

# Chapter 3

## Conservation Strategy

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## 3.1 Overview

This Conservation Strategy has two purposes. First, it is designed to convey the project-level permitting and environmental compliance requirements of ESA, CESA, CEQA, NEPA, and other applicable laws (see discussion in Chapter 1) for all projects within the study area with impacts on biological resources. Second, it is intended to create a vision for how biological resources in the study area should be conserved through the project permitting process and through non-regulatory conservation actions.

To support the project permitting process, the Conservation Strategy identifies a set of mitigation standards. These standards include avoidance and minimization measures and a compensation program to offset impacts expected from projects in the study area. They also include a set of specific management prescriptions to benefit natural communities and focal species. To address the needs of conservation actions that occur independently of project mitigation (e.g., by nonprofit organizations, land trusts, local agencies, or voluntary actions by private landowners), the Conservation Strategy sets long-range conservation

goals for preservation of all natural communities in the study area. The Conservation Strategy is designed to contribute to species recovery to help to delist the listed focal species and prevent the listing of non-listed focal species through the protection, restoration, and enhancement of natural communities and species habitat. By focusing on conservation at the natural community level as well as at the focal species level, the Conservation Strategy will also ensure that common habitats and common species continue to be common in the study area.

The Conservation Strategy is based on the best scientific data available at the time of its preparation and takes into account the limitations of the baseline data available for the study area (see Chapter 2). The strategy was developed to be flexible, with the assumption that it would be consistently updated as lessons are learned through implementation.

The Conservation Strategy is based on the conservation goals and objectives described below. To achieve these goals and objectives, a series of conservation actions have been developed that often meet multiple objectives or goals. The chapter is focused on conservation actions that will accomplish the conservation goals and objectives through the following general concepts.

- Coordinate the protection of remaining natural communities where they occur to allow them and the species that depend on them to persist in the study area (Table 3-1).
- Avoid and minimize project-level impacts on species and their habitats through avoidance and minimization measures that are consistently applied throughout the study area (Tables 3-2 and 3-3).
- Preserve major local and regional connections between key habitat areas and among existing protected areas.
- Restore natural communities that have been degraded or lost over time where possible.

The Conservation Strategy was designed using a multi-scale approach in accordance with principles of conservation biology. At the largest scale, conservation goals and objectives were developed to encompass ecological processes, environmental gradients, biological diversity, and regional wildlife linkages. Conservation actions were developed to implement these goals and objectives. These conservation actions occur at the landscape scale or *landscape level*—generally at the scale of miles or tens of miles. At the middle scale, conservation actions were developed to address natural communities primarily through the enhancement, restoration, and management of vegetation types (i.e., land cover types). This medium scale is called the *natural community level*. The final scale addresses the specific needs of focal species for protection and enhancement of individuals, populations, and groups of populations. *Species-level* conservation actions were developed to supplement

and focus actions developed at the broader scales and to ensure that all the needs of particular species are addressed.

The conservation actions are described below at the landscape, natural community, and species levels. All conservation actions are designed to have enough detail and specificity to allow implementation. Because of the regional scale of this Conservation Strategy, actions are also designed to be flexible. For example, natural community–level actions provide broad management guidelines and principles such that future land managers can implement specific techniques on the ground that are best suited to site conditions.

Implementation of many actions will require the preparation of site-specific implementation documents (e.g., reserve management plans, restoration plans), particularly if a site is intended to serve as mitigation for impacts from a project. These documents will be prepared during planning at the project level after land is acquired and specific restoration and management needs are determined. Management plans are intended to guide activities on conservation or mitigation parcels. In some cases, management documents will rely on existing agreements or regional initiatives provided by existing land management organizations (e.g., EBRPD, Tri-Valley Conservancy). Management plans for individual parcels or groups of parcels intended to provide mitigation for individual projects will be completed prior to project implementation and within 1 year of the first acquisition of the land, unless otherwise specified by federal and state resource agencies.

## 3.2 Project-Level Use of the Strategy

At the project level, information contained in this Conservation Strategy is meant to provide context and guidance to project applicants, local jurisdictions with permit authority, and resource agencies in determining the potential impacts of a project and the level and type of mitigation necessary to offset those impacts. The conservation gap analysis, described in detail in Section 3.4.1, provides information on where natural communities occur in the study area, how many acres are currently protected, and how many should be protected for the natural community to persist. This information is presented in a spatially explicit (i.e., conservation zones, Section 3.4.2) manner to inform project-level decisions at a manageable, regional scale.

The conservation goals and objectives provide a long-term vision of how conservation of resources should be implemented in the study area. Focal species habitat assessment scoresheets provide project applicants, local jurisdictions, and resource agencies with a consistent method to evaluate potential impacts and sources of mitigation. The quality of the habitat on a project site should be assessed, excluding the influence of current land management practices or other anthropogenic sources of disturbance (discussed in greater detail in Section 3.2.2). Once the quality of habitat is

determined for the focal species, standardized mitigation ratios can be applied, and in some cases adjusted, to determine the level of mitigation necessary for the project.

Once in place, all these components of the Conservation Strategy will streamline and increase the predictability of the permit process for both the project applicant and the local and resource agencies. Because the Conservation Strategy focuses on project-level conservation of natural communities and species, there may be areas within the Conservation Strategy project area that, due to the regional significance and presence of rare and unique natural communities and species, will require additional considerations that are beyond the scope of this Conservation Strategy.

This Conservation Strategy should be used during the entire project-level analysis, starting at project inception and ending at regulatory permits. In short, when project applicants and resource agencies are reviewing project impacts and making decisions about mitigation, they should apply the mitigation standards of the Conservation Strategy and determine if the mitigation supports its conservation goals and objectives. Further, they should determine whether the mitigation contributes to closing one or more conservation gaps for the focal species or natural communities in question within a given conservation zone, and ultimately within the study area. Additionally, the mitigation standards and analysis should not apply to projects that do not incorporate the conservation goals, objectives, and priorities of the strategy. Those projects will require additional analysis and most likely increased mitigation.

### **3.2.1 Standardized Mitigation**

Mitigation requirements are typically outlined at the species level when it is determined that focal species utilize affected land cover types for all or part of their life cycle. In cases where no focal or other native species are present but natural communities would be affected by a project, mitigation should be outlined for each land cover type in the CEQA document. As a general guideline, mitigation should include a provision for the protection of the same land cover type at a 3:1 ratio. The mitigation ratio may vary depending on the quality of habitat being lost. This ratio could vary further depending on the total acreage and quality of the natural community in that particular Conservation Zone. In other words, if the project will affect a rare natural community in the Conservation Zone, the ratio could be higher. If the community is fairly common, the ratio could be lower. Changes in the ratio would need to be justified through the CEQA process and in coordination with the Resource Agencies.

As mentioned above, most mitigation is assigned at the species level for impacts on species' habitat. Under this Conservation Strategy, standardized mitigation ratios have been determined for each focal species. Standardized mitigation

ratios were developed for each federally listed wildlife species; more general ratios were developed for plant species and non-listed wildlife species. The variations in how mitigation ratios are applied under this strategy depend on the amount of information available for the species in the study area and the degree to which that information can be systematically applied. The standardized mitigation ratios are shown in Tables 3-4 through 3-12. Figures 3-6 through 3-14 show spatially explicit information about how the ratios are applied. It is imperative that when determining the mitigation ratio for a focal species both the species' standardized mitigation ratio table and figure are consulted. Like mitigation ratios for natural communities, these species ratios provide guidance for project applicants and agency personnel. If the project area is more sensitive or if proposed mitigation sites have a higher habitat value, then ratios should be adjusted accordingly. In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation.

Mitigation is assigned through the permitting process and either written into a permit as a *permit condition* or included in a CEQA document as a mitigation measure. The standardized mitigation ratios presented in the Conservation Strategy are only valid if a project application is in compliance with all other parts of the Conservation Strategy (i.e., avoidance and minimization measures).

### **3.2.2 Impact/Mitigation Scoring of Focal Species Habitat**

In addition to mitigating the loss of focal species habitat on the basis of acreage, it is the intent of the Conservation Strategy to ensure that species' habitat quality is preserved. The Conservation Strategy includes some general guidelines on how to quantify the quality of species habitat both on project sites where impacts might occur and on proposed mitigation sites, where those impacts are supposed to be offset. A scoresheet has been developed for each focal species using the key life history characteristics that make habitat suitable for that species (Appendix E). The intent of the scoresheets is to allow for a project site to be assessed by a qualified biologist/botanist, determining if it is habitat for a focal species, and then to use the same criteria to assess any proposed mitigation sites. It is important that project sites and mitigation locations are assessed on the basis of their basic habitat values, disregarding current land uses and management activities. For example, if a parcel supports upland habitat for California tiger salamander because it is within the typical dispersal distance from a known breeding site, it would be scored as such even if it was currently disked by the landowner. In other words, the maximum potential habitat quality of a site will be used when judging habitat quality.

By using this approach, project applicants, local jurisdictions, and resource agencies can make consistent determinations about habitat quality for species and can more easily achieve consensus on whether a mitigation site

appropriately compensates for the impacts that will occur on the project site. Using the outcomes of the scoring effort, project applicants and resource agencies can determine if the standardized mitigation ratios presented for focal species in Tables 3-4 through 3-12 are appropriate or if adjustments need to be made.

### 3.3 Independent Conservation Actions

While much of this Conservation Strategy is focused on how mitigation should be implemented for development or infrastructure projects, an additional benefit of a long-range Conservation Strategy is to bring focus and purpose to independent conservation actions inside the study area. By outlining conservation goals and objectives for the study area and completing a conservation gap analysis, this Conservation Strategy creates a framework for future conservation efforts in the study area. For example, as new land acquisitions occur, the level of protection of various natural communities can be tracked against the current gaps in protection. This Conservation Strategy provides a “roadmap” for land acquisition organizations and informs future land acquisition decisions. This strategy also allows private landowners to better understand the conservation value of their lands in a regional context. The strategy could be used to justify financial assistance to landowners for voluntary conservation projects on land with high conservation values.

### 3.4 Methods and Sources

The primary data sources for the Conservation Strategy were scientific literature, recovery plans, species accounts from adjacent conservation plans, and occurrences documented in the California Natural Diversity Database. That information is summarized in the ecological accounts of focal species (Appendix D), the species distribution models (Appendix D), and the inventory of existing conditions summarized in Chapter 2. Other sources consulted to develop the Conservation Strategy are cited throughout the chapters. Additional general sources are listed below.

- Various accounts of focal species biology and natural community function in the scientific literature (cited as referenced).
- Species recovery plans, if available:
  - California Red-Legged Frog (U.S. Fish and Wildlife Service 2002a).
  - Upland Species of the San Joaquin Valley (U.S. Fish and Wildlife Service 1998a).
  - Draft Recovery Plan for Chaparral and Scrub Communities Species East of San Francisco Bay, California (U.S. Fish and Wildlife Service 2002b).

- ❑ Vernal Pool Ecosystems of California and Southern Oregon (U.S. Fish and Wildlife Service 2005).
- Species and natural community experts, including USFWS and CDFG agency personnel.
- Approved or in-process conservation plans for adjacent or nearby areas with similar natural communities and focal species:
  - ❑ San Francisco Public Utilities Commission Alameda Watershed HCP (in process).
  - ❑ Altamont Pass Wind Resources Area NCCP/HCP (in process).
  - ❑ Pacific Gas & Electric Company Bay Area Operations and Maintenance HCP (in process).
  - ❑ East Contra Costa County HCP/NCCP (approved).
  - ❑ Santa Clara Valley HCP/NCCP (in process).
  - ❑ San Joaquin County HCP (approved).
  - ❑ East Bay Regional Park District HCP (in process)

### 3.4.1 Conservation Gap Analysis

A key step in the development of a regional Conservation Strategy is to determine the existing level of protection for natural communities and focal species. Species or natural communities with low levels of existing protection may require greater emphasis in the strategy to ensure that their conservation in the study area is assured. In contrast, species or natural communities that are well protected may need little or no additional focus from the strategy. For these species, the conservation goals and objectives may instead focus on habitat restoration or improved habitat management in existing protected areas.

The analysis conducted to determine the levels of existing protection of species and natural communities is called a *conservation gap analysis*. The methods used were based on similar approaches applied at the national, state, and local levels (Scott et al. 1993, 2001; Wild 2002).

