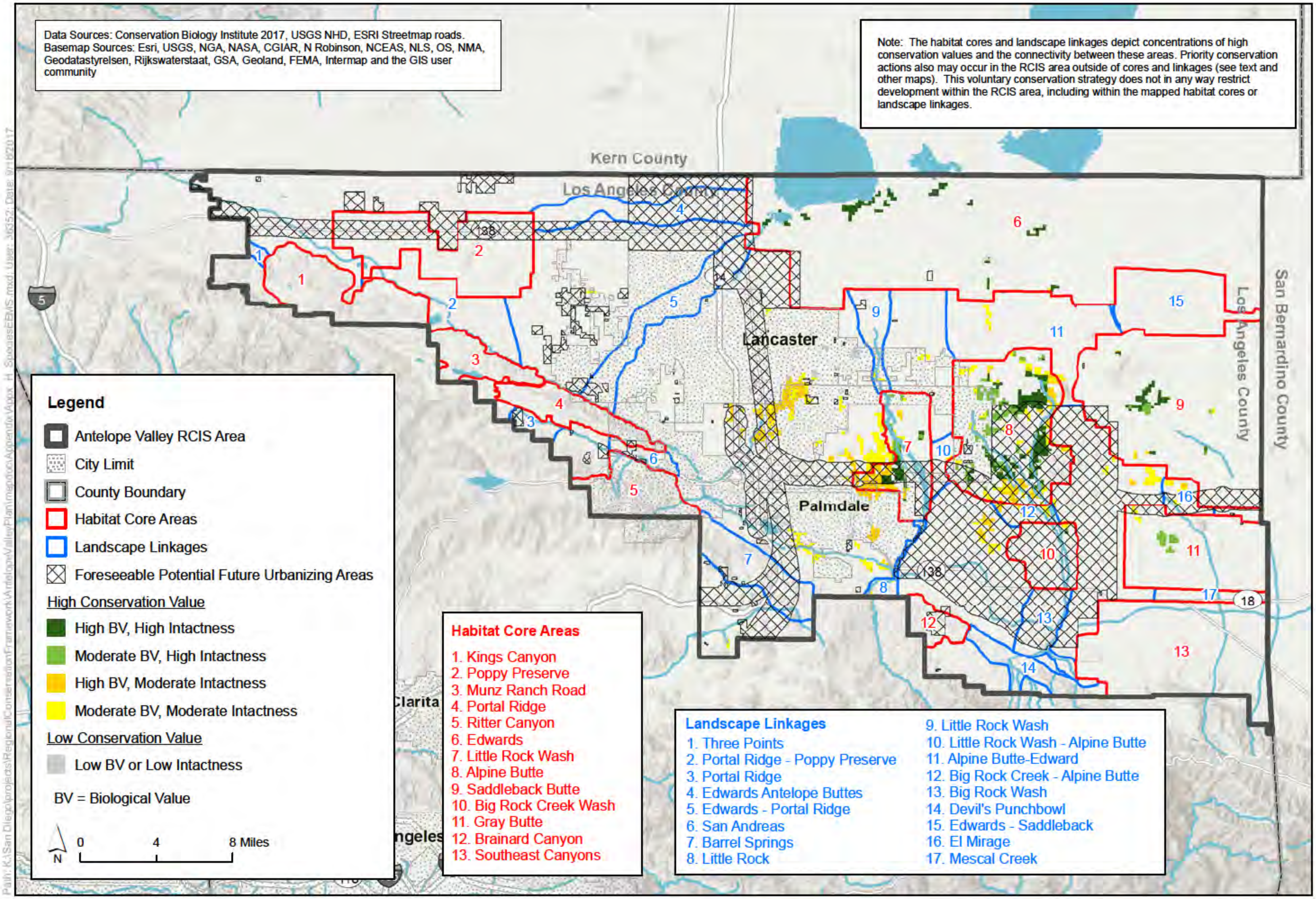


**Figure H-7**
**Desert Horned Lizard High Conservation Value Habitat (Desert Species Group)**

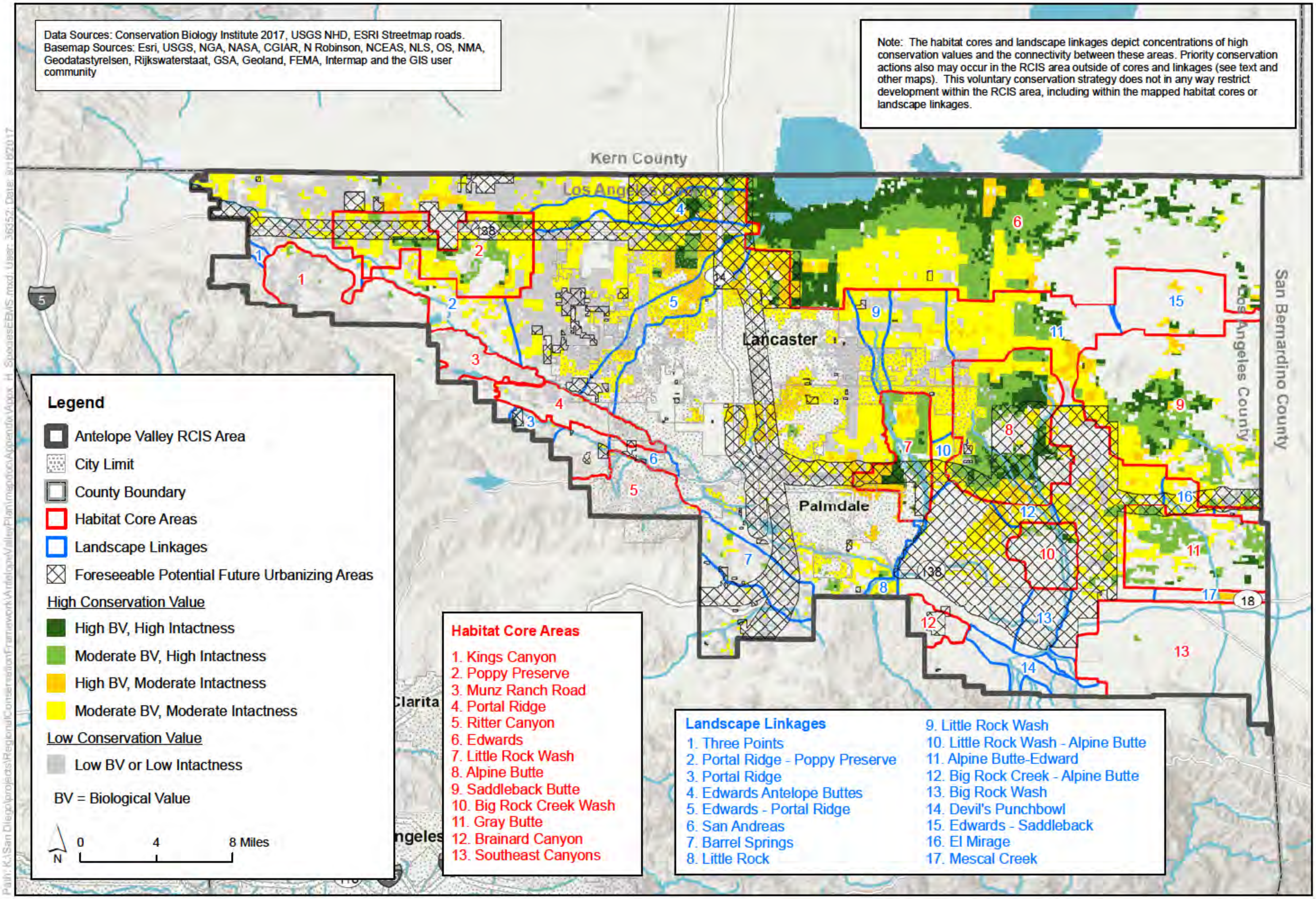


**Figure H-24a**
**Desert Kit Fox High Conservation Value Habitat (Desert Species Group)**

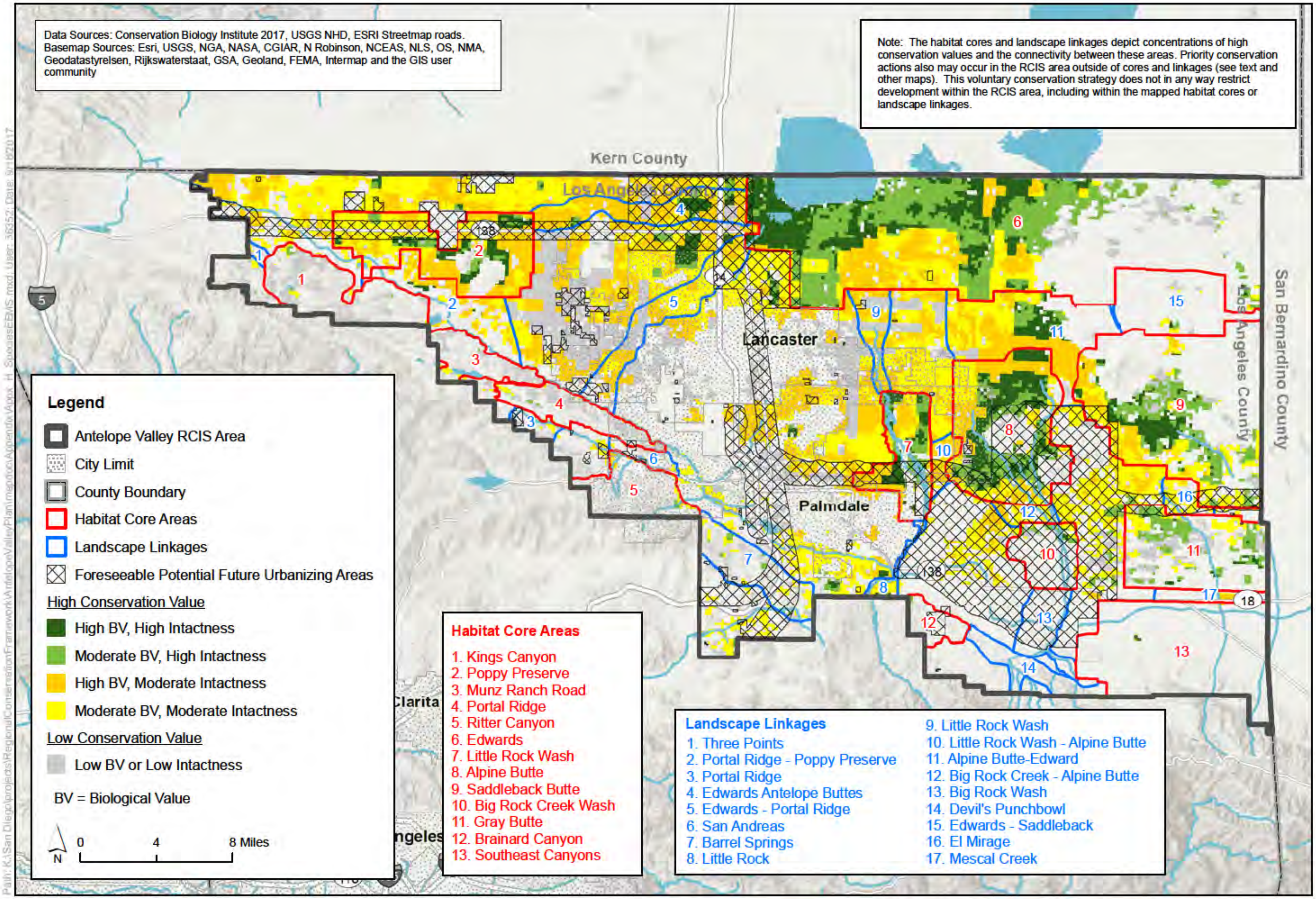


**Figure H-24b**
**Desert Kit Fox High Conservation Value Habitat (Agriculture and Grassland Species Group)**

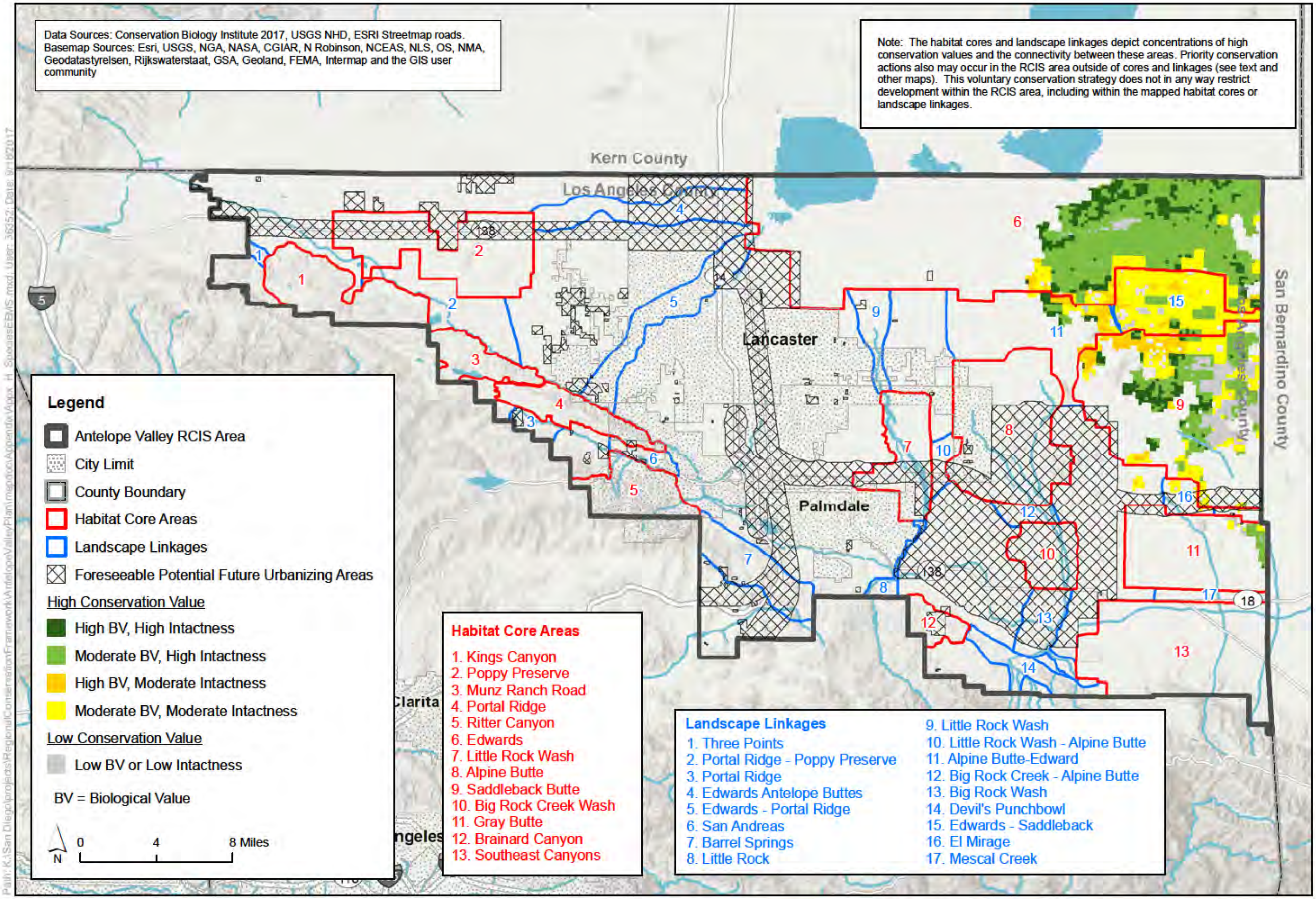


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**Figure H-8**
**Desert Tortoise High Conservation Value Habitat (Desert Species Group)**

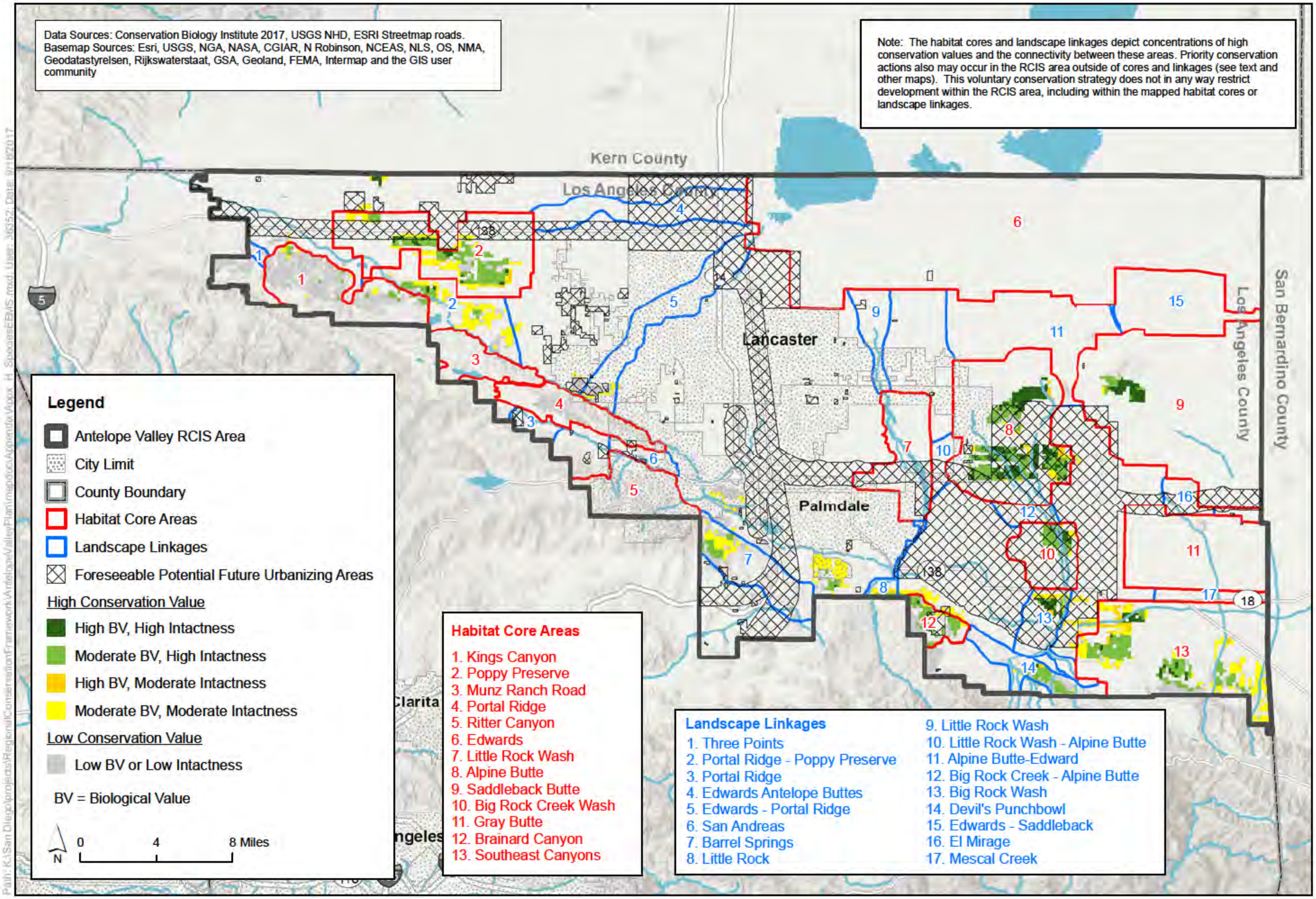


**Figure H-12a**
**Golden Eagle High Conservation Value Habitat (Desert Species Group)**

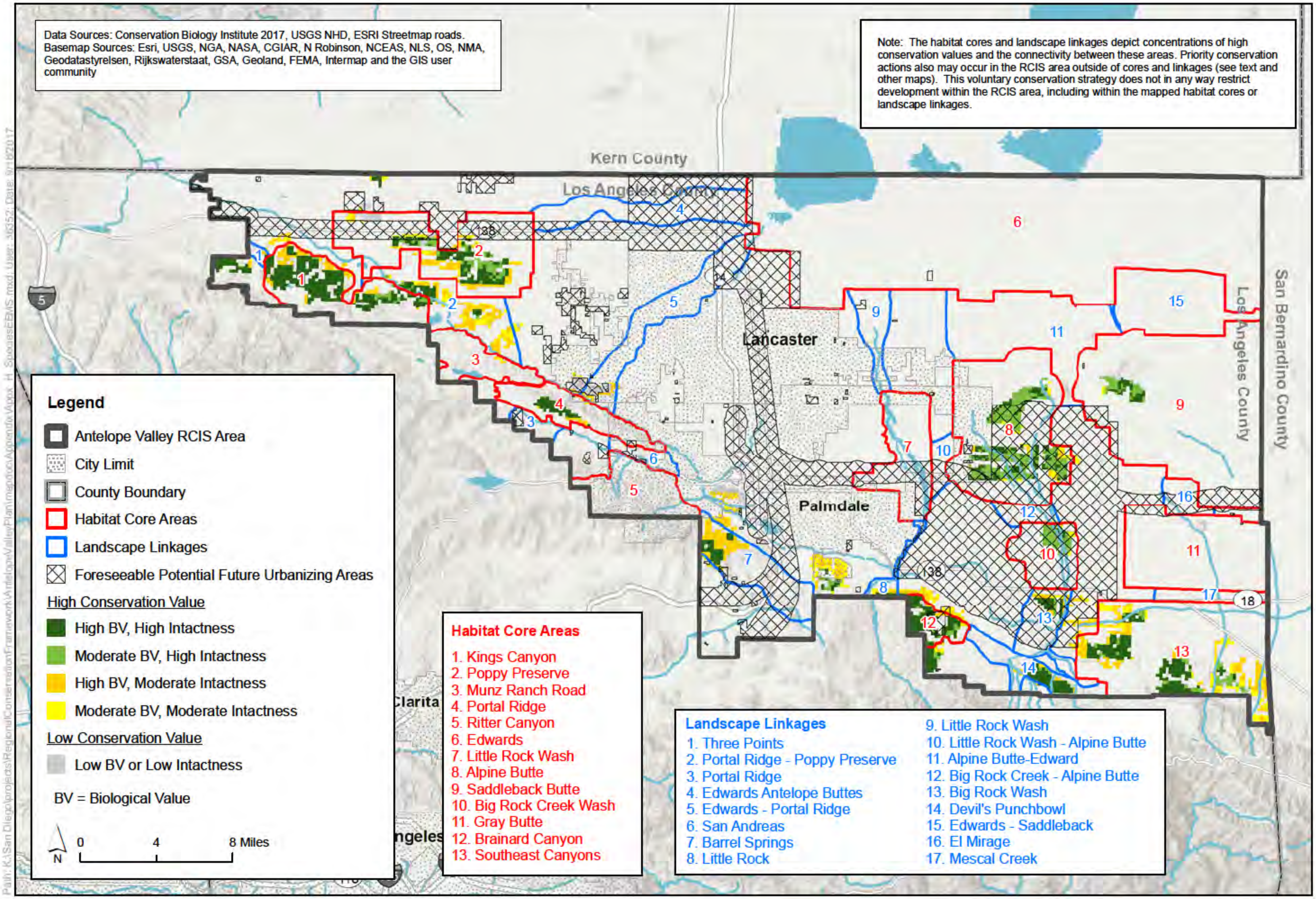


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**Figure H-12b**
**Golden Eagle High Conservation Value Habitat (Foothill and Riparian Species Group)**