Conservation biology theory holds that by protecting a wide variety of ecosystems and natural communities or land cover types at a broad scale, the majority of the biological diversity contained within these natural communities will also be protected (Noss 1987; Hunter 2005). This approach is complemented by then focusing on finer scale resources such as species occurrences, species habitat, or unique physical features to conserve biological diversity not protected by the broader scale approaches. That additional focus is incorporated through species-level conservation goals and objectives.

### 3.4.1.1 Conservation Gaps in the Study Area

To determine the gaps in protection in the study area, the following GIS data layers were overlaid with the open space Types 1, 2, and 3 layer (Figure 2-3).

- Land cover (see Chapter 2 and Figure 2-8).
- Species habitat distribution models (see Chapter 2 for a general description of these models and Appendix D for the model parameters for each species).

The results of the conservation gap analyses are presented in Table 3-1 for land cover types. Data are presented by open space Types 1 and 2 (see Chapter 2 for a definition of open space types). Together, these results lay the groundwork for land preservation goals in the study area. Understanding the quantity and location of resources in the study area will inform regulatory decisions and mitigation concepts at the project level under the guidance of the Conservation Strategy.

Many natural land cover types have greater than 25% of their extent in open space Types 1 or 2 (Table 3-1). Types 1 and 2 have sufficient protections and management strategies in place for this strategy to consider them “protected.” These protected areas can be leveraged when protecting new areas to gain a larger conservation benefit for natural communities and species. Natural land cover types that have a high percentage protected relative to the total acres of the land cover that occur in the study area (>40%) are coulter pine woodland (81%), serpentine bunchgrass grassland (65%), sycamore alluvial woodland (50%), and rock outcrop (46%). While these natural communities are considered protected under this strategy, they are considered rare and will be conserved to the maximum extent possible. Natural land cover types with the lowest proportion in open space overall and where the conservation gaps are greatest are northern mixed chaparral–chamise chaparral (0%), Sargent cypress woodland (0%), perennial freshwater marsh (0%), and mixed willow riparian forest and woodland (<0.1%). Cropland land cover types are also poorly represented in open space in the study area overall.

## 3.4.2 Geographic Units of Conservation

The study area was subdivided into 18 discrete units called *conservation zones* (CZs) (Figure 3-1) to identify locations for conservation actions in areas with the same relative ecological function as those areas where impacts occur. The primary purpose of these CZs is to describe the specific areas in which conservation actions such as land acquisition will occur, without identifying individual parcels. This focuses the conservation actions in a spatially explicit manner while maintaining the flexibility to conduct these actions on different parcels and using different mechanisms (e.g., acquisition vs. incentives) to meet

the conservation objectives. The arrangement of the zones also provides a mechanism to apply conservation actions at several spatial scales using consistent units (e.g., within a watershed, within a combination of zones, or within a single zone).

The conservation zones were developed using subwatershed boundaries from the California Department of Water Resources (Figure 2-7). Other adjustments were made to the zone boundaries to facilitate the Conservation Strategy; for example, the large Livermore subwatershed that crosses I-580 was split into two subwatersheds for planning purposes<sup>1</sup>, and subwatersheds that were partially outside the study area were combined with others that were completely inside.

To ensure that habitat protection occurs in locations that will maximize the benefits to natural communities and focal species, protection recommendations are defined by conservation zone. A discussion of the conservation value and conservation acreage goals for each CZ is outlined in Chapter 4.

Recommendations by CZ were calculated by applying the percentage of a land cover type that needs to be protected throughout the study area to the fraction of each land cover type in each zone. This approach will allow for a more relevant assessment of the importance of resources in each zone during project review and determine where the conservation focus should be for each part of the study area.

Land cover types are grouped by natural community and shown in Figures 3-2 through 3-5. The conservation priorities in each CZ were determined by (1) the rarity of the resource in the zone and in the study area, (2) the current and future threats on the persistence of the resource in the zone and in the study area, and (3) the acreage of the land cover type under protection in each zone relative to its distribution in the study area.

## 3.5 Conservation Goals and Objectives

Most of the conservation goals and objectives are designed at least to maintain current populations of focal and other native species in the study area. In some cases, populations of focal species are expected to increase as a result of land preservation, management, habitat enhancement, habitat restoration, and habitat creation. Each conservation goal is supported by several conservation objectives, presented below. All conservation goals and objectives will be achieved through the implementation of conservation actions at the project level.

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<sup>1</sup> In addition, major roadways such as I-580 create barriers for many of the focal species (e.g., California red-legged frog) making it more realistic to split such subwatersheds into separate conservation zones.

## 3.5.1 Landscape-Level Goals and Objectives

### 3.5.1.1 Landscape Goals and Objectives

#### Goal 1

Protect and enhance natural and semi-natural landscapes that are large enough to accommodate natural processes beneficial to populations of native species.

**Objective 1.1.** Protect a range of environmental gradients (such as slope, elevation, aspect) across a diversity of natural communities within the conservation zones.

**Objective 1.2.** Protect riverine systems and hydrologic function within the study area through protection and management of terrestrial land covers, streams, ponds, and wetlands across all watersheds of the study area.

**Objective 1.3.** Allow natural disturbance regimes required for natural community regeneration and structural diversity and native species germination and recruitment to occur on protected lands within the study area or implement management actions that mimic those natural disturbances.

**Objective 1.4.** Eradicate or reduce the cover, biomass, and distribution of targeted nonnative invasive plants and reduce the number and distribution of nonnative invasive animals using IPM principles to enhance natural communities and native species habitat on protected lands within the study area.

**Objective 1.5.** Reduce edge effects of development on natural and semi-natural landscapes.

#### Goal 2

Maintain and enhance the effective movement and genetic exchange of native organisms within and between natural communities inside and outside the study area.

**Objective 2.1.** Maintain connectivity for wildlife populations inside the study area through protection and enhancement of functional linkages across I-580 and I-680 to allow for movement of focal and other native species.

- *Conservation Action LAN-1.* Identify important linkages and pinch-points for wildlife connectivity along major roadways and prioritize them for protection and/or enhancement.
- *Conservation Action LAN-2.* Protect and enhance important linkages and pinch-points to encourage wildlife passage through the use of strategically

placed fencing and vegetation, especially along riparian corridors and at roadway underpasses.

- *Conservation Action LAN-3.* Where biologically appropriate, resize or redesign culverts to better accommodate wildlife passage under major roadway barriers.
- *Conservation Action LAN-4.* Fund and implement a monitoring program both to identify important linkages along major barriers and to determine the effectiveness of enhancement actions at protected undercrossing points

**Objective 2.2.** Protect and enhance habitat linkages between the study area and lands outside of the study area to enhance regional connectivity.

- *Conservation Action LAN-5.* Coordinate acquisitions related to mitigation or other conservation in eastern Alameda County with conservation programs in adjacent counties.

**Objective 2.3.** Retain, and if possible, increase the functionality of movement corridors across Vasco Road, the South Bay Aqueduct, SR 84, I-580, and I-680 for a range of species to move safely within and through the study area.

- *Conservation Action LAN-6.* Identify known crossings and potential crossings for San Joaquin kit fox, American badger, and other highly mobile mammalian species.
- *Conservation Action LAN-7.* Identify existing crossings with suitable habitat for focal species on both sides of the roadway (e.g., crossings with California tiger salamander breeding habitat on both sides of the underpass).

### Goal 3

Maintain a coordinated “Protected Lands” database that tracks the total acreage of each natural community as well as documented occurrences of focal species on current and newly acquired parcels in the study area.

**Objective 3.1.** Develop, maintain, and administer a protected lands database.

### 3.5.1.2 Regional Connectivity and Habitat Linkages

Landscape-level goals are intended to maintain and enhance the effective movement and genetic exchange of native organisms within and between natural communities inside and outside the study area (Goal 2). In order to maintain connectivity for wildlife populations within the study area, project-driven mitigation and independent conservation actions would need to protect and enhance functional linkages across major highways (e.g., I-580 and I-680) to allow for movement of species (Objective 2.1). Initially, the Implementation Committee could identify important linkages and “pinch-points” (migration areas with restricted or disturbed corridors) to prioritize for protection or

enhancement (LAN-1). The functionality of movement corridors across Vasco Road, SR 84, I-580, and I-680 have already been identified as important movement corridors within the study area that should be enhanced (Objective 2.3). Wildlife passage through important corridors could be encouraged by using strategically placed fencing and vegetation, especially along riparian corridors and at roadway underpasses (LAN-2), and by resizing or redesigning culverts (LAN-3). A monitoring program could help identify linkages and determine the effectiveness of enhancement actions (LAN-4). This could be a grant-funded initiative that is conducted across the study area. Known and potential crossings should be identified for San Joaquin kit fox, American badger, and other highly mobile mammalian species (LAN-6). Crossings on either side of roadways should also be identified for focal species, such as California tiger salamander, which may have breeding habitat on both sides of an underpass (LAN-7).

To enhance regional connectivity, the coordinated mitigation and independent conservation actions would also need to protect and enhance habitat linkages between the study area and lands outside the study area (Objective 2.2). Land acquisitions related to mitigation or other conservation in eastern Alameda County could be coordinated with conservation programs in neighboring counties (LAN-5). A “Protected Lands” database should be developed to track the total acreage of each natural community and to document occurrences of focal species on current parcels in the study area as well as on newly acquired parcels (Goal 3). The Implementation Committee would identify the entity that would develop, maintain, and administer this database (LAN-8).

### **3.5.2 Natural Community–Level Goals and Objectives**

Conservation goals developed at the community level aim to protect and enhance the functionality and ecological value of each natural community. Goals and objectives were developed for four terrestrial communities in the study area: grassland, chaparral and scrub, oak woodland, and conifer woodland. For aquatic communities, the conservation goals mainly strive to improve the overall quality of aquatic and riparian communities as well as the hydrologic and geomorphic processes that support them to maintain functional aquatic communities. Conservation goals and objectives were developed for three aquatic communities: riparian forest and scrub, wetland and pond, and streams. By focusing protection goals and management objectives at the natural community level, the strategy would benefit focal species and native biodiversity would not decrease. Goals and objectives for each natural community are described below.

To determine the best use of a conservation site, Conservation Strategy users will have to determine the most immediate conservation need on that site and manage it accordingly. Where conflicts arise between common communities, such as oak woodland and annual grassland, this management decision could

favor either type; for instance, restoration of oak woodland would necessarily supplant annual grassland. However, for rare natural communities, where protection opportunities are more limited, achieving the goals and objectives for those communities would likely supersede goals and objectives for common natural communities.

To ensure the effective management of natural communities and the management rights of parcels that support them, parcels need to be acquired, either through fee title purchase or by placement of conservation easements. In most cases, protection of additional land will result from mitigation requirements related to project-level impacts. In some cases, land acquisition could be achieved through conservation efforts by local conservation groups or local agencies, or through expansion of the ownership of East Bay Regional Park District or other land managing organizations. In cases where the parcel is not sought for mitigation credit, management could be guaranteed through other written assurances (e.g., management plans with long-term endowments, deed restrictions) with private landowners.

### 3.5.2.1 Grassland

#### Conservation Goals and Objectives

##### Goal 4

Protect and enhance functional grassland communities (alkali meadow and scald, California annual grassland, non-serpentine native bunchgrass grassland, serpentine bunchgrass grassland, rock outcrop, valley sink scrub) that benefit focal species and promote native biodiversity.

**Objective 4.1.** Field verify the Conservation Strategy land cover map of native grasslands and create a refined map that better accounts for mapped stands.

- *Conservation Action GRA-1.* During project-level analysis of parcels with proposed impacts, applicants will provide information on grassland stand size and species composition to the authorizing land use jurisdiction as part of the permit process for inclusion into the Conservation Strategy database.
- *Conservation Action GRA-2.* During assessment of lands for mitigation, the entity fulfilling mitigation requirements will provide information on grassland stand size and species composition to the authorizing land use jurisdiction for inclusion into the Conservation Strategy database. All stands of grassland composed of >10% native species will be spatially mapped to the extent possible.

**Objective 4.2.** Avoid or minimize direct impacts on grassland communities during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Tables 3-2 and 3-3.

**Objective 4.3.** To ensure that the full range of grassland community associations persist in the study area at a level that will sustain the natural processes and native species diversity typically found in this natural community, guarantee the management (through permanent protection or written assurances) on 75% (~75,542 acres) of California annual grassland, 90% (~60 acres) of serpentine bunchgrass grasslands, 90% (~43 acres) of rock outcrops, 90% (773 acres) of alkali meadow and scald, and 90% (114 acres) of valley sink scrub for ecosystem function expected within the study area.

- *Conservation Action GRA-3.* Mitigate the loss of grassland natural communities. For impacts on grassland communities that do not provide habitat for focal species, impacts will be mitigated at a ratio of 3:1 through the appropriate CEQA process. Mitigation for the loss of annual grasslands that provide focal species habitat will be consistent with focal species standardized mitigation tables.
- *Conservation Action GRA-4.* Acquire and manage, through fee title purchase or conservation easement, parcels with grassland communities that benefit focal species or otherwise meet the conservation goals and objectives of this strategy.
- *Conservation Action GRA-5.* Establish an incentive program for private landowners for the management of grassland communities on private lands that will support native vegetation by promoting regeneration and recruitment of native species while supporting the natural processes that are typically found in grassland communities.

**Objective 4.4.** Enhance appropriate grasslands in the study area (i.e., grasslands that retain native seed stock) by promoting regeneration and recruitment of native species and, when necessary, mimicking natural processes that typically characterize these natural communities in eastern Alameda County.

- *Conservation Action GRA-6.* Continue or introduce livestock grazing in a variety of grazing regimes by enhancing the ability of rancher stewardship and managed livestock grazing to occur consistent with Objectives 1.2, 1.3 and 1.4.
- *Conservation Action GRA-7.* Conduct prescribed burns. Use targeted studies to inform location and frequency.
- *Conservation Action GRA-8.* Conduct mowing in small-scale, select areas to reduce plant height and biomass cover where use of livestock is impractical.
- *Conservation Action GRA-9.* Identify areas in the study area where shrub- or tree-dominated plant communities are encroaching on native grasslands due to lack of natural disturbance regimes (e.g., fire) and, if appropriate,

work to reduce the encroachment in order to restore the function of native grasslands.

*Conservation Action GRA-10.* When rodent management is needed to protect the integrity of structures such as levees or stock pond dams or to prevent nuisance populations on adjacent private lands, encourage land managers to use Integrated Pest Management (IPM) principles. Cease using rodenticides in protected areas; if they are necessary, use rodenticides consistent with IPM principles.

**Objective 4.5.** Work with private landowners to develop an incentive program that would enable conservation to occur on private lands that would meet the conservation goals and objectives of this strategy.

## Avoidance, Minimization, and Mitigation

Direct impacts on grasslands resulting from project construction and indirect impacts resulting from postproject activities should be avoided or minimized (Objective 4.2). Avoidance measures outlined in Table 3-2 and 3-3 should be implemented to avoid these direct and indirect impacts. Any impacts that cannot be avoided will be mitigated. Most mitigation in grassland communities will be determined at the focal species level. Impacts on grassland communities that do not provide habitat for focal species will be mitigated at a ratio of 3:1 through the appropriate CEQA process. When focal species or their habitat are present, measures would be outlined in the Section 7 consultation (federal projects), consistent with USFWS's programmatic biological opinion or an individual section 7 biological opinion. If state-listed species are present, then a permit under CESA is required if there will be take. Provisions in that permit would call for the avoidance, minimization, and mitigation of grassland communities.

## Management

Management could enhance grassland communities in several ways. Effective grassland management should support native vegetation by promoting regeneration and recruitment of native species and fostering the natural processes of grassland communities (GRA-5). When necessary, this could include mimicking natural processes that typically occur in these communities in eastern Alameda County (Objective 4.4). Most grasslands in the study area occur on private lands, many of which are actively grazed rangelands. In order to manage this natural community at a regional scale, an incentive program for private landowners should be established to guide and support private stewardship of these lands (GRA-5). Other management tools that could be continued or established include livestock grazing, using a variety of grazing regimes (GRA-6), mowing techniques to reduce plant height and biomass cover

where use of livestock is impractical (GRA-8), and prescribed burns in targeted areas (GRA-7). This would require a grazing management plan and should be standardized on the basis of scientific evidence and onsite conditions. Incentives could include enhanced water stations for cattle to evenly distribute animals, compensation for loss of grazing time when seasonal grazing is required, and funding for infrastructure (cross fences) to better manage animal movement and distribution. Species experts, vegetation ecologists, and rangeland managers would need to provide advice on the location and frequency of these management techniques because site-specific conditions typically determine the best regime. Many other grassland-specific conservation actions are discussed below for individual focal species.

## Protection

In addition to enhancing grasslands, it is important that a full range of grassland associations persist in the study area to sustain natural processes and native species diversity. The best way to ensure the continued persistence of grassland communities in the study area is to increase the extent of protected grassland communities. To accomplish this, parcels with grassland land cover types that would benefit focal species or otherwise meet the conservation goals and objectives for this strategy should be acquired through fee title purchase or conservation easement (GRA-4). Permanent protection or written assurances with private landowners should be placed on at least 75% (approximately 75,542 acres) of California annual grassland, 90% (approximately 60 acres) of serpentine bunchgrass grasslands, 90% (approximately 43 acres) of rock outcrops, 90% (approximately 773 acres) of alkali meadow and scald, and 90% (114 acres) of valley sink scrub within the study area (Objective 4.3).

## Specific Conservation Opportunities

In all Conservation Zones, protection of annual grassland should be prioritized to favor areas surrounding ponds that support breeding California red-legged frog, California tiger salamander, or tricolored blackbird, particularly those areas within 1 mile of known breeding sites for these species; or areas that provide denning, foraging, and dispersal habitat for San Joaquin kit fox.

- CZ-4. This CZ contains 742 acres of alkali meadow and scald. Protection and management of at least 388 acres of this land cover is a high priority, particularly in areas of designated critical habitat for vernal pool fairy shrimp (Table 4-4 and Table 4-19a).
- CZ-6. This CZ contains 71 acres of rock outcrop (72% of the study area's total unprotected acreage). Protection of at least 24 acres of this land cover is a high priority; particularly in areas of designated critical habitat for longhorn fairy shrimp (*see Chapter 4 and Table 4-4 for more details*).

### 3.5.2.2 Chaparral and Coastal Scrub

#### Conservation Goals and Objectives

##### Goal 5

Protect and enhance functional chaparral and coastal scrub communities (northern mixed chaparral/chamise chaparral, mixed serpentine chaparral, northern coastal scrub/Diablan sage scrub) that benefit focal species and promote native biodiversity.

**Objective 5.1.** Avoid or minimize direct impacts on chaparral and scrub communities during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Tables 3-2 and 3-3.

**Objective 5.2.** To ensure that the full range of chaparral and coastal scrub community associations persist in the study area at a level that will sustain the natural processes and native species diversity typically found in this natural community, guarantee the management (through permanent protection) on 75% (~2,013 acres) of northern mixed chaparral/chamise chaparral stands, 75% (~1,251 acres) of northern coastal scrub/Diablan sage scrub stands, 90% (~3,361 acres) of mixed serpentine chaparral stands for ecosystem function expected within the study area.

- *Conservation Action CCS-1.* Mitigate the loss of chaparral and coastal scrub natural communities by protecting existing stands through fee title purchase or conservation easement. Impacts on chaparral and coastal scrub communities that do not provide habitat for focal species will be mitigated at a ratio of 3:1 through the appropriate CEQA process. The loss of chaparral and coastal scrub that provide focal species habitat will be mitigated consistent with focal species standardized mitigation tables.
- *Conservation Action CCS-2.* Acquire parcels, with stands of chaparral and coastal scrub, through fee title purchase or conservation easement
- *Conservation Action CCS-3.* Establish an incentive program for private landowners to guarantee the management of chaparral and coastal scrub land cover types on private lands which will promote regeneration and recruitment of native species *and support the natural processes* which are typically found in this natural community.

**Objective 5.3.** Enhance all stands of chaparral and coastal scrub in the study area that are being managed for ecosystem function by promoting regeneration and recruitment of native species and, when necessary, mimicking natural processes (e.g., fire) that are typically found in these natural communities in eastern Alameda County but are currently being suppressed.

- *Conservation Action CCS-4.* Conduct prescribed burns in chaparral and coastal scrub communities to maintain canopy gaps and promote regeneration. This would require active participation and permitting from Cal Fire and the Air Quality Control District. Use targeted studies to choose locations and frequency [*Targeted studies would require grant funding*].
- *Conservation Action CCS-5.* Mechanically thin chaparral and coastal scrub to promote structural diversity. Use targeted studies to inform location and frequency and compare results between mechanically thinned only stands, burned only stands, and mechanically thinned and burned stands to. Over the long-term utilize management practice that demonstrates best results.
- *Conservation Action CCS-6.* Identify areas in the study area where tree-dominated plant communities (e.g. foothill pine-oak woodland) are encroaching on chaparral and scrub communities due to the suppression of natural disturbance (e.g., fire). In areas where this encroachment is affecting rare plant communities, work to reduce the encroachment through mechanical means if natural disturbance is being suppressed.

### **Avoidance, Minimization, and Mitigation**

The location of these land cover types and opportunities for conservation are discussed in Chapter 4 for each Conservation Zone and below under Specific Conservation Opportunities in this section.

Since this land cover type is slow growing and difficult to restore, chaparral and coast scrub communities would benefit most from avoidance at the project level. This approach would be most successful if measures were incorporated into project design to address effects that could occur both during and after construction. In addition, the amount of chaparral and coastal scrub that is protected and managed for ecosystem function should be increased. To ensure that conservation goals are met for the entire study area and not just on protected lands, an incentive program could be established for private landowners to facilitate and guide the management of chaparral and coastal scrub communities on their lands (CCS-3). See Chapter 5, Section 5.7, *Conservation Actions Unrelated to Mitigation – Voluntary Conservation Actions*, for suggested incentive programs.

Chaparral and coastal scrub communities should be avoided during project construction and during postproject activities, if possible (Objective 5.1). If impacts do occur, the project proponent would mitigate any loss of chaparral and coastal scrub natural communities (CCS-1). If no state or federally listed species occur on the project site then the avoidance, minimization, and mitigation requirements would need to be outlined in the CEQA document. Most mitigation in chaparral and scrub communities will be determined at the focal species level. Impacts on chaparral and scrub communities that do not provide habitat for focal species will be mitigated at a ratio of 3:1. When focal

species or their habitat are present, measures would be outlined in the Section 7 consultation, consistent with USFWS's programmatic biological opinion or an individual section 7 biological opinion. If state-listed species are present, a permit under CESA should be obtained if there will be take. Provisions in that permit would call for the avoidance, minimization, and mitigation of impacts on chaparral and scrub communities.

## Management

All chaparral and coastal scrub stands in the study area that are currently being managed for ecosystem function should be enhanced where needed and where possible (Objective 5.3). Current management practices are restricted to grazing pressure. While grazing helps new chaparral and coastal scrub communities form establishing it does little to promote structural diversity and habitat enhancement for the ecosystem. Most enhancements could be accomplished through promoting regeneration or recruitment of chaparral and scrub stands and, when necessary, by mimicking natural processes (e.g., fire) typically found in these natural communities but that are currently being suppressed. To meet these conservation goals, local agencies or project proponents could coordinate or conduct prescribed burns in chaparral and coastal scrub communities to maintain canopy gaps and promote regeneration, using targeted studies to inform locations and frequency (CCS-4). Any implementation of prescribed burning would be carried out through coordination with Cal Fire and other local jurisdictions, and would adhere to regional air quality constraints.

Where fire is not feasible, chaparral and coastal scrub communities could also be mechanically thinned to promote structural diversity (CCS-5). In areas where tree-dominated plant communities (e.g., foothill pine-oak woodland) are encroaching on chaparral and scrub land cover due to suppression of natural disturbance (e.g., fire), the land managers should work to reduce the encroachment if it is determined that this encroachment is affecting rare plant communities, degrading habitat quality for wildlife, or otherwise compromising the functions of the natural community. If natural disturbance is being suppressed and it is not feasible to reintroduce that disturbance onto the landscape, mechanical means may be necessary to reduce the encroachment (CCS-6).

## Protection

In addition to enhancing chaparral and scrub habitats that are currently protected, it is also important that a full range of chaparral and scrub habitat associations persist in the study area to sustain natural processes and native species diversity. The best way to ensure the continued persistence of chaparral and scrub communities in the study area is to increase the amount that is protected. To accomplish this, parcels with chaparral and scrub

communities that would benefit focal species or otherwise meet the conservation goals and objectives of this strategy should be acquired through fee title purchase or conservation easement (CCS-2). Permanent protection with private landowners should be placed on at least 75% (~2,013 acres) of northern mixed chaparral/chamise chaparral stands, 75% (~1,251 acres) of northern coastal scrub/Diablan sage scrub stands, 90% (~3,361 acres) of mixed serpentine chaparral stands within the study area.