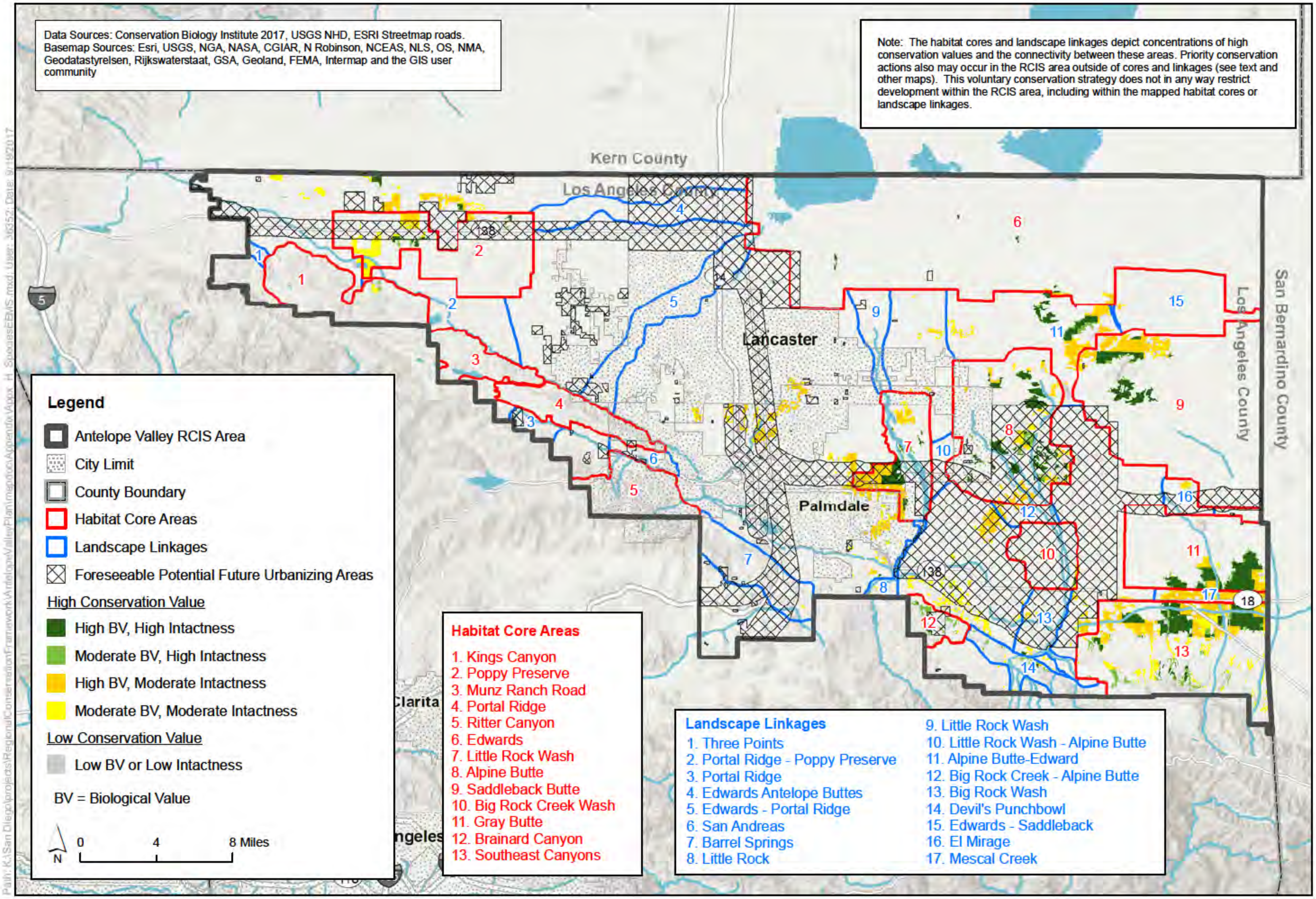


**Figure H-3**
**Joshua Tree High Conservation Value Habitat (Desert Species Group)**

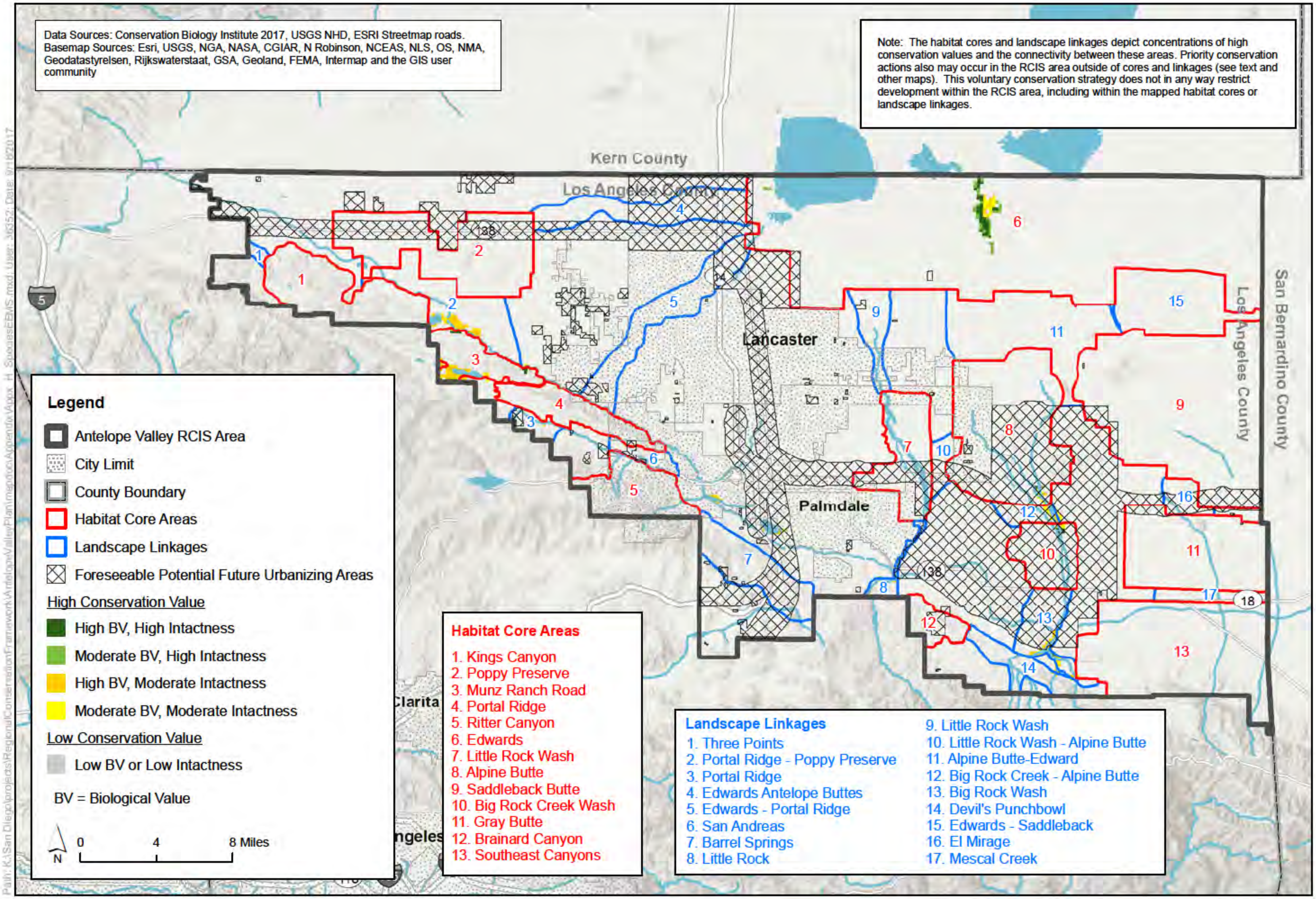


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**Figure H-14**
**Least Bell's Vireo High Conservation Value Habitat (Foothill and Riparian Species Group)**