### Specific Conservation Opportunities

- In all Conservation Zones, protection and management of chaparral and scrub stands should be prioritized in favor of stands that support known occurrences of, suitable habitat for, or critical habitat for Alameda whipsnake.
- In many Conservation Zones there are stands of chaparral/scrub that are only partially protected. Protecting the full extent of those stands should be the priority in all cases.
- CZ-17. There is currently only 1 acre of mixed serpentine chaparral habitat in this CZ. Verification of that stand and its protection should be a priority.
- CZ-18. This CZ supports the largest stand of mixed serpentine chaparral habitat in the study area. Protection and management of at least 559 acres of northern mixed chaparral/chamise chaparral and 2,588 acres of mixed serpentine chaparral should be a priority. Though there is little threat to loss of these stands, the most diverse stand(s) could be located in this CZ.

### 3.5.2.3 Oak Woodland

#### Conservation Goals and Objectives

##### Goal 6

Protect and enhance functional oak woodland communities (blue oak woodland, valley oak woodland, coast live oak forest and woodland, mixed evergreen forest/oak woodland) to benefit focal species and promote the level of native biodiversity expected to occur within this natural community in the study area.

**Objective 6.1.** Field verify the Conservation Strategy land cover map of oak woodland stands and create a refined map that reflects oak species composition.

- *Conservation Action OAK-1.* During project-level analysis of parcels with proposed impacts, applicants will provide information on oak woodland

stand size and species composition to the authorizing land use jurisdiction as part of the permit process for inclusion in the Conservation Strategy database.

- *Conservation Action OAK-2.* During assessment of lands for mitigation the entity fulfilling mitigation requirements will provide information on oak woodland stand size and species composition to the authorizing land use jurisdiction for inclusion in the Conservation Strategy database.

**Objective 6.2.** Avoid or minimize direct impacts on oak woodland communities during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Tables 3-2 and 3-3.

**Objective 6.3.** To ensure that the full range of oak woodland associations persist in the study area at levels that will sustain the natural processes and native species diversity typically found in this natural community, guarantee the management (through permanent protection or written assurances) on 75% (~15,614 acres) of blue oak woodland stands, 75% (~694 acres) of coast live oak forest and woodland stands, 75% (~16,633 acres) of mixed evergreen forest/oak woodland stands, 90% (total acreage unknown) of valley oak woodland, and 90% (total acreage unknown) of black oak woodland stands for ecosystem function expected within the study area.

- *Conservation Action OAK-3.* Mitigate loss of oak woodland habitats. Impacts on oak woodland communities that do not provide habitat for focal species will be mitigated at a ratio of 3:1 through the appropriate CEQA process. The loss of oak woodlands that provide focal species habitat will be mitigated consistent with focal species standardized mitigation tables.
- *Conservation Action OAK-4.* Acquire parcels with stands of oak woodland that meet the conservation goals and objectives of this strategy through fee title purchase or conservation easement.
- *Conservation Action OAK-5.* Establish an incentive program for private landowners to guarantee the management of oak woodland communities on private lands that will promote regeneration and recruitment of native species and support the natural processes typically found in this natural community.

**Objective 6.4.** Enhance all stands of oak woodland in the study area that are being managed for ecosystem function by promoting regeneration and recruitment of oak trees and, when necessary, by mimicking natural processes typically found in oak woodlands in eastern Alameda County.

- *Conservation Action OAK-6.* Increase natural community function in oak woodland communities, including the likelihood that they will support focal species, by reducing percent cover and total biomass of nonnative invasive plants listed by Cal-IPC in protected oak woodland stands in the study area.

- *Conservation Action OAK-7.* Identify areas of oak woodlands where recruitment has been suppressed or is not occurring. Assess why recruitment of oaks is not occurring and where supplemental plantings could be used to increase the recruitment of oak species.
- *Conservation Action OAK-8.* Reduce the feral pig population in protected areas to reduce impacts on oak woodland communities through targeted hunting programs or incentivized hunting on private lands in coordination with CDFG.

## Avoidance, Minimization, and Mitigation

Initially, the oak woodland communities in the study area should be field verified by comparing field analysis to the Conservation Strategy land cover map of oak woodland stands. Any updates to the existing data should result in the creation of a refined map that reflects oak species composition (Objective 6.1). This would occur during project-level analysis of parcels with proposed impacts or during assessment of lands proposed for mitigation. The entity fulfilling mitigation requirements (or the landowner attempting to gain mitigation credit) should provide additional information on the size and species composition of oak woodland stands on the subject parcel for inclusion into the Conservation Strategy database (OAK-1, OAK-2). This information would be provided to the authorizing land use jurisdiction(s) as part of the permit process.

Since restoring oak woodland habitats is difficult, avoiding impacts on existing stands is the best form of mitigation in all cases. Direct and indirect impacts on oak woodland communities should be avoided or minimized during project construction and postproject activities to ensure the continued protection of oak woodland communities in the study area through the implementation of avoidance and minimization measures outlined in Table 3-2 and 3-3. Additional site-specific measures should be considered for all projects with potential impacts on oak woodlands. Impacts on oak woodland communities that cannot be avoided would be mitigated by project applicants. In some cases, the level of mitigation would be related to impacts on focal species; all mitigation would defer to focal species habitat requirements if focal species habitat were documented on the site.

If no state- or federally listed species occur on the project site, then the avoidance, minimization, and mitigation requirements would need to be outlined in the CEQA document. Most mitigation in oak woodland communities will be determined at the focal species level. Impacts on oak woodland communities that do not provide habitat for focal species will be mitigated at a ratio of 3:1. When federally listed species or their habitat are present, measures would be outlined in a Section 7 consultation (federal projects), consistent with USFWS's programmatic biological opinion or an individual section 7 biological opinion. If state-listed species are present, a permit under CESA should be obtained if there will be take. Provisions in that permit would call for the

avoidance, minimization, and mitigation of impacts on oak woodland communities.

## Management

Oak woodland stands could be enhanced by promoting oak recruitment (mimicking natural processes if necessary), reducing percent cover and biomass of nonnative plants, and promoting natural community function (OAK-6). If recruitment is not occurring or is suppressed, the cause should be determined. If appropriate, supplemental plantings should be used to increase the recruitment of oak species in oak woodland stands (OAK-7). These plantings would need to be protected against herbivory. If there is a larger-scale issue suppressing regeneration then plantings will likely not be a successful approach to correcting the problem. An incentive program for private landowners could be established to guarantee the management of oak woodland communities on private lands. Finally, the feral pig population in protected areas should be reduced to lessen impacts on oak woodland communities. Targeted hunting programs or incentivized hunting on private lands are possible methods that could be used to effectively manage the feral pig population in these areas (OAK-8).

## Protection

In addition to enhancing oak woodland communities, it is important that a full range of oak woodland associations persist in the study area to sustain natural processes and native species diversity (Objective 6.3). The best way to ensure the continued persistence of oak woodland communities in the study area is to increase the amount of protected oak woodland communities. To accomplish this, parcels with stands of oak woodland would need to be acquired through fee title purchase or conservation easement (OAK-4). Some of this would occur as the result of mitigation for impacts on oak woodland stands or through purchase for open space or other conservation purpose. Similar management assurances could occur through guaranteed management plans. For example, private landowners could enter into contracts with the Implementation Committee with a commitment to manage their oak woodlands according to an approved management plan. Through permanent protection, the Implementation Committee could strive for the guarantee of effectively managing ecosystem function on 75% (approximately 15,614 acres) of blue oak woodland stands, 75% (approximately 694 acres) of coast live oak forest and woodland stands, 75% (approximately 16,633 acres) of mixed evergreen forest/oak woodland stands, 90% (total acreage unknown) of valley oak woodland stands, and 90% (total acreage unknown) of black oak woodland stands (Objective 6.3).

### Specific Conservation Opportunities

- The protection goals for oak woodland communities in each conservation zone are shown in Chapter 4. Below is a list of specific opportunities for this natural community.
- *CZ-2, CZ-3, CZ-5, and CZ-6.* There is minimal oak woodland acreage in these Conservation Zones. Avoiding impacts on all stands of oak woodland is preferred.
- The greatest opportunities to protect large extents of oak woodland are in CZ-8, CZ-13, CZ-16, and CZ-18. However, with the exception of CZ-8, most of these areas are under little threat. Smaller stands of oak woodland in CZ-9, CZ-11, CZ-12, CZ-13, CZ-14, and CZ-15 are a higher conservation priority because they are more likely threatened by land use changes and because they represent the edges, or *ecotones*, of this community in the study area.

### 3.5.2.4 Conifer Woodland

#### Conservation Goals and Objectives

##### Goal 7

Protect and enhance functional conifer woodland communities (foothill pine-oak woodland, Sargent cypress woodland) that benefit focal species and promote native biodiversity.

**Objective 7.1.** Avoid or minimize direct impacts on conifer woodland communities during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Tables 3-2 and 3-3.

**Objective 7.2.** To ensure the full range of conifer woodland associations persist in the study area at levels that will sustain the natural processes and native species diversity typically found in this natural community, guarantee the management (through permanent protection or written assurances) of 75% (~15,077 acres) of foothill pine-oak woodland stands and 90% (~588 acres) of Sargent cypress woodland stands for ecosystem function expected within the study area.

- *Conservation Action CON-1.* Mitigate loss of conifer woodland habitats. Impacts on conifer woodland communities that do not provide habitat for focal species will be mitigated at a ratio of 3:1. The loss of conifer woodlands that provide focal species habitat will be mitigated consistent with focal species standardized mitigation tables.

- *Conservation Action CON-2.* Acquire parcels with stands of conifer woodland that meet the conservation goals and objectives of this strategy through fee title purchase or conservation easement.
- *Conservation Action CON-3.* Establish an incentive program for private landowners to guarantee the management of conifer woodland land cover types on their properties that will promote regeneration and recruitment of native species and support the natural processes typically found in this natural community.

**Objective 7.3.** Enhance stands of conifer woodland in the study area that are being managed for ecosystem function to maintain a mosaic of stands in numerous successional stages that ensure sustainability and maximize native species diversity a by allowing for succession and regeneration of native species and, when necessary, by mimicking natural processes typically found in conifer woodlands in eastern Alameda County.

- *Conservation Action CON-4.* To increase natural community function in conifer woodland communities, including the likelihood that they will support focal species, reduce the percent cover and total biomass of nonnative invasive plants in protected conifer woodland stands in the study area.
- *Conservation Action CON-5.* Diagnose loss of recruitment and if appropriate use supplemental plantings to increase the recruitment of conifer species in stands of conifer woodland where recruitment has been suppressed or is not occurring.
- *Conservation Action CON-6.* Experimentally introduce management practices (e.g., selective thinning, prescribed burning) to help identify significant factors in conifer woodland functionality [this would likely be a grant-funded initiative and not mitigation related].
- *Conservation Action CON-7.* In coordination with Cal Fire and Alameda County, establish “let-burn” zones in portions of Alameda County where fires would be allowed to burn to encourage the role that fire plays in management of this natural community.

## Avoidance, Minimization, Mitigation

Direct and indirect impacts on conifer woodland communities should be avoided or minimized during project construction and postproject activities (Objective 7.1). Avoidance measures outlined in Tables 3-2 and 3-3 should be implemented to decrease the likelihood that impacts will occur. Impacts on conifer woodland communities that cannot be avoided would be mitigated by project applicants. In some cases the level of mitigation would be related to focal species impacts; all mitigation would defer to focal species habitat requirements if focal species habitat were documented on the site.

If no state- or federally listed species occur within the project site, the avoidance, minimization, and mitigation requirements would need to be outlined in the CEQA document. Most mitigation in conifer woodland communities will be determined at the focal species level. When federally listed species or their habitat are present, measures would be outlined in a Section 7 consultation (federal projects), consistent with USFWS's programmatic biological opinion or an individual section 7 biological opinion. In either case, if state-listed species are present, a permit under CESA should be obtained if there will be take. Provisions in that permit would call for the avoidance, minimization, and mitigation of impacts on conifer woodland communities.