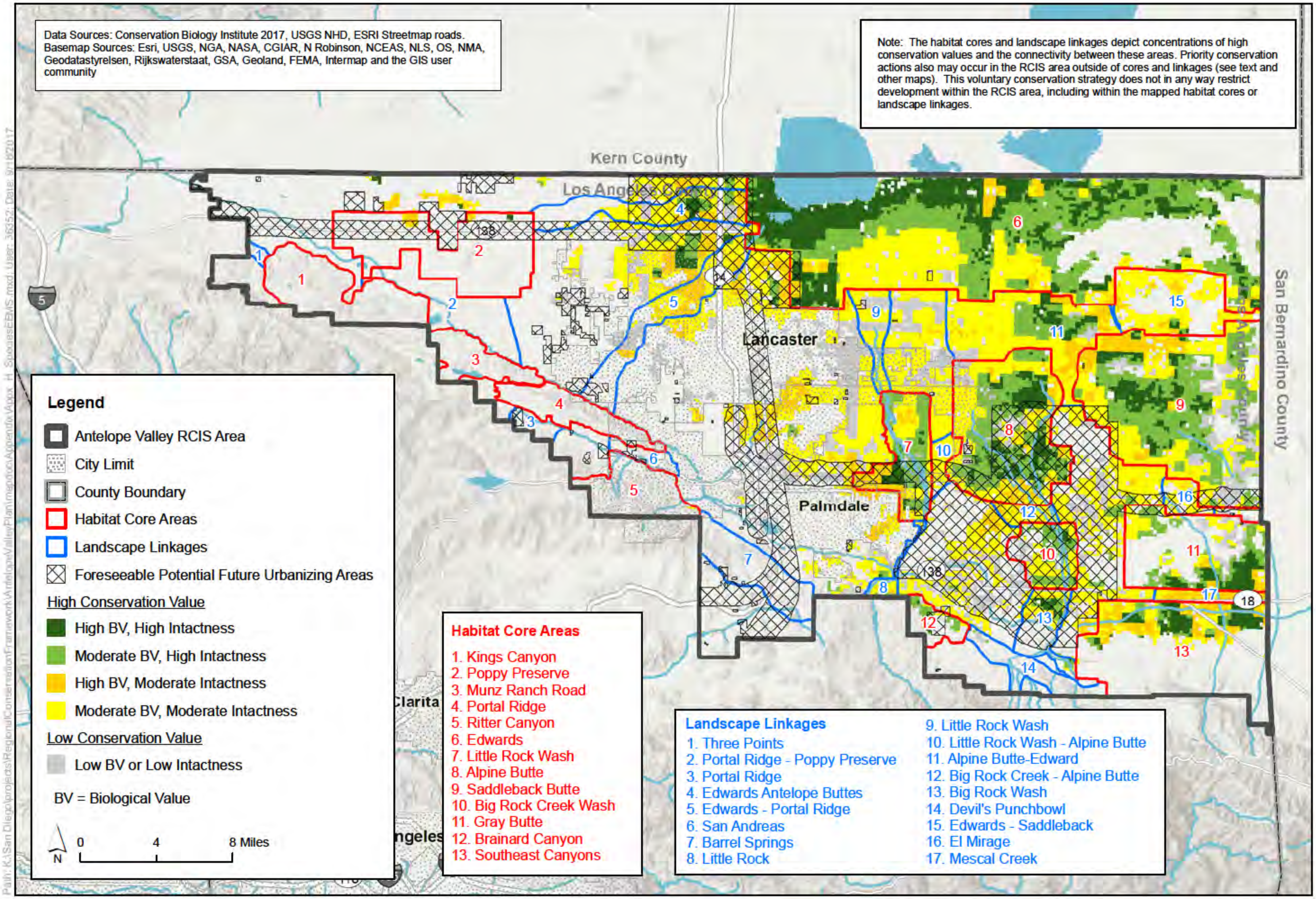


**Figure H-13a**
**Le Conte's Thrasher High Conservation Value Habitat (Desert Species Group)**

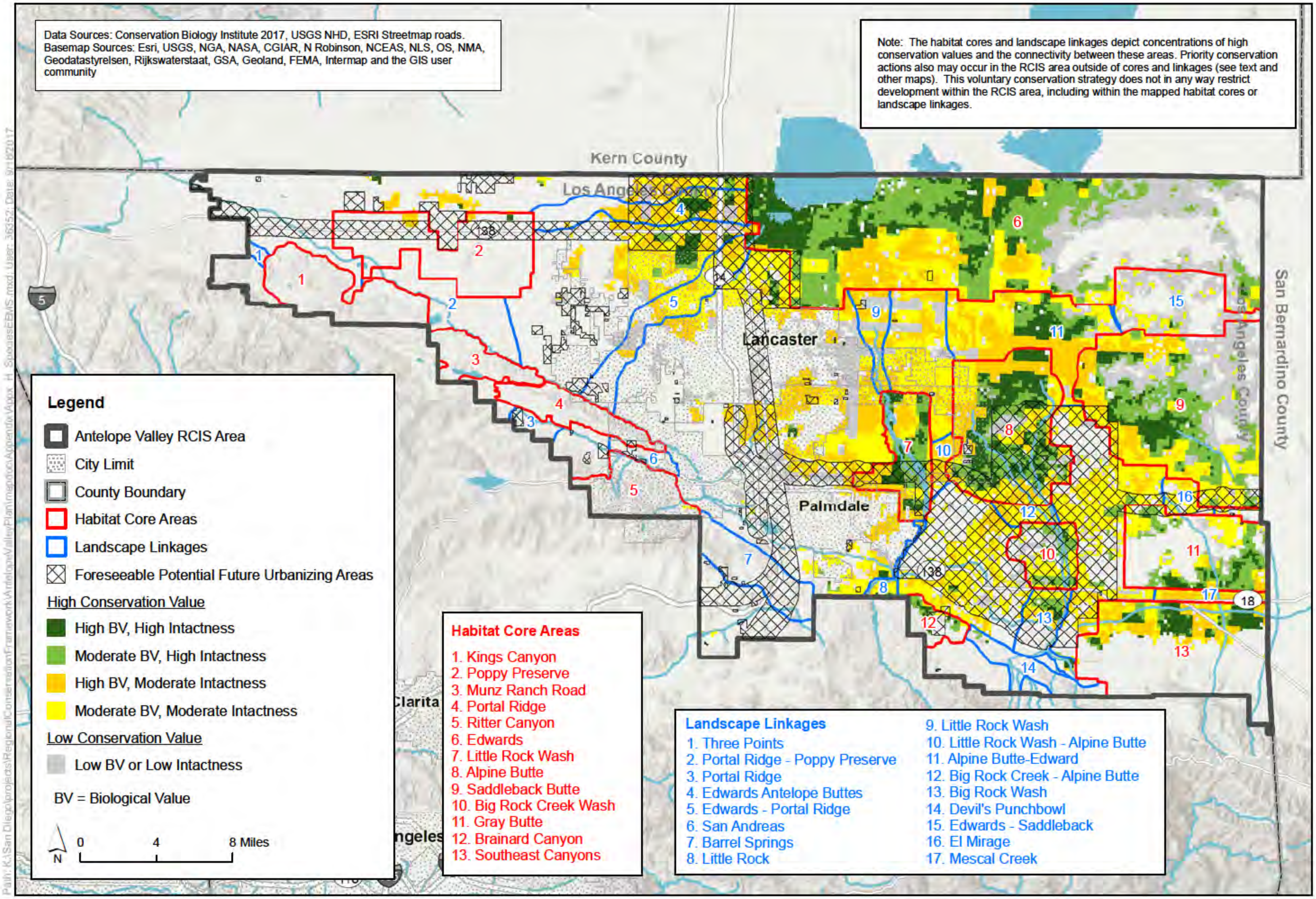


**Figure H-13b**
**Le Conte's Thrasher High Conservation Value Habitat (Agriculture and Grassland Species Group)**

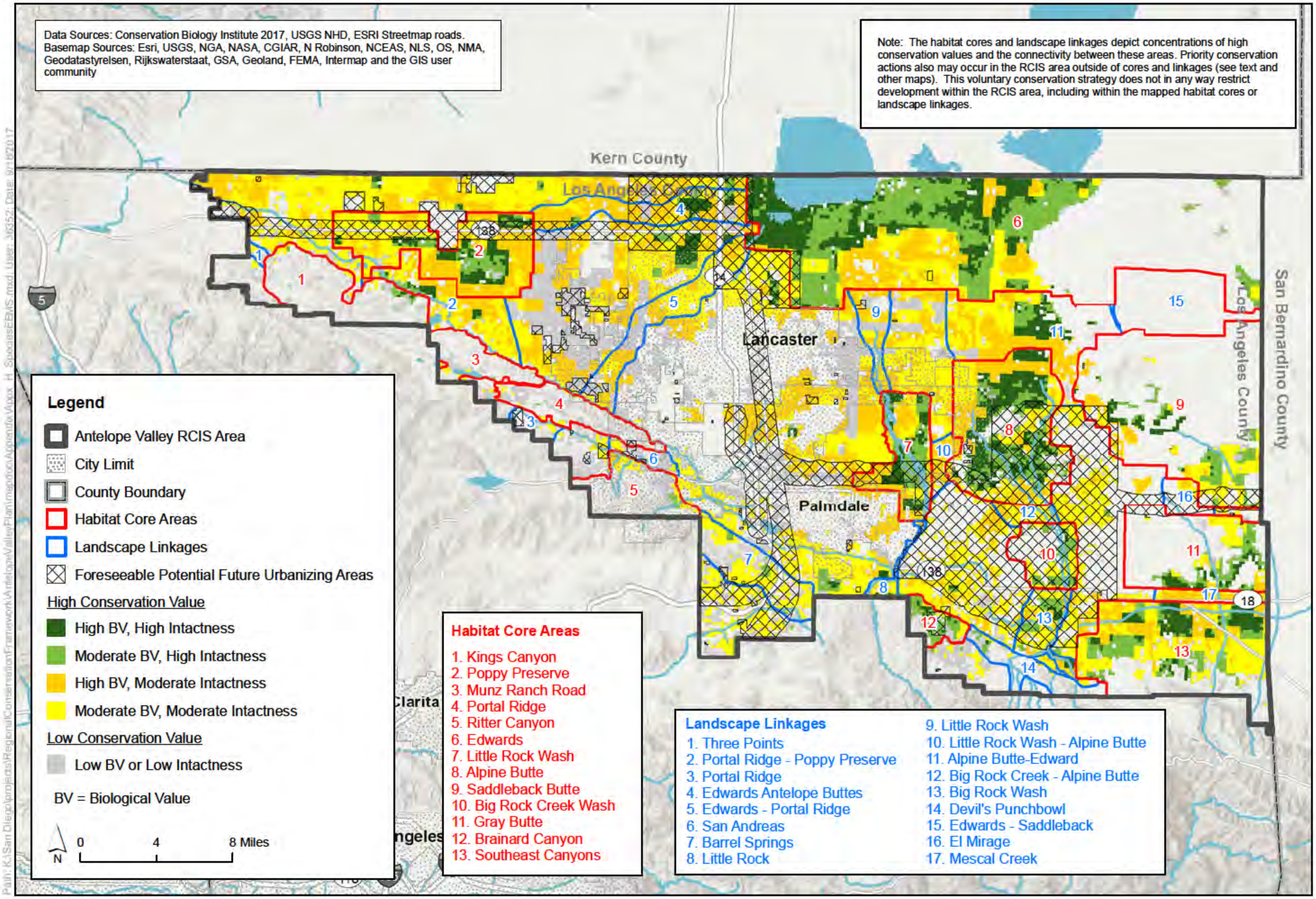


**Figure H-15**
**Loggerhead Shrike High Conservation Value Habitat (Agriculture and Grassland Species Group)**

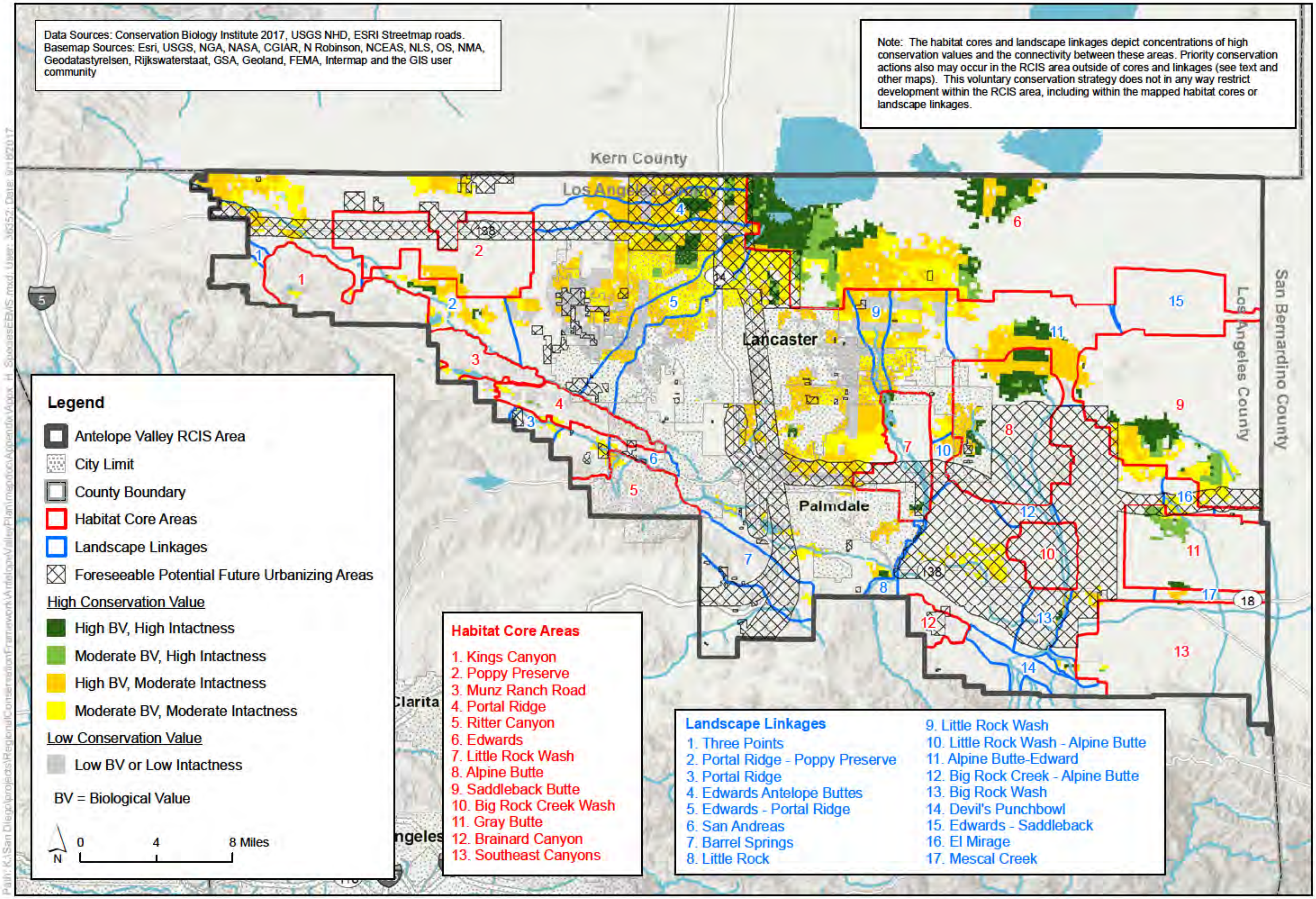


**Figure H-16**
**Long-Billed Curlew High Conservation Value Habitat (Agriculture and Grassland Species Group)**

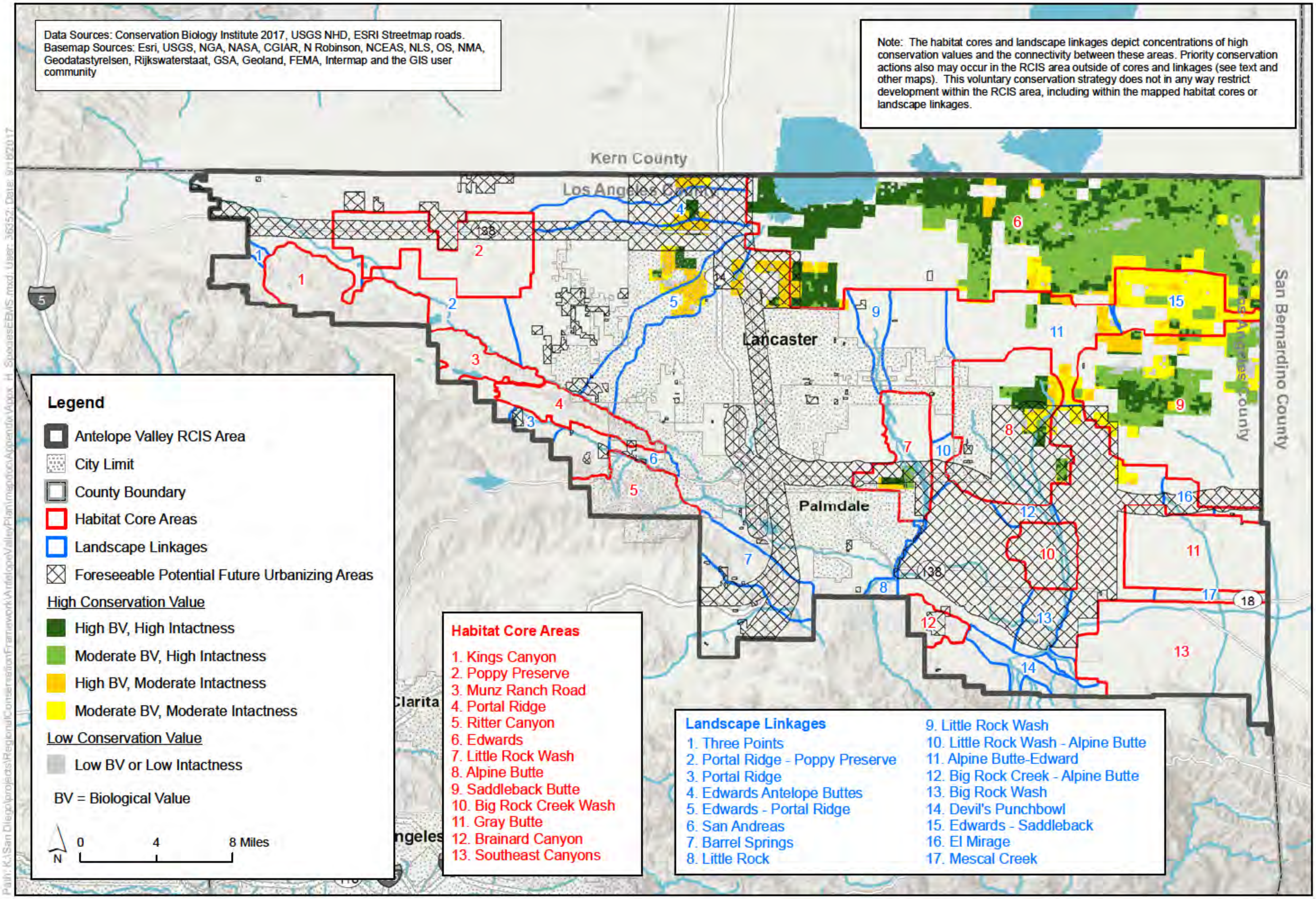


**Figure H-25**
**Mohave Ground Squirrel High Conservation Value Habitat (Desert Species Group)**

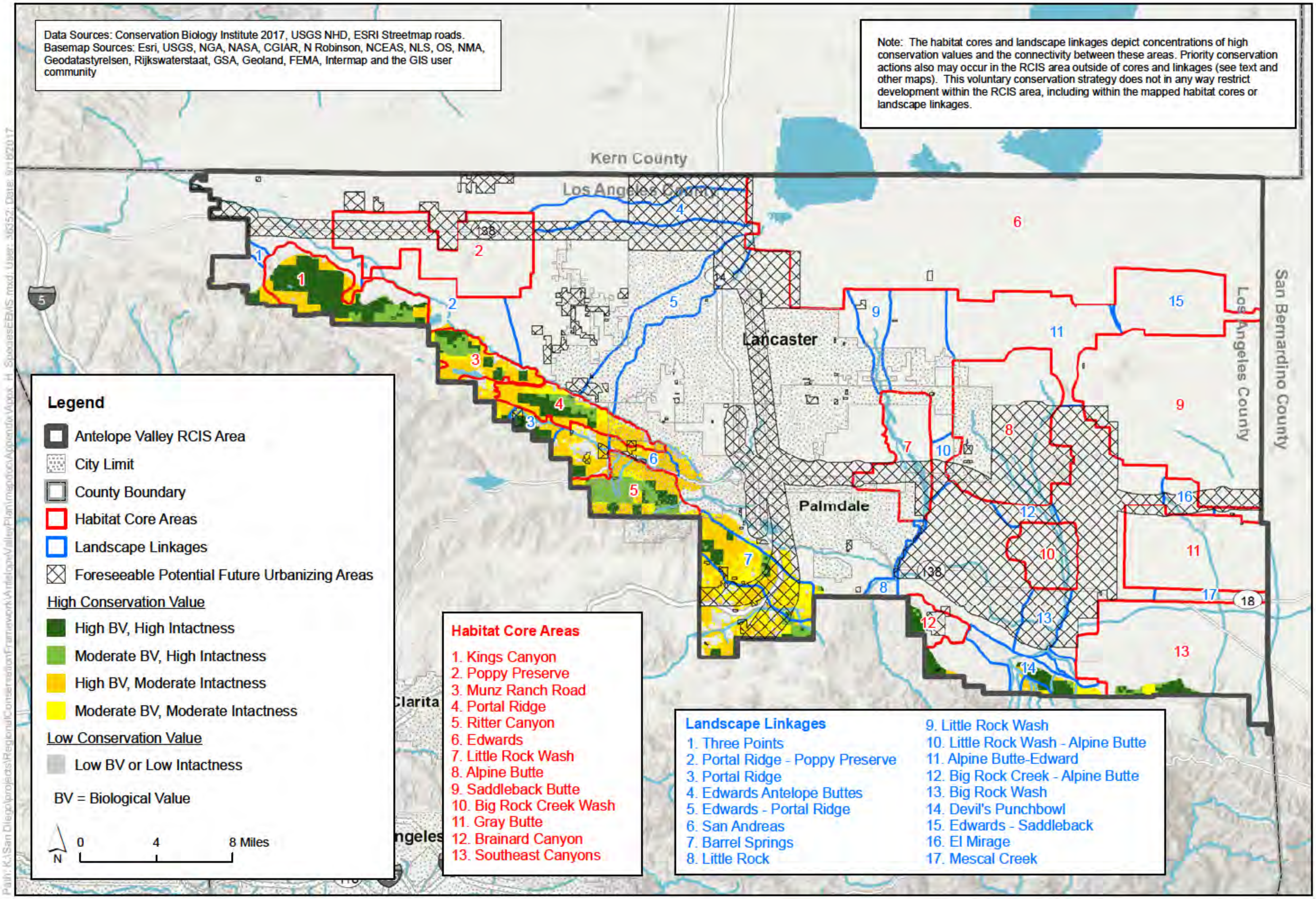


**Figure H-26**
**Mountain Lion High Conservation Value Habitat (Foothill and Riparian Species Group)**

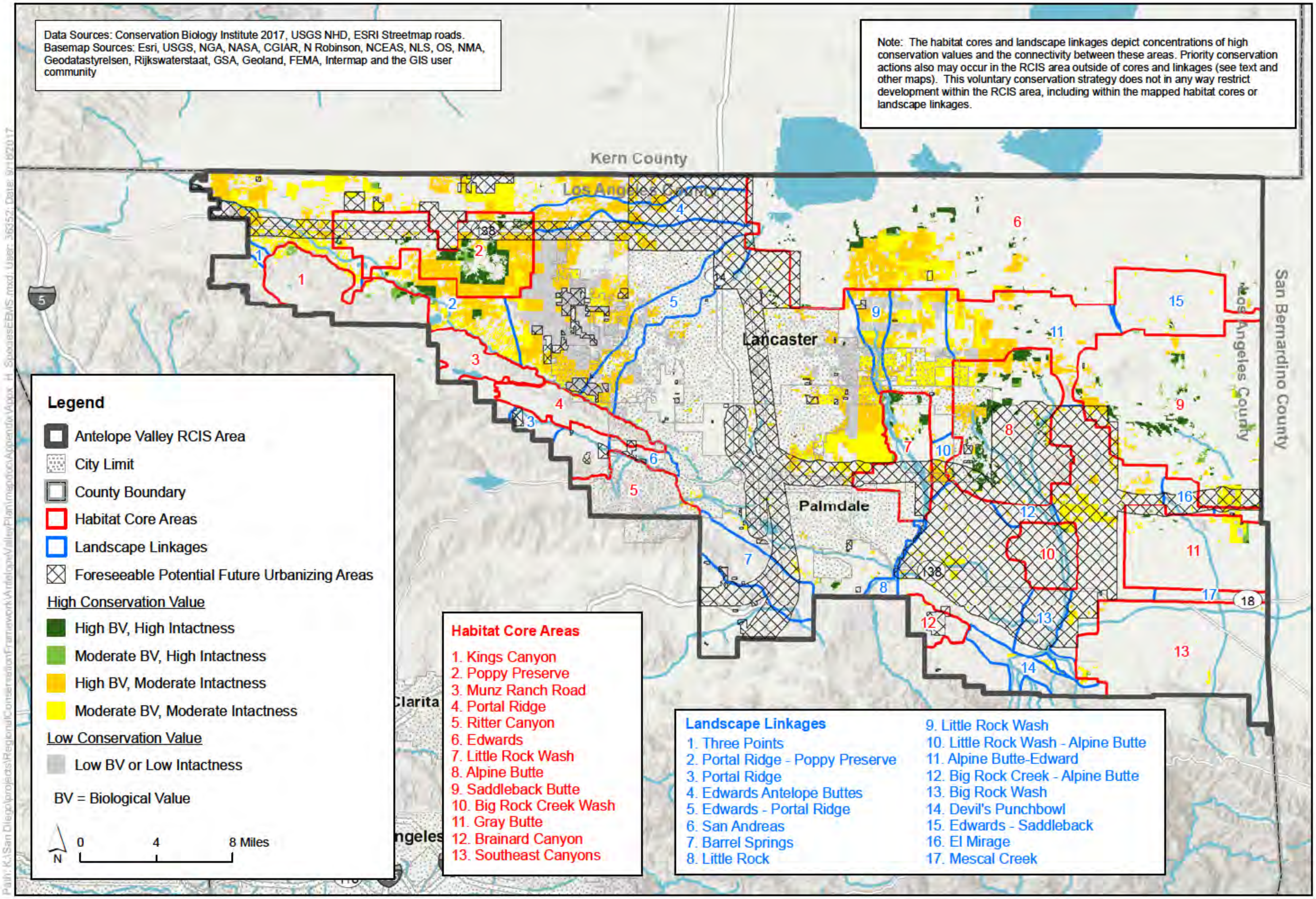


**Figure H-17**
**Mountain Plover High Conservation Value Habitat (Agriculture and Grassland Species Group)**

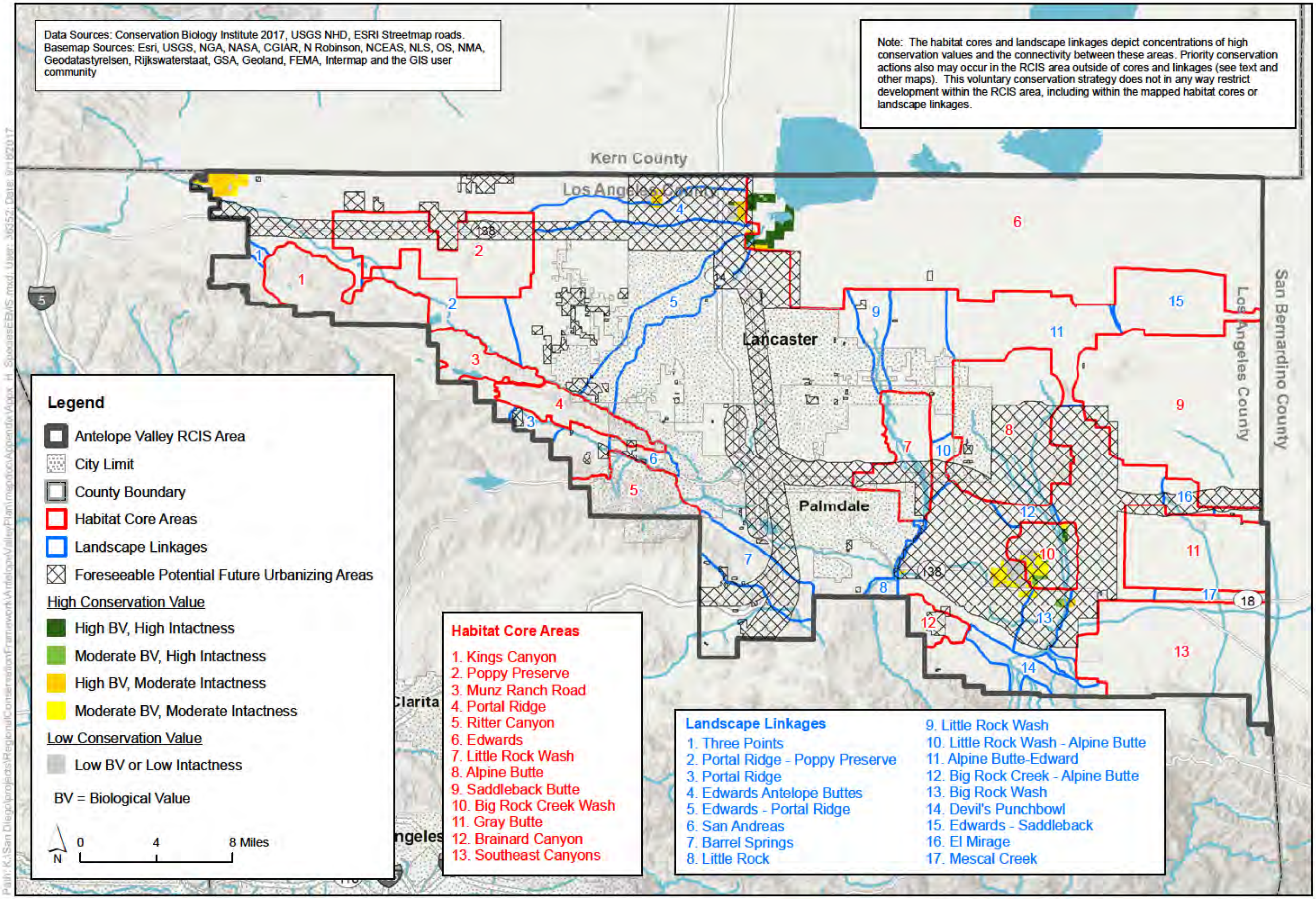


**Figure H-18**
**Northern Harrier High Conservation Value Habitat (Agriculture and Grassland Species Group)**

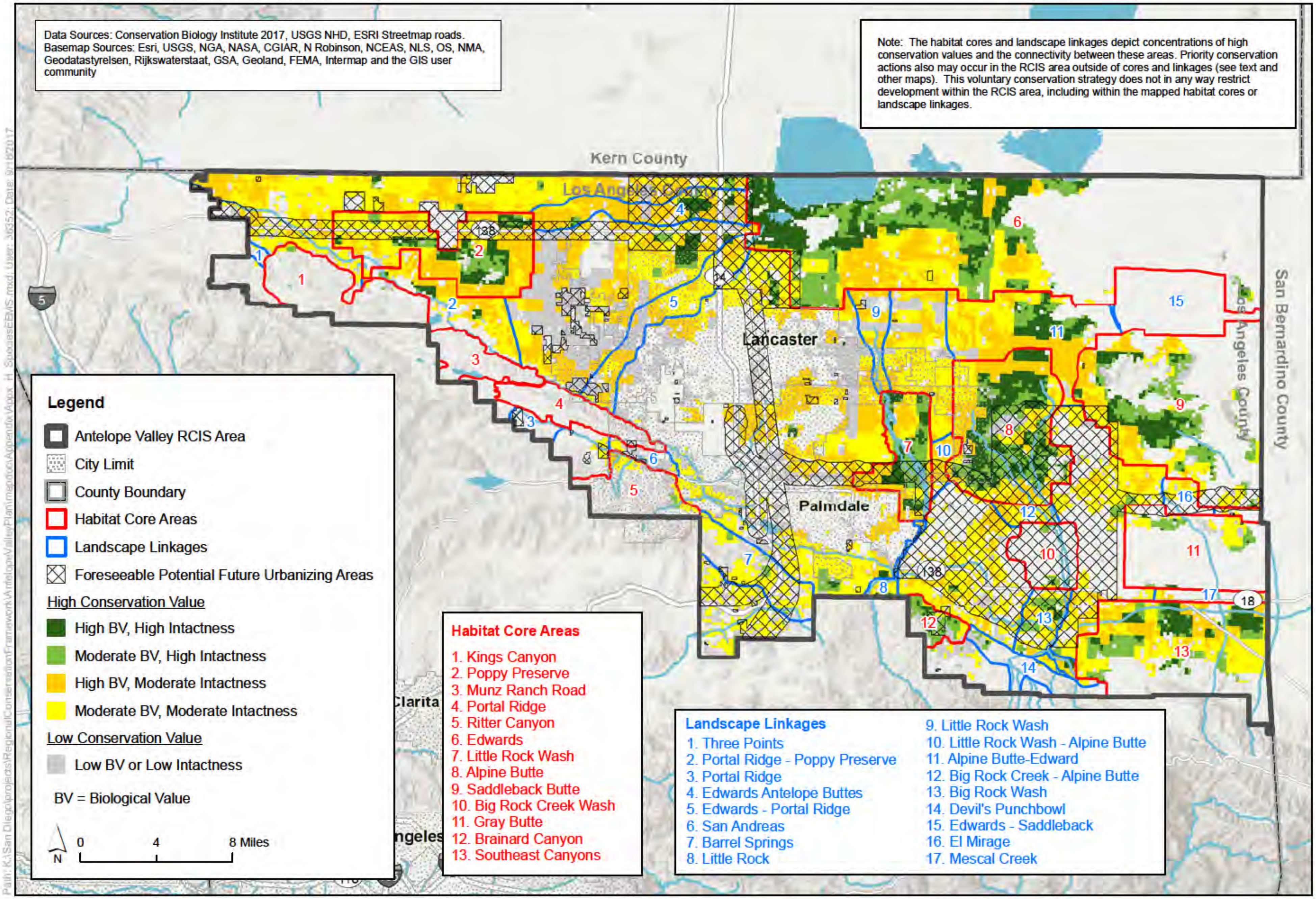