## Management

Conifer woodlands and conifer woodland associations should be enhanced in the study area through management that promotes ecosystem function, natural processes, and native species diversity typically found in this community (Objective 7.2, Objective 7.3). Stands could be enhanced by promoting ecologically appropriate structure, function, and species composition, facilitating succession and regeneration of native species. If necessary, stands could be improved by mimicking natural processes that are typically found in conifer woodlands in eastern Alameda County (Objective 7.3). Several management procedures could be used to increase natural community function in conifer woodland communities. Supplemental plantings could increase the recruitment of conifer species in areas where recruitment is suppressed or is not occurring (CON-5), and introducing experimental management practices, such as selective thinning, prescribed burning, or "let-burn" zones, could help identify significant factors in conifer woodland functionality (CON-6, CON-7). The Implementation Committee would coordinate with Cal Fire and Alameda County to establish "let-burn" zones in portions of Alameda County where fires would be allowed to burn if minimal structural damage would be incurred, damage could be offset through compensation, and no homes or life would be endangered (CON-7). The "let-burn" zones would encourage the role that fire plays in management of this natural community (CON-7). In turn, these management practices would support focal species while reducing the percent cover and biomass of nonnative invasive plants in protected conifer woodland stands in the study area (CON-4).

## Protection

In order to increase the number of protected conifer woodland communities in the study area, the Implementation Committee should acquire parcels with stands of conifer woodland that meet the conservation goals and objectives of this strategy through fee title purchase or conservation easement (CON-2). The Implementation Committee could also promote the establishment of an incentive program for private landowners that guarantees the management of

conifer woodland communities on their properties. The management program would promote regeneration and recruitment of native species and support the natural processes typically found in this natural community (CON-3). Through permanent protection or written assurances, the Implementation Committee should guarantee the management of 75% (approximately 15,077 acres) of foothill pine-oak woodland stands and 90% (approximately 588 acres) of Sargent cypress woodland stands for ecosystem function (Objective 7.2).

### Specific Conservation Opportunities

- **CZ-13.** This CZ contains the largest expanse of Sargent cypress woodland in the study area, estimated at 636 acres. Protection of at least 573 acres of this community should be a priority.
- **CZ-12.** This CZ contains 90% (13 acres) of the study area's unprotected Coulter pine woodland. Avoidance and protection of all of this land cover type is recommended.
- The greatest opportunities to protect large extents of conifer woodland are in CZ-8, CZ-12, CZ-14, CZ-15, CZ-16, and CZ-17. However, with the exception of CZ-8 and CZ-12, most of these areas are under little threat. Smaller stands of conifer woodland in CZ-9, CZ-10, and CZ-11 are a higher conservation priority because they are more likely threatened by land use changes in the study area.

## 3.5.2.5 Riparian Forest and Scrub

### Conservation Goals and Objectives

#### Goal 8

Improve the overall quality of riparian communities and the hydrologic and geomorphic processes that support them to increase the amount of riparian habitat for focal species and promote native biodiversity.

**Objective 8.1.** Field verify the Conservation Strategy land cover map of riparian forest and scrub stands and create a refined map that reflects species composition, key riparian community attributes, and conservation opportunities at the stream reach level.

- **Conservation Action RIP-1.** During project-level analysis of parcels with riparian vegetation, applicants will provide information on riparian forest and scrub stand size and species composition to the local authorizing land use jurisdiction as part of the permit process for inclusion in the Conservation Strategy database.

- *Conservation Action RIP-2.* During assessment of lands for mitigation the entity fulfilling mitigation requirements or the landowner seeking mitigation credit will provide information on riparian forest and scrub stand size and species composition to the authorizing land use jurisdiction for inclusion in the Conservation Strategy database.

**Objective 8.2.** Avoid or minimize direct impacts on riparian forest and scrub communities during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Table 3-2 and 3-3.

**Objective 8.3.** To ensure that the full range of riparian forest and scrub associations persist in the study area at levels that will sustain the natural processes and native species diversity typically found in this natural community, guarantee the management (through permanent protection) of 90% (~238 acres) of sycamore alluvial woodland stands, 75% (~1,529 acres) of mixed riparian forest and woodland stands, and 75% (~498 acres) of mixed willow riparian scrub stands that benefit focal species and promote native biodiversity.

- *Conservation Action RIP-3.* Mitigate the loss of riparian forest and scrub communities. For impacts on riparian communities that do not provide habitat for focal species, mitigation will be determined based on the functions and values of the watercourse on that particular project site as well as the project's impacts on channel form and geomorphic stability within and downstream of the project footprint. Mitigation for the loss of riparian forest and scrub that provides focal species habitat will be mitigated consistent with focal species standardized mitigation tables.
- *Conservation Action RIP-4.* Acquire parcels with stands of riparian forest and scrub communities that meet the conservation goals and objectives of this strategy through fee title purchase or conservation easement.
- *Conservation Action RIP-5.* Establish an incentive program (e.g., a riparian corridor easement program) for private landowners to guarantee the management and restoration of riparian forest and scrub communities on their lands to promote regeneration and recruitment of native species and support the natural processes typically found in this natural community and that ultimately contribute to the conservation objectives for this community.

**Objective 8.4.** Increase riparian forest and scrub communities in the study area through restoration projects that will promote natural function, including the regeneration and recruitment of native species and, when necessary and approved, that mimic natural processes typically found in riparian communities in the study area.

- *Conservation Action RIP-6.* Create an incentive program (e.g., ecosystem services marketplace) that would encourage private and public landowners

to implement appropriate riparian forest and scrub restoration projects on their property.

**Objective 8.5.** Enhance riparian forest and scrub stands that are protected and are being managed for ecosystem function by promoting natural function, including the regeneration and recruitment of native species, and when necessary, by mimicking natural processes (e.g., vegetation succession) typically found in riparian communities in the study area.

- *Conservation Action RIP-7.* Where geomorphically feasible without causing damage to channel stability and habitat values, increase natural community function in riparian forest and scrub communities, including the likelihood that they will support focal species, by reducing the total percent cover and total biomass of nonnative riparian plants in protected riparian areas in the study area.
- *Conservation Action RIP-8.* Where appropriate to the naturally occurring riparian vegetation community that would be present without anthropogenic stressors, and under the natural flow regime of the creek, plant and/or seed native understory and overstory riparian vegetation within an appropriate buffer (30–100 feet) of the edge of the low-flow channel to create structural diversity, provide overhead cover, and moderate water temperature.
- *Conservation Action RIP-9.* Where appropriate to the naturally occurring riparian vegetation community that would be present without anthropogenic stressors, and under the natural flow regime of the creek, plant and/or seed native riparian vegetation in gaps in existing riparian corridors to promote continuity and enhance connectivity.
- *Conservation Action RIP-10.* Mimic natural disturbance in riparian habitats in the absence of scouring flood flows using techniques such as altering the channel, when alterations are geomorphically appropriate to prevent or correct channel degradation, or removing vegetation to ensure a variety of successional stages of riparian forest and scrub communities, when vegetation management is coordinated with and permitted by the resource agencies.

## Avoidance, Minimization, and Mitigation

Direct and indirect impacts on riparian forest and scrub communities should be avoided during construction and during postproject activities, respectively (Objective 8.2). Project applicants should implement avoidance measures outlined in Table 3-2 and 3-3 to help avoid any impacts on these communities (Objective 8.2). Development in these areas could reduce stream function and sometimes create perennial watercourses downstream where seasonal water courses previously occurred. This type of development can also limit opportunities for future stream restoration activities. If impacts do occur, the

project applicant will mitigate the loss of riparian forest and scrub communities. Typically, the mitigation in these communities will be determined based on standards set for focal species (Tables 3-4 through 3-12). In situations where no focal species or their habitat are present, mitigation will be determined on the basis of the functions and values of the watercourse on the project site. In these cases, mitigation ratios will be determined by CDFG through the Lake and Streambed Alteration Agreement.

## Management

Restoration projects could be developed to encourage natural function and increase riparian forest and scrub communities in the study area. Restoration projects should promote the establishment and recruitment of native species and, if necessary, mimic natural processes to accomplish native species regeneration (Objective 8.4). Several types of restoration projects could be implemented in these communities. Native riparian plantings would create structural diversity, provide overhead cover, and moderate water temperature. Additionally, an incentive program could be created that could include streamlined permitting, funding, and a corridor easement program to encourage private and public landowners to conduct riparian forest and scrub restoration projects on their property (RIP-6).

Effective management that promotes natural ecosystem function of protected riparian forest and scrub stands could also enhance these communities (Objective 8.5). Cover and biomass of nonnative riparian plants in protected riparian areas in the study area should be decreased. Reduction of nonnative species would increase natural community function and support focal species in these communities (RIP-7). Native riparian vegetation could also be planted or seeded in gaps in existing riparian corridors to promote continuity and enhance connectivity where appropriate (RIP-9). In the absence of scouring flood flows, techniques such as altering stream geometry or removing vegetation could be used to manage physical process and vegetation, but would require appropriate studies before implementation. These types of active management could ensure that a variety of successional stages of riparian forest and scrub communities would be present in the study area (RIP-10). The design and success criteria of each restoration project would be determined in consideration of site-specific conditions in coordination with the Resource Agencies.

## Protection

The number of protected communities of riparian forest and scrub stands could be increased through acquiring parcels through fee title purchase or conservation easement. Project applicants could acquire parcels through fee title purchase or conservation easements to mitigate project impacts (RIP-3). To

accomplish conservation goals for this natural community several things will have to occur in addition to the mitigation of project impacts. The Implementation Committee could establish an incentive program for private landowners (RIP-5) to guarantee the management of riparian forest and scrub communities on private lands. Management plans for private lands would be developed to promote regeneration and recruitment of native species, support natural processes, and ultimately contribute to the conservation objectives for this natural community (RIP-5).

The full range of riparian forest and scrub associations should persist in the study area at levels that will sustain the natural processes and native species diversity typically found in this natural community (Objective 8.3). To this end, the Implementation Committee should guarantee the management (through permanent protection or written assurances) of functional riparian forest and scrub communities in 90% (~238 acres) of sycamore alluvial woodland stands, 75% (~1,529 acres) of mixed riparian forest and woodland stands, and 75% (~498 acres) of mixed willow riparian scrub stands (Objective 8.3). Effective management would improve sycamore alluvial woodland, mixed riparian forest and woodland, and mixed willow riparian scrub communities, benefitting focal species and promoting native biodiversity.

### Specific Conservation Opportunities

- The extent of riparian forest and scrub communities is limited within the study area, and their conservation should be a priority for all conservation zones.
- Identify and rank restoration opportunities for each conservation zone.
- *CZ-2, CZ-12, CZ-14, and CZ-15*. Protect the remaining acreage of sycamore alluvial woodland.
- Protect all remaining mixed riparian forest/woodland and mixed willow riparian scrub habitat in the study area.
- *CZ-8, CZ-11, CZ-14, CZ-15*. Priority should be given to riparian forest and scrub in areas of dispersal habitat and designated critical habitat for Alameda whipsnake and California red-legged frog.
- When restoration or management decision are made for focal fish or amphibian species, consideration of the long-term viability of those management actions should be considered relative to upstream water releases from dams.
- *CZ-10, CZ-13, CZ-17*. Priority should be given to riparian forest and scrub communities in areas of potential foothill yellow-legged frog and California red-legged frog habitat and areas where the CNDDDB lists occurrences.
- *CZ-13, CZ-15, CZ-17*. Priority should be given to riparian forest and scrub communities in areas of future spawning and rearing habitat for central

coast steelhead, provided downstream barriers to movement are removed or passage opportunities are enhanced.

### 3.5.2.6 Wetlands and Ponds

#### Conservation Goals and Objectives

##### Goal 9

Improve the overall quality of wetlands (perennial freshwater marsh, seasonal wetland, alkali wetland); ponds; and their upland watersheds to maintain functional aquatic communities that benefit focal species and promote native biodiversity.

**Objective 9.1.** Field verify the Conservation Strategy land cover map of seasonal and perennial wetlands and create a refined map that reflects habitat quality and restoration opportunities.

- *Conservation Action WP-1.* During project-level analysis of parcels with wetlands or ponds, project applicants will provide information on the size of the aquatic feature and a characterization of habitat quality to the local authorizing land use jurisdiction as part of the permit process, regardless of whether that feature will be affected by the project, for inclusion in the Conservation Strategy database.
- *Conservation Action WP-2.* During assessment of lands for mitigation the project applicant fulfilling mitigation requirements or the landowner seeking mitigation credit will provide information on wetland or pond size and a characterization of habitat quality to the authorizing land use jurisdiction for inclusion in the Conservation Strategy database.

**Objective 9.2.** Avoid or minimize direct impacts on wetland or pond communities during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Table 3-2 and 3-3.

**Objective 9.3.** To ensure the full range of wetland and pond communities persist in the study area at levels that will sustain the natural processes and native species diversity supported by these natural communities, guarantee the management (through permanent protection, term protection or other types of written assurances) of 90% (~477 acres) of seasonal wetland, 90% (~56 acres) of perennial freshwater marsh, 90% (~549 acres) of alkali wetland, and 75% (~256 acres) of ponds.

- *Conservation Action WP-3.* Mitigate the loss of wetland and pond communities. Impacts on wetland and pond communities that do not

provide habitat for focal species will be mitigated at a ratio of 3:1 through the appropriate CEQA process. The loss of wetlands and ponds that provide focal species habitat will be mitigated consistent with focal species standardized mitigation tables.

- *Conservation Action WP-4.* Acquire parcels with wetland and pond communities or wetland restoration potential that meet the conservation goals and objectives of this strategy through fee title purchase or conservation easement.
- *Conservation Action WP-5.* Support new incentive programs for private landowners to guarantee the management of wetland and pond communities on their lands. This could be completed through the implementation of management plans that will promote regeneration and recruitment of native species and that support the natural processes typically found in these natural communities and ultimately contribute to the conservation objectives.
- *Conservation Action WP-6.* Facilitate a program to streamline permitting and registration of ponds in the study area to enable management activities that are necessary to maintaining ponds. Key maintenance activities could include periodic dredging; seasonal draining; and repair of dams, inlets, and spillways.

**Objective 9.4.** Increase wetland and pond communities in the study area where possible through wetland restoration or pond creation projects.

- *Conservation Action WP-7.* Restore wetlands in areas with proper hydrology, soils, and topography to support naturally occurring features without long-term human intervention.
- *Conservation Action WP-8.* Plant and/or seed native wetland vegetation to create structural diversity, provide overhead cover, and moderate water temperature.
- *Conservation Action WP-9.* Create new ponds in areas where there are gaps in connectivity between breeding sites for aquatic amphibians without adversely affecting downstream drainage patterns.

**Objective 9.5.** Enhance wetlands and ponds that are protected and that are managed for ecosystem function by promoting natural function. Pond enhancements should be designed so that enhanced ponds dry in August or September during dry years to reduce bullfrog, fish, and hybrid California tiger salamanders.

- *Conservation Action WP-10.* Control livestock grazing pressure in wetlands by maximizing animal distribution over the landscape through creation of alternative water sources and various types of fencing and seasonal grazing.
- *Conservation Action WP-11.* To increase natural community function in wetland and pond communities, including the likelihood that they will

support focal species, reduce the total percent cover and total biomass of nonnative or invasive plants listed by California Invasive Plant Council in protected wetlands and ponds in the study area.

- *Conservation Action WP-12.* Implement a systematic bullfrog and nonnative predatory fish removal project in all ponds and wetlands on protected lands inside the study area.
- *Conservation Action WP-13.* Ensure that all wetland and pond mitigation lands include provisions in their management and monitoring programs to fund bullfrog and nonnative predatory fish removal and control.
- *Conservation Action WP-14.* Create an incentive program that would encourage private landowners to maintain their properties free of bullfrogs and nonnative predatory fish.
- *Conservation Action WP-15.* Remove California tiger salamander hybrid paedomorphs when found by a qualified biologist.

### **Avoidance, Minimization, Mitigation**

The full range of wetland and pond communities should persist in the study area at levels that will sustain the natural processes and native species diversity supported by them (Objective 9.3). In order to ensure the persistence of these communities, impacts should be avoided or minimized during construction (direct) and postconstruction activities (indirect). Project applicants should implement avoidance measures outlined in Table 3-2 and 3-3 to reduce the likelihood that impacts may occur (Objective 9.2). If impacts do occur, the project applicants will mitigate the loss of wetland and pond communities (WP-3). In almost every case, the mitigation in these communities will be determined in accordance with standards set for focal species aquatic habitat. Mitigation for the loss of ponds should be developed in a manner that best represents the lost habitat and should not be based solely on net acres. For example, if two ponds of 0.5 acre each are destroyed at a construction site, then two or more ponds should be developed or protected at an offsite location, rather than a single large (1-acre) pond.

If no focal species or their habitat are present, mitigation will be determined based on the functions and values of the specific wetland or pond on the project site. In such cases, mitigation ratios will be determined by the Corps, the RWQCB, or CDFG, depending upon jurisdiction.

### **Management**

Wetland restoration or pond creation projects would increase wetland and pond communities in the study area (Objective 9.4). Projects could include restoring wetlands with proper hydrology, soils, and topography to support

naturally occurring features without long-term human intervention (WP-7). Native wetland vegetation could be planted or seeded to create structural diversity, provide overhead cover, and moderate water temperature (WP-8). New ponds could be created without affecting downstream drainage patterns in areas where there are gaps in connectivity between breeding sites for aquatic amphibians (WP-9). Any new pond construction that is intended as mitigation would need to be registered with the State Water Resources Control Board Division of Water Rights. An incentive program, including streamlined permitting, could be created that would encourage private and public landowners to implement wetland restoration projects on their property (WP-10).

Protected wetlands and ponds could be effectively managed by promoting ecosystem function (Objective 9.4). Livestock grazing pressure should be controlled in wetlands where necessary to benefit focal species. If such control entails reducing grazing pressure around wetlands or ponds, alternative water sources should be provided in a manner that ensures habitat function of surrounding ponds and wetlands (WP-10). The percent cover and biomass of nonnative plants in protected wetlands and ponds in the study area should be reduced to help increase natural community function and support focal species in wetland communities (WP-11). In addition, a systematic bullfrog removal project in all ponds and wetlands on protected lands in the study area should be implemented (WP-12). This could include the partial filling of ponds (using a dozer) to capture bullfrogs in the pond after draining, and thereby reducing capacity (at least temporarily) or creating a more seasonal pond to benefit native amphibians. This approach would reduce the likelihood of bullfrogs dispersing to other nearby aquatic habitats. This could be partially funded using mitigation funds generated by projects that have impacts on pond or wetland habitats. Similar provisions in management and monitoring programs on mitigation lands should be included to fund bullfrog removal and control (WP-13, WP-14). Finally, an incentive program, including streamlined permitting, could be created to encourage private landowners to maintain a bullfrog-free property (WP-15).

## Protection

The amount of protected land in the study area with these communities could be increased. Parcels with wetland and pond communities or wetland restoration potential could be acquired through fee title purchase or conservation easement (WP-4). In addition, the Implementation Committee could establish an incentive program for private landowners to guarantee the management of wetland and pond communities on their lands. Management plans that promote regeneration and recruitment of native species and support natural processes could be implemented throughout private lands in the study area. Guaranteed management of these natural communities on private lands would ultimately contribute to the conservation objectives (WP-5).

Through permanent protection or written assurances, the Implementation Committee should have as a goal the management of 90% (approximately 477 acres) of seasonal wetland, 90% (approximately 56 acres) of perennial freshwater marsh, 90% (approximately 549 acres) of alkali wetland, and 75% (approximately 256 acres) of ponds (Objective 9.3).

*[Note: Due to the scale of air photo interpretation that was used to create the land cover map for this Conservation Strategy, many small wetlands and ponds may not be represented in land cover calculations. Field verifying this aquatic dataset at the parcel level would allow the Implementation Committee to greatly refine the long-term protection goals for this natural community.]*

### Specific Conservation Opportunities

- Prioritize the protection of ponds or wetlands that either support breeding California red-legged frog, California tiger salamander, or tricolored blackbird or have the potential to be enhanced to support species in all CZs. Ponds within 1.3 miles of other known red-legged frog or tiger salamander breeding sites are the highest priority to retain key linkages for these species.
- CZ-5, CZ-6, CZ-9, CZ-10. These areas support alkali wetland, a relatively rare community in the study area, which supports a high diversity of habitat-dependent species. Protection of this community should be a priority.
- CZ-4. This conservation zone contains a high percentage of the study area's seasonal wetlands. Protection of at least 44 acres of seasonal wetland should be a priority in this conservation zone.

### 3.5.2.7 Streams

#### Conservation Goals and Objectives

##### Goal 10

Improve the overall quality of streams and the hydrologic and geomorphic processes that support them to maintain functional aquatic communities, benefitting focal species and promoting native biodiversity.

**Objective 10.1.** Field verify the Conservation Strategy land cover map of streams and create a refined map that reflects hydroperiod, riparian species composition, and restoration or enhancement opportunities at the stream reach level.

- *Conservation Action STM-1.* During project-level analysis of parcels with streams, applicants will provide information on the size of the aquatic

feature and a characterization of habitat quality to the local authorizing land use jurisdiction as part of the permit process, regardless of whether that feature will be affected by the project, for inclusion in the Conservation Strategy database. The assessment will include an assessment of channel form (e.g., bank-full depth and width, channel slope, channel sinuosity); watershed size; watershed land uses (focusing on subwatersheds that may impact channel stability at the project site, including the hydroperiod at the project site, and the watershed immediately downstream of the project site); sediment balance (for larger projects with impacts to the stream corridor); stream condition (e.g., stability of banks, presence of bank armoring, presence of structures within the stream channel, extent and health of vegetation in the stream channel); and surrounding land uses.

**Objective 10.2.** Avoid or minimize direct impacts on streams during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Table 3-2 and 3-3.

- *Conservation Action STM-2.* To avoid additional impacts from development, the Steering Committee should encourage jurisdictions with planning authority to restrict changes in land use designation within the 100-year floodplain that would enable urban development within the floodplain and reduce stream function, limit natural migration of the stream over time, or limit opportunities for future stream restoration activities. In addition, development in the FEMA 100-year floodplain increases the risk of flooding downstream communities. Municipalities should also continue to enforce creek set-backs as defined by their respective ordinances. The set-back distance should be established by the natural channel's sinuosity plus an agreed distance to allow for channel migration.

**Objective 10.3.** To ensure that the full range of stream habitats persist in the study area at an extent that will sustain the natural processes and native species diversity typically found in this natural community, guarantee the management (through permanent protection or written assurances) of 90% (~191 miles) of stream habitat to benefit focal species and promote native biodiversity .

- *Conservation Action STM-3.* Acquire parcels with stream restoration potential that meet the conservation goals and objectives of this strategy through fee title purchase or conservation easement.
- *Conservation Action STM-4.* Establish new incentive programs for public and private landowners to guarantee the management of streams on their lands. This could be achieved through implementation of management plans that will promote regeneration and recruitment of native species and support the natural processes typically found in these natural communities.

**Objective 10.4.** Increase natural stream habitat in the study area where possible through restoration projects.

- *Conservation Action STM-5.* Restore streams in areas with proper hydrology, soils, and topography to support naturally occurring features that reduce the need for long-term human intervention to maintain stream channel stability.
- *Conservation Action STM-6.* Reconfigure or enhance stream channels to mimic natural stream channel systems by supporting the balanced transport of sediment and water (e.g. reconnecting the floodplain to the stream channel, establishing a low flow channel to efficiently transport sediment, and, where geomorphically appropriate, increasing channel complexity while increasing floodwater retention and detention capabilities. See Appendix G (Proposed new appendix with hydrology/habitat goals) for additional information on maintaining stable creek systems.
- *Conservation Action STM-7.* Plant and/or seed native understory and overstory riparian vegetation within an appropriate buffer along the edge of the low-flow channel to create structural diversity, provide overhead cover, and moderate water temperature, creating a plant density that is appropriate to the naturally occurring vegetation community and stream type. Appropriate buffers should be based on the natural channel's sinuosity plus an appropriate distance to allow for channel migration and to support viable, site-appropriate riparian plant communities.
- *Conservation Action STM-8.* Identify highly erosive stream bank conditions and evaluate underlying causes of instability (e.g., roads, culverts, increased amounts of impervious surfaces in the watershed, decreased sediment load). Attempts should be made to restore an appropriate level of stability using biotechnical bank stabilization techniques.
- *Conservation Action STM-9.* Where stream bank instability threatens the integrity of structures or infrastructure, restore an appropriate level of bank stability using biotechnical bank stabilization techniques to the maximum extent practicable. The use of hardscape to stabilize creek banks is not preferred in this Conservation Action, because hardscape does not provide habitat value to the channel and hardscape is not capable of adapting to minor changes in channel configuration.
- *Conservation Action STM-10.* In areas where it has been determined that livestock grazing has decreased stream habitat quality, seasonally control livestock grazing pressure on near-stream and in-stream resources using exclusion fencing and addition of off-channel water sources. Sufficient access points and width of fenced areas should be maintained to allow for spot grazing when necessary.