**Figure H-19**
**Prairie Falcon High Conservation Value Habitat (Agriculture and Grassland Species Group)**

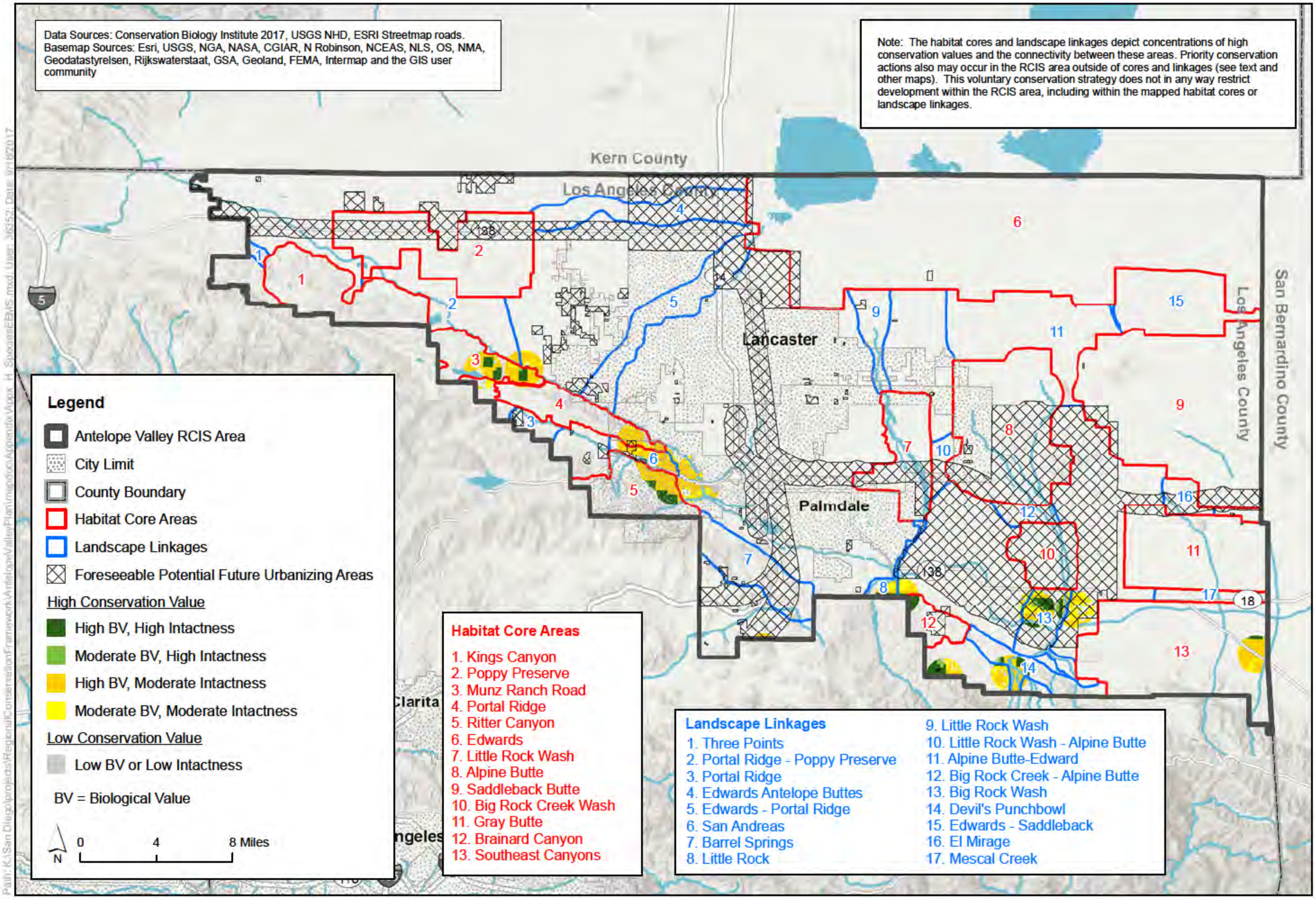


**Figure H-5**
**Short-jointed Beavertail Cactus High Conservation Value Habitat (Foothill and Riparian Species Group)**

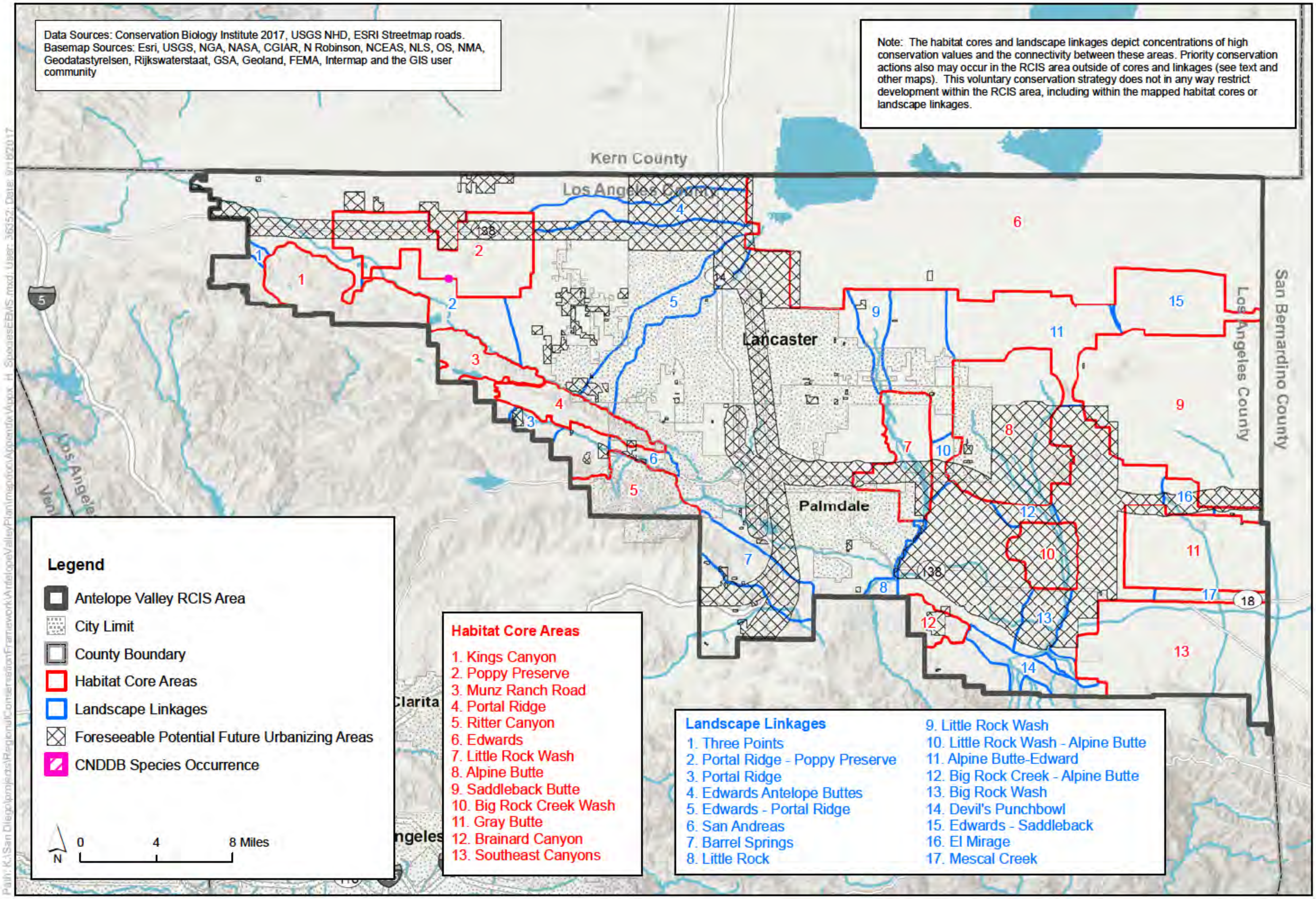


**Figure H-4**
**Spreading Navarretia Occurrence (no model) with Habitat Cores and Linkages**

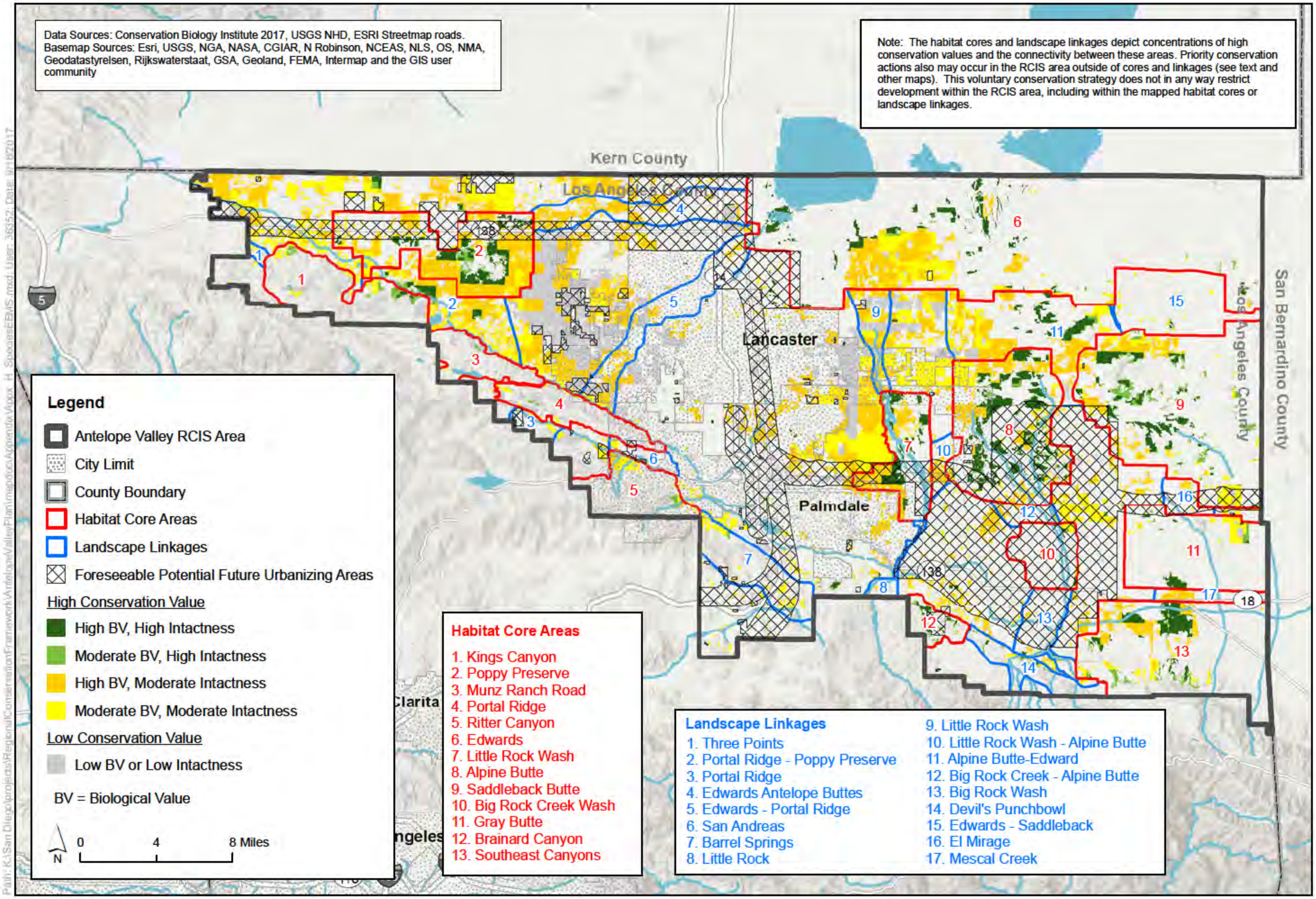


**Figure H-20**
**Swainson's Hawk High Conservation Value Habitat (Agriculture and Grassland Species Group)**

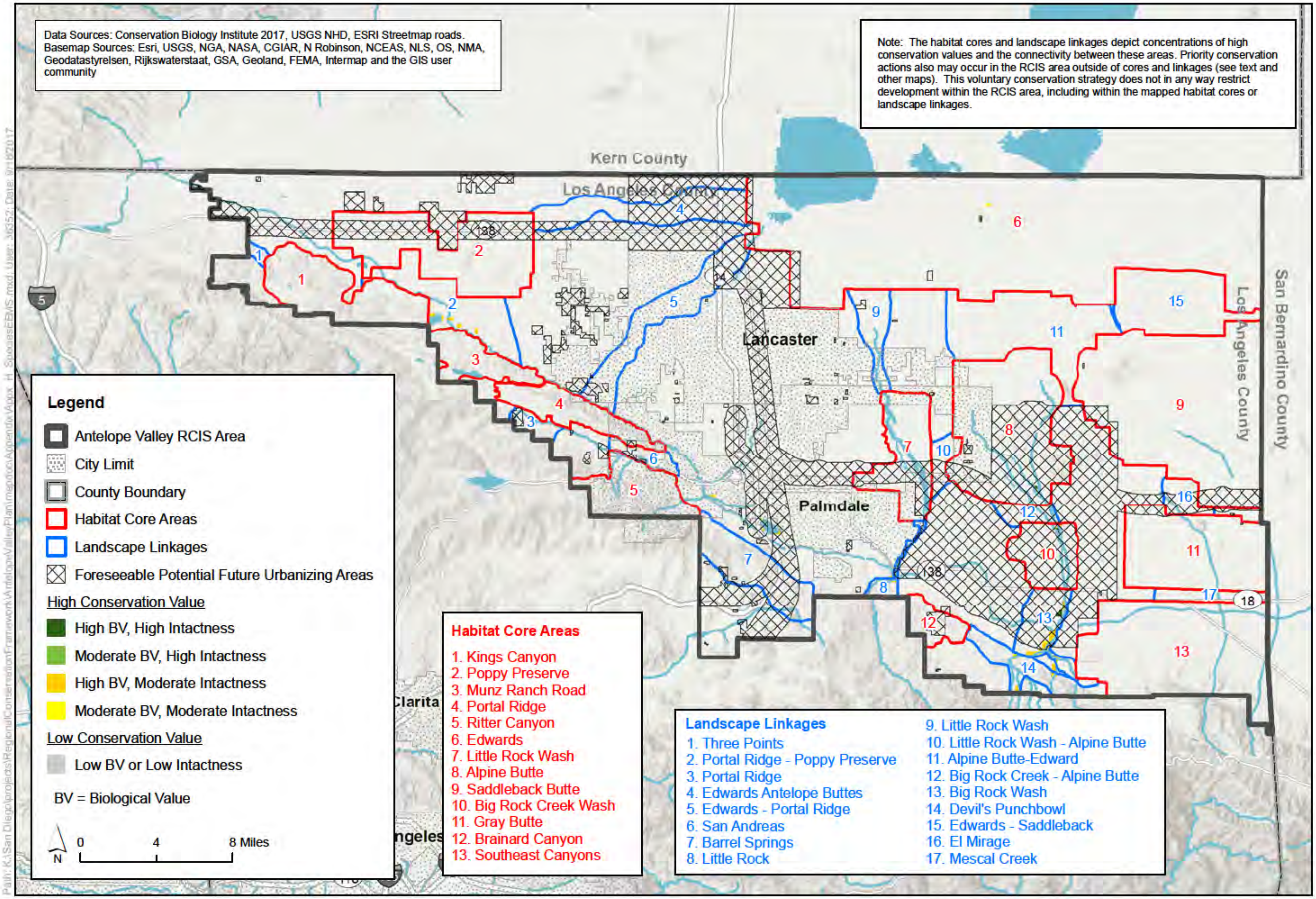