### **Avoidance, Minimization, Mitigation**

Direct and indirect impacts on streams should be avoided during construction and postproject activities, respectively (Objective 10.2). Project applicants should implement avoidance measures outlined in Table 3-2 and 3-3 to help

avoid any impacts on these communities (Objective 10.2). To avoid additional impacts of development, the Implementation Committee could also restrict changes in the land use designation that would allow urban development within the FEMA 100-year floodplain (STM-2). Development in these areas could reduce stream function or limit opportunities for future stream restoration activities. If impacts do occur, the project applicant will mitigate the loss of stream habitat. Typically, the mitigation in these communities will be based on standards set for focal species. In situations where no focal species or their habitat are present, mitigation will be determined on the basis of the functions and values of the watercourse on the individual project site. In such cases, mitigation ratios will be determined by the Corps (if impacts are below the ordinary high water mark), the RWQCB, CDFG, or all three.

## Management

Stream restoration would increase aquatic habitat in the study area (Objective 10.4). Projects could include restoring streams by fixing hardscaped and incised channels and removing riprap and barriers to fish and other aquatic species. These activities could result in proper hydrology, soils, and topography to support naturally occurring features that reduce the need for long-term human intervention (STM-5). Stream channels that have not experienced significant incision could be reconfigured to mimic natural channel systems by transporting both water and sediment in a proper balance, while supporting natural habitats (STM-6). For example, reconnecting streams to floodplains could increase channel complexity and return the system to a more natural state, while retaining flood retention capabilities. See Appendix G (New Appendix proposed by Water Board for hydrology goals) for additional guidance on maintaining stable and healthy creek systems. Native understory and overstory riparian vegetation could be planted and/or seeded (STM-7). Highly erosive stream banks could be identified and restored, ideally using biotechnical approaches (STM-8 and STM-9). Livestock grazing pressure near or in streams or stream resources could be lessened by using exclusion fencing or seasonal grazing. Off-channel water sources could be used to reduce grazing pressure on aquatic resources if needed (STM-10). If this method of grazing management is used, sufficient access points and width of fenced areas should be maintained to allow for spot grazing when necessary.

## Protection

The amount of protected stream habitat in the study area could be increased. Parcels with stream restoration potential could be acquired through fee title purchase or conservation easement (STM-3). In addition, the Implementation Committee could establish an incentive program for private landowners to guarantee the management of stream habitat on their lands. Management plans that promote regeneration and recruitment of native species and support

natural processes could be implemented throughout private lands in the study area. Guaranteed management of streams on private lands would ultimately contribute to the conservation objectives (STM-4).

### Specific Conservation Opportunities

- Prioritize the protection of streams that support focal species or have the potential to be enhanced to support focal species in all CZs.
- Identify and rank stream restoration opportunities for each conservation zone.
- *CZ-10, CZ-13, CZ-17*. Priority should be given to streams in areas of potential foothill yellow-legged frog habitat and CNDDDB occurrences.
- *CZ-13, CZ-15, CZ-17*. Priority should be given to streams in areas of future spawning and rearing habitat for central coast steelhead, provided downstream barriers to movement are removed or enhanced.

## 3.5.3 Focal Species Goals and Objectives

Conservation goals developed at the focal species level aim to protect and enhance the habitats of focal species that are protected under federal and state laws. The focal species evaluated for goals and objectives are listed below.

- Vernal pool and longhorn fairy shrimp
- Callippe silverspot butterfly
- California red-legged frog
- California tiger salamander
- Foothill yellow-legged frog
- Alameda whipsnake
- Golden eagle
- Tricolored blackbird
- Western burrowing owl
- American badger
- San Joaquin kit fox
- Central California coast steelhead

For focal plant species, the conservation goals mainly strive to protect existing populations and maintain habitat. The focal plant species are listed below.

- San Joaquin spearscale

- Big tarplant
- Congdon's tarplant
- Palmate-bracted bird's-beak
- Livermore Valley tarplant
- Recurved larkspur

Focal species would benefit and native biodiversity would increase as a result of conservation actions supporting these conservation goals. Goals and objectives for each focal species are described below.

### 3.5.3.1 Standardized Mitigation Ratios

The core of the Conservation Strategy for the focal species is the application of standardized mitigation ratios for each species (Tables 3-4 through 3-12). These ratios would be utilized by local jurisdictions and the Resource Agencies to determine the level of mitigation necessary to offset project impacts. The ratios were developed in collaboration with the Resource Agencies and based on consideration of sites with habitat quality and species occurrence typical of the study area.

Mitigation ratios are applied to the project site based on actual site conditions and habitat quality. Project applicants evaluate habitat quality based on a scoring system that qualitatively assigns *habitat units* for each focal species that occurs or may occur on the project site. A scoring system was created for all focal species except steelhead based on each species' life history (see Appendix E for the scoresheets). Each applicable scoresheet will be completed to reflect project site conditions that are directly related to the habitat quality for each focal species. As discussed above, the assessment of habitat potential on a site will disregard the current land use and management activities that might be compromising the maximum potential habitat quality of the site. Sites with higher quality habitat will score higher for that particular focal species.

The habitat unit scores for project impacts reflect the habitat quality on the site where impacts will occur. While final determinations are subject to site-specific conditions, it is recommended that mitigation generally not be allowed at sites supporting lower quality habitat than the site being affected. However, exceptions can be made where potential mitigation sites with lower quality habitat have the potential to be enhanced or restored to a level of equal or higher habitat value. If such a decision is made, it is further recommended that the enhancements or restoration actions be completed prior to initiation of project impacts to ensure that the mitigation adequately offsets the impacts.

### 3.5.3.2 Calculating Mitigation Ratios

The mitigation need for each species is determined by multiplying the total acres of focal species habitat that are affected by the mitigation ratios, according to the location of the mitigation site and the mix of mitigation provided. Mitigation ratios are determined by using the mitigation reference map for the appropriate species and applying the mitigation ratio from the mitigation ratio table depending on the location of project impact and the location of proposed mitigation.

Less mitigation may also be required if mitigation habitat is of higher quality than affected habitat. For a given species the species score sheets provided in Appendix E allow a project applicant and the USFWS and CDFG to calculate a habitat score for the area that will be impacted by the proposed project. Similarly the species score sheets in Appendix E would be used to calculate a habitat score for that species on the proposed mitigation site. For the species in question the mitigation site must score equally or higher than the impact site in order for it to be considered for mitigation purposes. If the score of the mitigation site is higher than the score of the impact site the total mitigation required ( as calculated using the Standardized Mitigation Table for that species and Mitigation Reference Map) would be reduced using a Mitigation Correction Factor. The Mitigation Correction Factor for the species in question is the species habitat score for the impact site divided by the species habitat score for the mitigation site. The Mitigation Correction Factor is then multiplied times the total mitigation acreage required when the Standardized Mitigation Ratios for that species are applied. This approach provides incentives for applicants to mitigate close to the impact sites.

For some species, habitat restoration can be used in lieu of some habitat preservation. If habitat restoration can be provided, less habitat preservation may be required. In all cases, more species habitat will be preserved or restored at a mitigation site than will be lost at the impact site.

### 3.5.3.3 Vernal Pool and Longhorn Fairy Shrimp

#### Species Goals and Objectives

##### Goal 11

Protect and maintain habitat for longhorn fairy shrimp and vernal pool fairy shrimp.

**Objective 11.1.** Avoid all direct impacts on sandstone rock outcrop vernal pools.

**Objective 11.2.** Avoid and minimize direct impacts on longhorn fairy shrimp and vernal pool fairy shrimp (mortality of individuals and loss of occupied habitat) during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Table 3-2 and 3-3.

**Objective 11.3.** Protect 90% of all existing longhorn fairy shrimp and vernal pool fairy shrimp populations and suitable habitat that has the potential to be occupied in the future.

- **Conservation Action FS-1.** Mitigate the loss of suitable longhorn fairy shrimp and vernal pool fairy shrimp habitat, including upland habitat within 250-feet of known vernal pools, by protecting occupied habitat, or restoring suitable habitat, in accordance with the mitigation guidelines outlined in Table 3-4, *Mitigation Guidelines for Vernal Pool Fairy Shrimp in Eastern Alameda County* and Table 3-5, *Mitigation Guidelines for Longhorn Fairy Shrimp in Eastern Alameda County*. The scoring sheets are shown in Appendix E.
- **Conservation Action FS-2.** Acquire parcels in the Altamont Hills Core Areas (Livermore) identified in the Vernal Pool Recovery Plan that support documented longhorn fairy shrimp or vernal pool fairy shrimp habitat and meet the conservation goals and objectives through fee title purchase or conservation easement.
- **Conservation Action FS-3.** Offer financial or regulatory incentives to public and private landowners to guarantee the management and potential expansion of vernal pool habitats and vernal pool crustaceans on private lands.

**Objective 11.4.** Enhance existing habitat and restore additional habitat for longhorn fairy shrimp and vernal pool fairy shrimp that has the potential to be occupied in the future.

- **Conservation Action FS-4.** Identify sites that have either supported vernal pool crustaceans in the past or have the potential, based on habitat conditions, to support these species in the future; determine the underlying reasons that the habitat is not functional and complete a management plan to address those issues.
- **Conservation Action FS-5.** Following restoration of a site and a determination that the site has all the features necessary to support vernal pool crustaceans set a time frame for when species occupancy could be expected (e.g., 3 years).
- **Conservation Action FS-6.** If suitable habitat is not occupied by vernal pool crustaceans within the time frame proposed in the management plan, initiate a study in coordination with USFWS to determine the feasibility of translocating individuals from nearby stable populations into the newly restored suitable habitat to increase the population in the study area.

## Mitigation Guidance

Direct and indirect (temporary and permanent) impacts on sandstone rock outcrop vernal pools should be avoided during construction and postproject activities (Objective 11.1 and 11.2). Avoidance of both direct and indirect (temporary and permanent) impacts on vernal pool habitats is the most important form of conservation that can occur for this species. Project applicants should implement avoidance measures outlined in Tables 3-2 and 3-3 (Objective 11.2). Additional measures could be prescribed if site-specific conditions warrant.

When avoidance and minimization are not possible and loss of habitat occurs, the project proponent will mitigate the loss of suitable vernal pool fairy shrimp and longhorn fairy shrimp habitat in accordance with the mitigation guidelines outlined in Table 3-4 or Table 3-5 depending on the species present (FS-1). Mitigation will occur at the level specified in the tables, but a determination of the quality of habitat that is being affected would be made using the appropriate scoresheet (Appendix E). Mitigation could entail a combination of on- and offsite protection and enhancement of occupied habitats depending on project impacts.

The most effective conservation tool for these species is the protection of existing vernal pool and longhorn fairy shrimp populations and protection of additional suitable habitat near known populations. Development in vernal pools areas would destroy populations and habitat. Protection and management of habitat should be achieved through fee title purchase or conservation easement in the portion of the study area that is located in the Altamont Hills Core Area (Livermore) (FS-2).

Some protection will occur through mitigation for project-level impacts. The project applicant could acquire parcels, through fee title purchase or conservation easements, where populations have been documented. Such acquisition would necessitate a survey to document longhorn fairy shrimp and vernal pool fairy shrimp occurrences. Restoration projects in conjunction with preservation could be developed as mitigation to restore additional habitat for vernal pool fairy shrimp and longhorn fairy shrimp to ensure sustainability of future populations. Potential restoration sites would include sites previously inhabited and sites with appropriate habitat conditions (FS-4). To ensure that these sites are being occupied by fairy shrimp, monitoring would occur after restoration at the expense of the project applicant as part of the long-term management plan (FS-5). If suitable habitat is not occupied within a pre-determined time period (e.g., 3 years), the project applicant should coordinate with USFWS and CDFG to determine the feasibility of translocating individuals from nearby stable populations into the newly restored suitable habitat to increase the distribution of the species in the study area (FS-6). If translocation is not feasible or if vernal pool crustaceans cannot be established on the site, a

new mitigation alternative developed in the management plan will need to be implemented.