**Figure H-22**
**Willow Flycatcher High Conservation Value Habitat (Foothill and Riparian Species Group)**

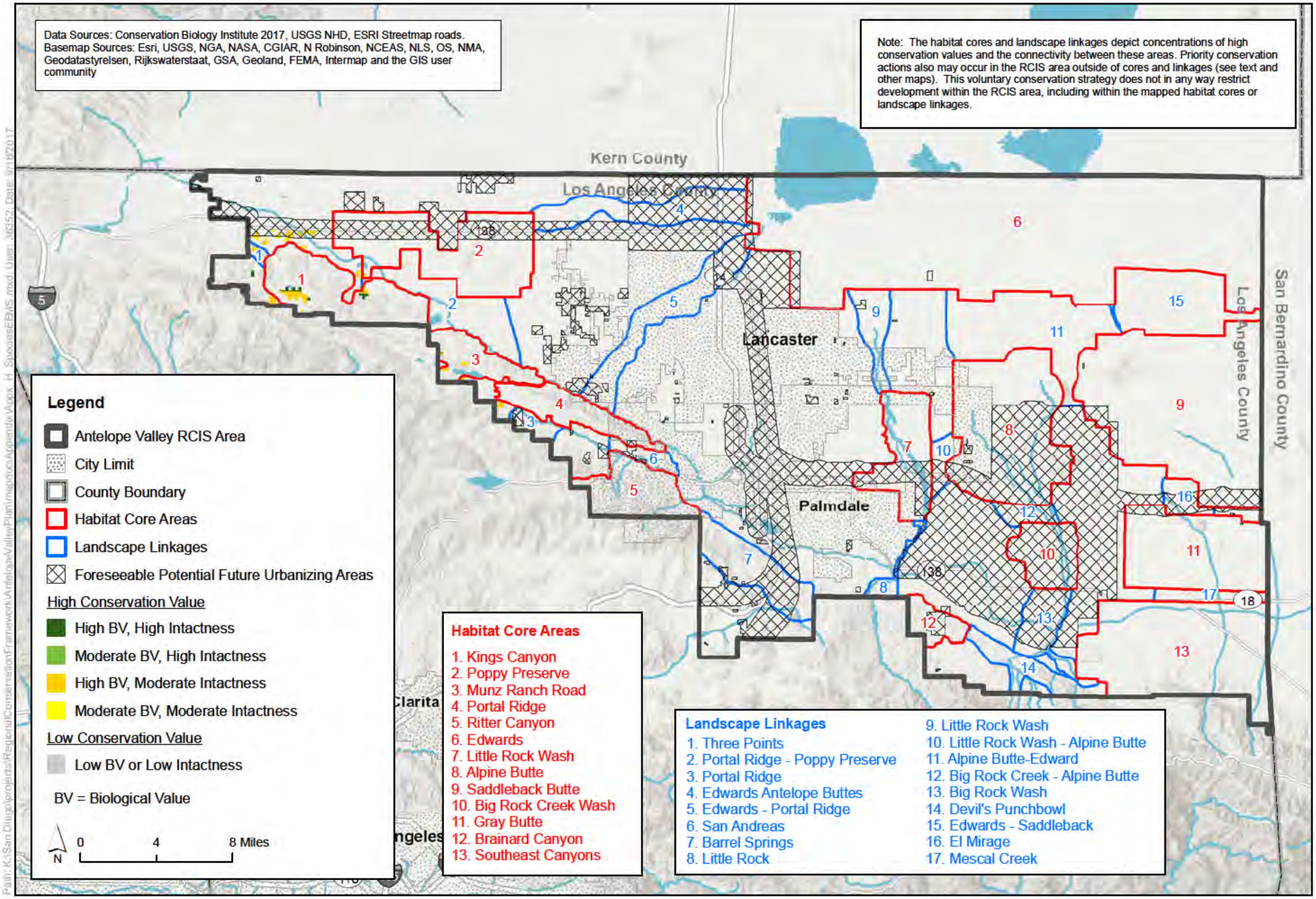


**Figure H-27**
**Tehachapi Pocket Mouse High Conservation Value Habitat (Foothill and Riparian Species Group)**

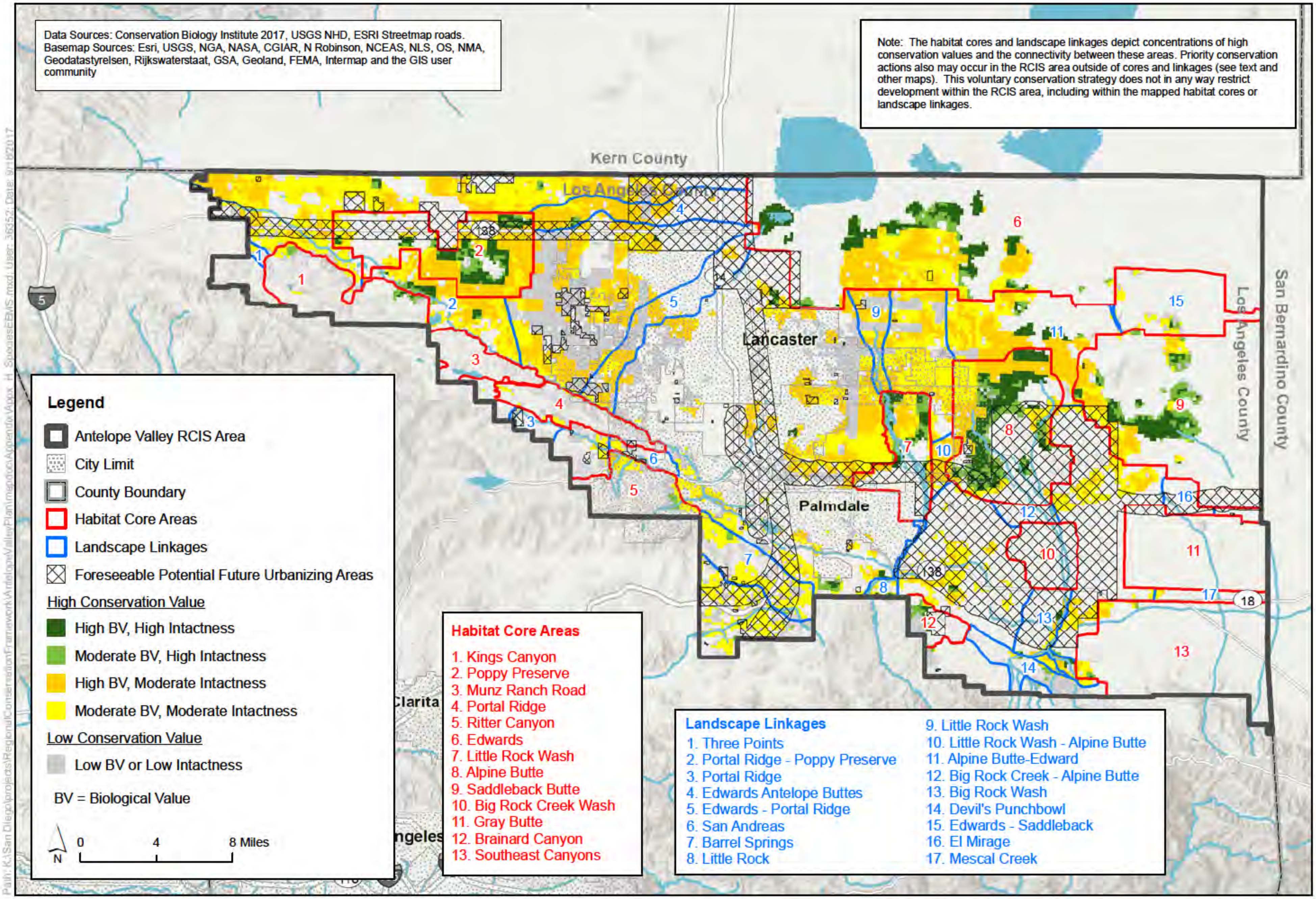


**Figure H-21**
**Tri-colored Blackbird High Conservation Value Habitat (Agriculture and Grassland Species Group)**

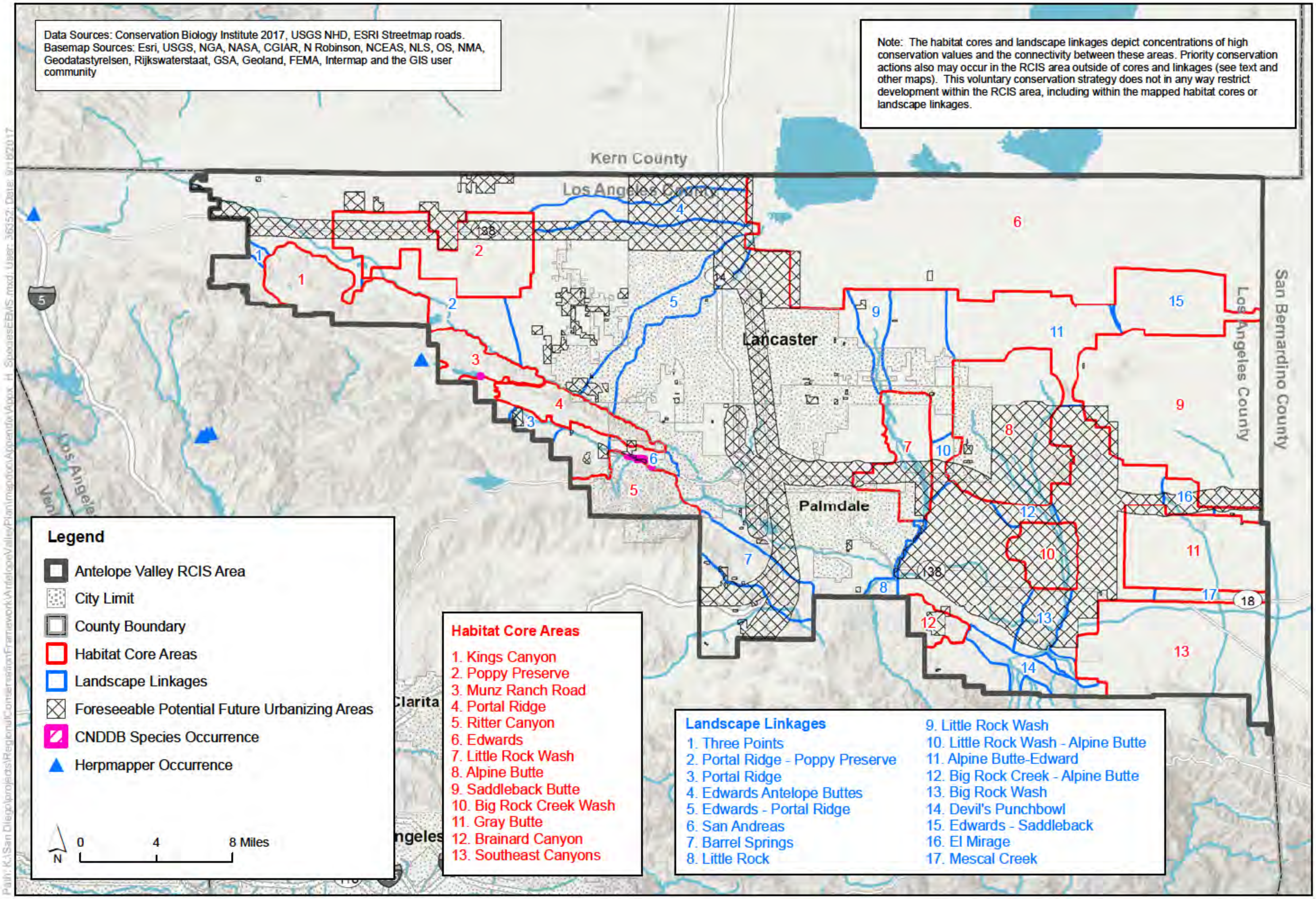


**Figure H-9**
**Western Pond Turtle Occurrence (no model) with Habitat Cores and Linkages**

Appendix I

# Land Cover Conservation Values Maps and Graphs

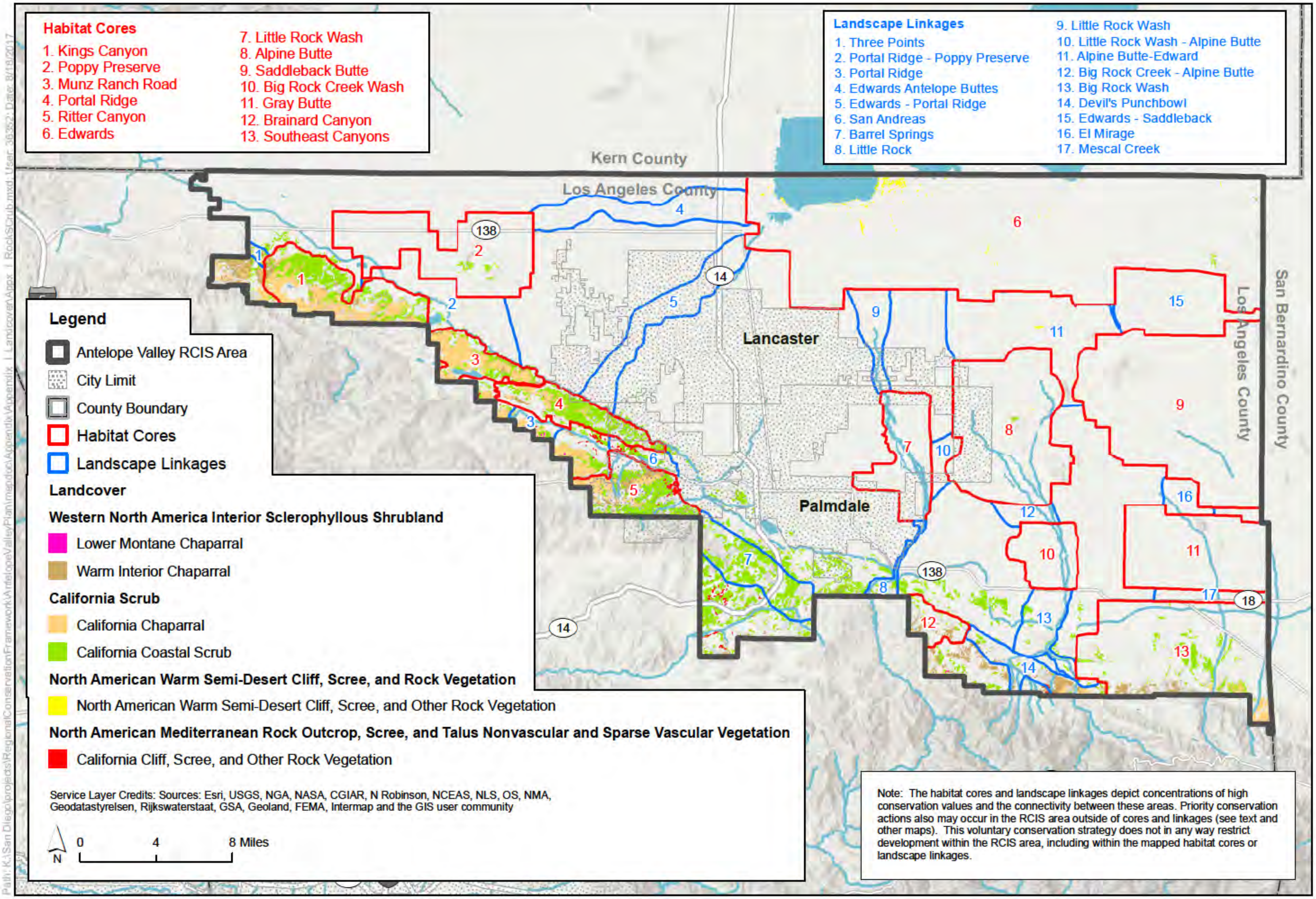


**Figure I-1**
**Rock and Scrub Land Cover with Habitat Cores and Landscape Linkages**

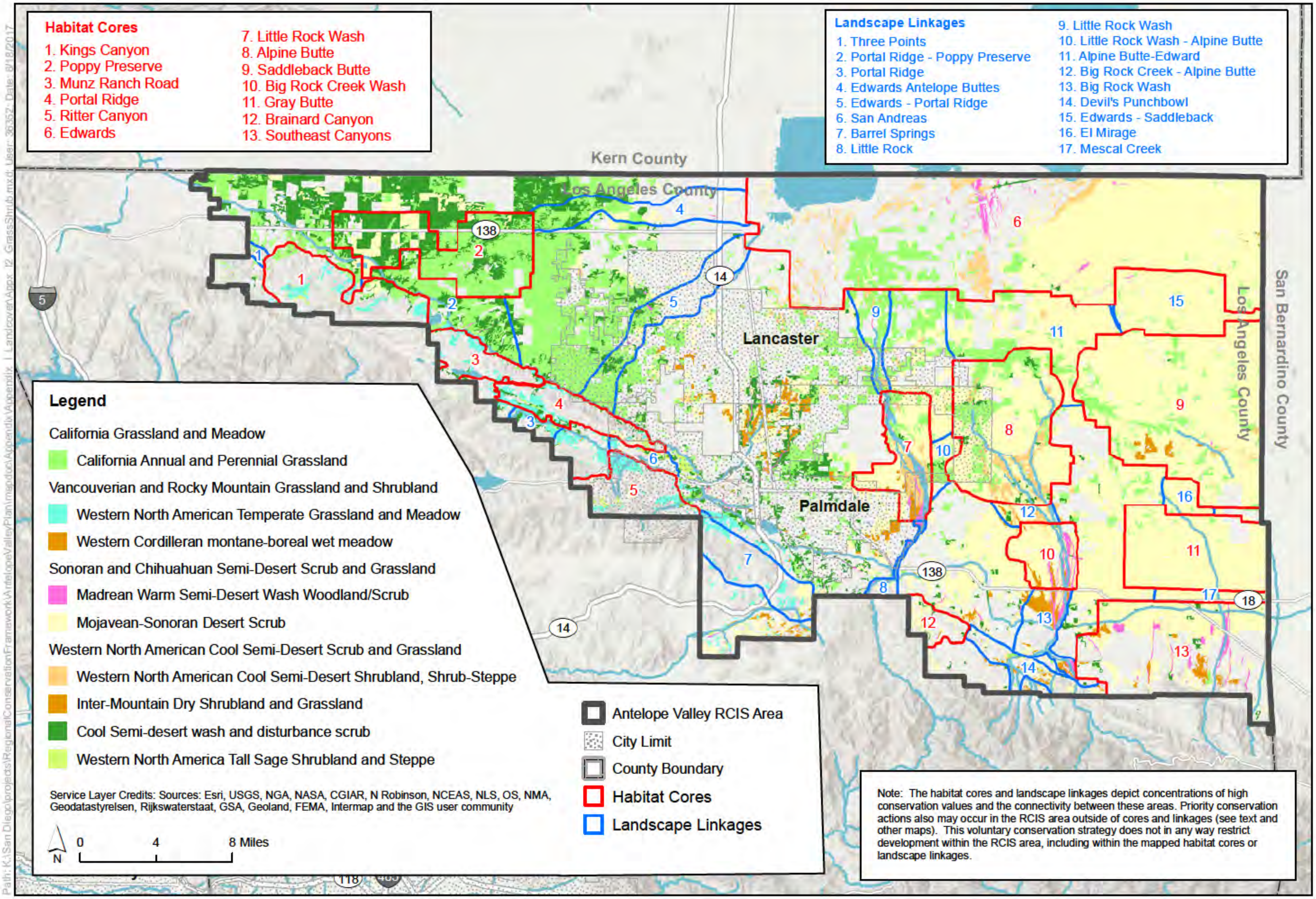


**Figure I-2**
**Grassland and Shrubland Land Cover with Habitat Cores and Landscape Linkages**

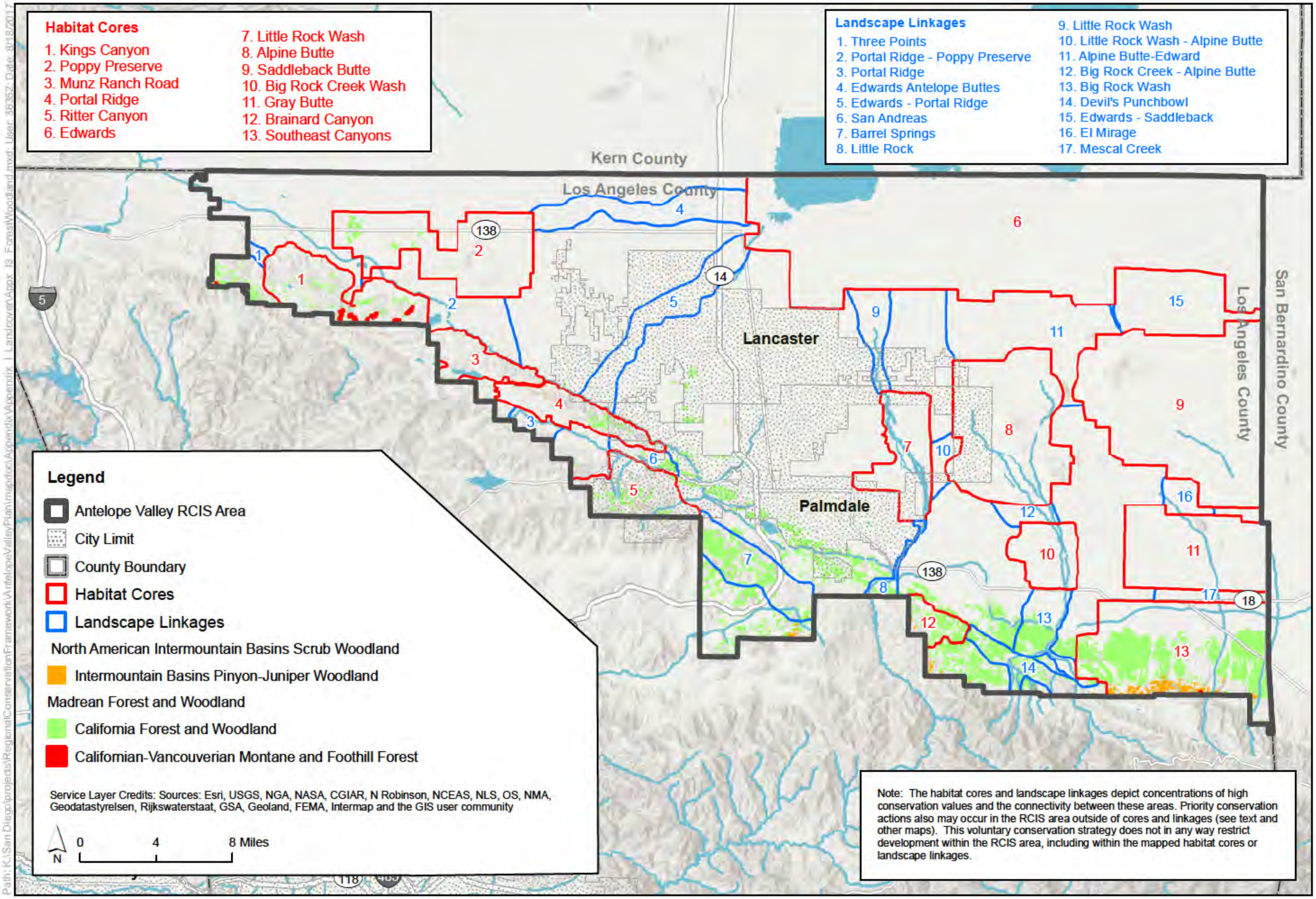


**Figure I-3**
**Forest and Woodland Land Cover with Habitat Cores and Landscape Linkages**

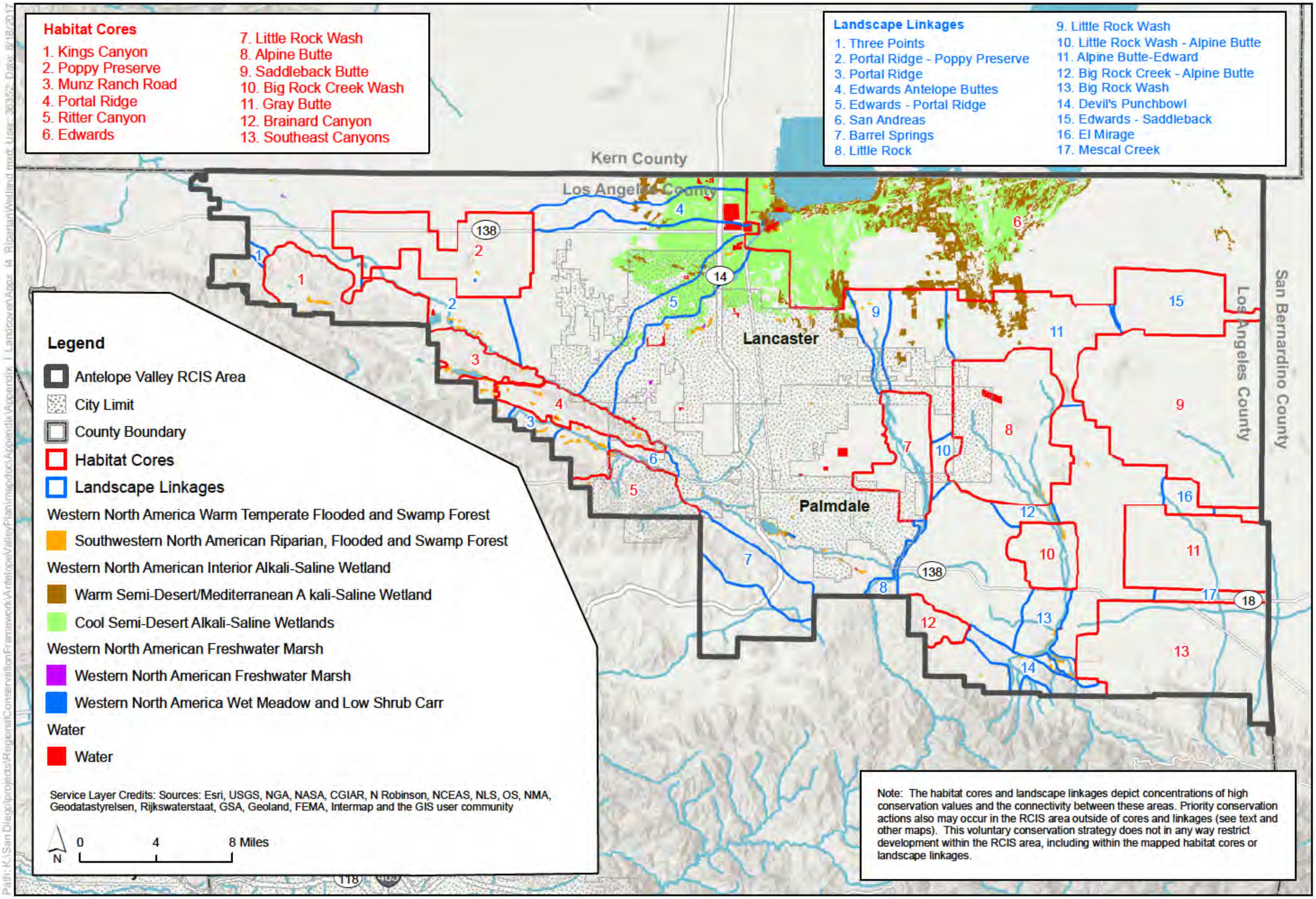


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**Figure I-4**
**Riparian and Wetland Land Cover with Habitat Cores and Landscape Linkages**

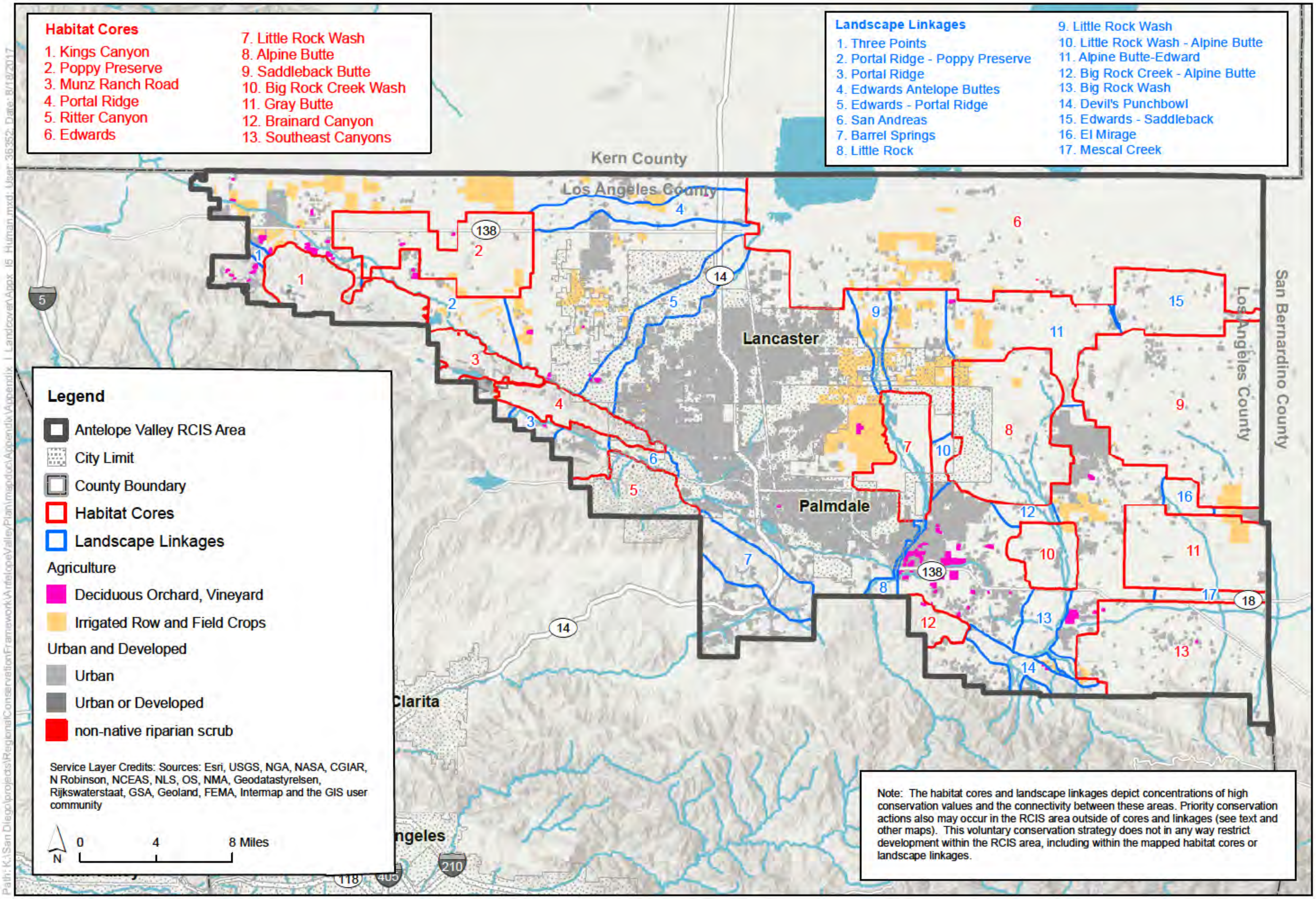


**Figure I-5**
**Agriculture and Developed Land Cover with Habitat Cores and Landscape Linkages**