Aside from protection of new lands and management of public lands, financial or regulatory incentives should be extended to landowners to facilitate management of vernal pool habitats and vernal pool crustaceans on private lands that are not being used as project mitigation (FS-3). Management plans could be written for private parcels that contain vernal pool habitats. These plans would include provisions for managing nonnative invasive vegetation. When grazing is used as a management tool, the management plans would outline a monitoring program to determine how vernal pool vegetation responds to the grazing regime, and how to adjust the grazing regime if necessary. Also, accounting for the water economy on the parcel and both upstream and downstream of the parcel is very important.

### Conservation Priorities

- Nearly all existing vernal pool habitat is restricted to CZ-4 through CZ-7. Designing projects to avoid impacts on vernal pool habitat and protecting a high percentage of remaining habitats is one of the greatest conservation priorities for these Zones.
- Most vernal pool data are not shown on the Conservation Strategy land cover map because the habitat occurs at a finer scale than the mapping allowed. Identifying these areas and including them in the Conservation Strategy land cover dataset would be an invaluable step toward ensuring their preservation.
- Critical habitat for longhorn fairy shrimp occurs in CZ-5 (133 acres) and CZ-6 (354 acres). None of the critical habitat in CZ-5 is currently protected, and only 219 acres of critical habitat in CZ-6 is protected. Protecting the rest of the critical habitat in both CZs is a high priority.
- Critical habitat for vernal pool fairy shrimp occurs in CZ-4 (1,378 acres) and CZ-5 (77 acres). In CZ-4, 486 acres are currently protected and in CZ-5, 17 acres are currently protected. This leaves 892 acres and 60 acres of vernal pool fairy shrimp critical habitat unprotected in these CZs, respectively. Protecting the rest of the critical habitat in both CZs is a high priority.

### 3.5.3.4 Callippe Silverspot Butterfly

#### Species Goals and Objectives

##### Goal 12

Protect any remaining populations of callippe silverspot butterfly in the study area and increase the understanding of the distribution and ecology of the species.

**Objective 12.1.** Avoid and minimize direct impacts on callippe silverspot butterfly (mortality of individuals and loss of habitat) during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Table 3-2 and 3-3.

**Objective 12.2.** Protect existing callippe silverspot butterfly populations and additional suitable habitat that has the potential to be occupied in the future.

- *Conservation Action CSB-1.* Mitigate the loss of suitable callippe silverspot butterfly habitat in CZ-8, CZ-11, CZ-12, CZ-14, CZ-15, and CZ-16 by protecting habitat in accordance with the mitigation guidelines outlined in Table 3-6 and the mitigation scoring parameters shown in Appendix E.
- *Conservation Action CSB-2.* Acquire, through fee title purchase or conservation easement, parcels with documented callippe silverspot butterfly populations or suitable habitat in CZ-8, CZ-11, CZ-12, CZ-14, CZ-15, and CZ-16 that also meet the conservation goals and objectives of this strategy.
- *Conservation Action CSB-3.* Offer financial or regulatory incentives to public and private landowners to guarantee the management of grasslands, especially native grasslands, to support callippe silverspot butterfly.

**Objective 12.3.** Determine the distribution of the callippe silverspot butterfly and intergrades in the study area and identify core areas that could contribute to the species' recovery.

- *Conservation Action CSB-4.* Fund systematic, multi-year surveys for callippe silverspot butterfly occupancy on suitable habitat on public and private lands in CZ-8, CZ-11, CZ-12, CZ-14, CZ-15, and CZ-16

#### Mitigation Guidance

The primary goal for this species is to protect any remaining populations of callippe silverspot butterfly in the study area and increase knowledge of its distribution and ecology (Goal 12). To better account for the distribution of this species and its habitat, an important conservation action under this strategy is

to coordinate multi-year surveys to identify occupancy of callippe silverspot butterfly and intergrades on public and private lands (CSB-4). A better understanding of the distribution of this species in the study area will allow for more effective avoidance, minimization, and mitigation for this species.

Project applicants must determine if host plants occur within their project area. This can be determined by a qualified biologist. If the plants are not present, no mitigation would be necessary for this species. If the plants are present, the project applicant has two options: (1) assume presence and mitigate in accordance with Table 3-6 (the selection of a mitigation site would be informed by the mitigation scoresheet shown in Appendix E), or (2) have a qualified biologist conduct a species survey, using methodology approved by the USFWS, to determine if the species habitat and/or species is present. If it is, the project applicant would proceed with avoidance, minimization, and mitigation measures.

Direct and indirect impacts on grasslands that support johnny jump-ups should be avoided during construction and postproject activities within the species' range (CZ-8, CZ-11, CZ-12, CZ-14, CZ-15, and CZ-16) (Objectives 12.1 and 12.2). Project applicants should implement avoidance measures outlined in Tables 3-2 and 3-3 to avoid any impacts on occupied habitat (Objective 12.1). Protection of existing callippe silverspot butterfly populations and suitable habitat will be necessary to contribute to the recovery of this species. The loss of suitable callippe silverspot butterfly habitat in CZ-8, CZ-11, CZ-12, CZ-14, CZ-15, and CZ-16 should be mitigated as outlined in Table 3-6, (CSB-1).

Lands should be acquired through fee title purchase or conservation easement within the CZs shown above and managed for this species (CSB-2). Preservation of habitat in the CZs would allow for the management of callippe silverspot butterfly habitat and potentially allow for colonization. Some of this land protection will occur as mitigation for projects that affect callippe silverspot butterfly habitat. Other suitable habitat might be protected as conservation initiatives by local land management entities. To facilitate management of callippe silverspot butterfly habitat on private lands, financial or regulatory incentives could be offered to landowners to manage their grasslands in a way that is beneficial to the host plant (CSB-3).

### Conservation Priorities

- Continue survey efforts in CZ-8, CZ-11, CZ-12, CZ-14, CZ-15, and CZ-16 to document observations of callippe silverspot butterflies and map suitable habitat.
- Track both positive and negative survey data in a spatial database that can be accessed during the project approval process. Since protocol surveys have not been established, all surveys will need to be verified and approved by USFWS. *[Note: negative survey data would only be useful if the survey*

*were conducted during the same growing year due to temporal variability in habitat occupancy.]*

### 3.5.3.5 California Red-Legged Frog

#### Goal 13

Increase the California red-legged frog population in the study area to a level that allows for long-term viability without human intervention and is consistent with the USFWS Recovery Plan. The USFWS Recovery Plan for California red-legged frog is available for review at [http://ecos.fws.gov/docs/recovery\\_plan/020528.pdf](http://ecos.fws.gov/docs/recovery_plan/020528.pdf).

**Objective 13.1.** Avoid and minimize direct impacts on California red-legged frog (mortality of individuals and loss of occupied aquatic habitat) during construction activities associated with projects implemented under the Conservation Strategy through implementation of avoidance measures outlined in Tables 3-2 and 3-3.

**Objective 13.2.** Protect existing California red-legged frog populations and allow for expansion of metapopulations.

- **Conservation Action CRLF-1.** Mitigate the loss of suitable California red-legged frog habitat by protecting occupied habitat, by restoring degraded aquatic and upland habitat to increase breeding success and survivorship and, where appropriate, by creating suitable aquatic habitat, in accordance with the mitigation guidelines outlined in Table 3-7 and the mitigation scoring parameters shown in Appendix E.
- **Conservation Action CRLF-2.** Acquire parcels that support documented California red-legged frog aquatic and/or upland habitat inside the East San Francisco Bay core recovery area (U.S. Fish and Wildlife Service 2002) and that meet the conservation goals and objectives of this strategy through fee title purchase or conservation easement
- **Conservation Action CRLF-3.** Acquire, through fee title purchase or conservation easement, parcels with California red-legged frog upland habitat within 2 miles of a documented California red-legged frog breeding location (within the previous 3 years).
- **Conservation Action CRLF-4.** Establish an incentive program for public and private landowners to facilitate restoration of key breeding ponds on private lands and guide management of these resources for California red-legged frog.

**Objective 13.3.** Enhance suitable California red-legged frog habitat on public and private lands in the study area through implementation of management plans.

- *Conservation Action CRLF-5.* Include the removal of exotic species such as bullfrogs, mosquitofish, nonnative predatory fish, and nonnative turtles by periodically draining ponds as a measure in all management plans that are prepared for mitigation or conservation lands in the study area.
- *Conservation Action CRLF-6.* Implement grazing management plans to increase the suitability for California red-legged frog of both aquatic habitat and the upland habitat surrounding it.
- *Conservation Action CRLF-7.* Create an incentive program that will encourage private landowners to manage ground squirrels on their property using IPM principles and work toward a balance between species needs and the requirements of a working landscape.
- *Conservation Action CRLF-8.* Create an incentive program, including streamlined permitting, to encourage public and private landowners to maintain their properties free of bullfrogs and nonnative predatory fish.
- *Conservation Action CRLF-9.* Offer financial or regulatory incentives to private landowners to enhance wetland and stream habitat to suit California red-legged frog, and to ensure that activities in upland habitat (e.g., dryland farming and ranching activities) support California red-legged frog movement and refuge needs.
- *Conservation Action CRLF-10.* Provide off-stream water sources for livestock to control grazing pressure in and around streams.
- *Conservation Action CRLF-11.* Increase the amount of California red-legged frog breeding habitat in existing creeks through the creation of more plunge pools and slow water habitats through geomorphically appropriate creek restoration projects.

## Mitigation Guidance

The primary goal for California red-legged frog in the study area is to increase the population and enhance suitable habitat on public and private lands (Goal 13 and Objective 13.3). First and foremost, project applicants must protect suitable habitat that currently exists. Avoiding direct and indirect impacts on California red-legged frogs and loss of occupied aquatic habitat during construction and postproject activities can be accomplished at the project level (Objective 13.1 and 13.2). The assessment of impacts on California red-legged frogs should include the direct mortality of individuals by construction vehicles when the project is in or near occupied breeding habitat. Tables 3-2 and 3-3 offer initial guidance on avoiding impacts at the project level, though site-specific measures should be considered (Objective 13.1).

Project applicants must first determine if California red-legged frog or its habitat occurs within their project area. This can be determined by a qualified biologist. Project applicants are encouraged to use the mitigation scoresheets (Appendix

E) to determine the quality of habitat for California red-legged frog. If the USFWS determines that no habitat is present, then mitigation would not be necessary for the project. If habitat is present, the project applicant has two options: (1) assume presence and mitigate in accordance with Table 3-7, or (2) have a USFWS-approved biologist conduct protocol-level surveys to determine if California red-legged frogs are present. If they are present, the project applicant would proceed with avoidance, minimization, and mitigation measures. If there are no California red-legged frogs present then no mitigation would be necessary. However, if there is suitable habitat on the project site and there is occupied habitat in adjacent areas (within the typical dispersal distance of California red-legged frogs) then the project applicant would need to obtain federal and state incidental take permits, implement avoidance and minimization measures (Table 3-3), and mitigate accordingly.

Protection of existing populations of California red-legged frogs would be the most affective form of mitigation. Project applicants should mitigate the loss of suitable California red-legged frog habitat by protecting and enhancing occupied habitat in accordance with the mitigation guidelines outlined in Table 3-7 (CRLF-1). A mitigation site must have documented species presence and contain both an aquatic (breeding) and upland component. If impacts would only affect upland habitat (i.e., suitable upland habitat within the typical dispersal distance of a known breeding location), the mitigation site must still either contain occupied breeding habitat or be within the typical dispersal distance of *protected* occupied breeding habitat. Consideration should be given to the potential for the mitigation site to become isolated in the future and the potential for the upland mitigation site to become isolated from the breeding habitat. Mitigation sites on contiguous protected lands are more likely to remain viable over the long term.

In order to contribute to the recovery goals for California red-legged frog, additional conservation including land acquisition (beyond that required for project impact mitigation) will have to occur in the study area. The Implementation Committee could establish an incentive program for public and private landowners (CRLF-4, CRLF-9). The incentive program would guarantee the management of California red-legged frog habitat and populations on those lands through the implementation of key restoration actions and management plans. Guidance could be written for private landowners to inform the management of stock ponds to benefit native amphibians. This guidance would be included in grazing management plans. This guidance could include provisions to enhance suitable California red-legged frog habitat on public and private lands, and would include removal and management to prevent recurrence of nonnative species such as bullfrogs (CRLF-8), mosquitofish, and nonnative turtles (CRLF-5); implement grazing management plans to decrease impacts on California red-legged frog habitat (CRLF-6 and CRLF-10); and create incentive programs to enhance wetland and stream habitat (CRLF-9) and create additional breeding habitat (CRLF-11). Removal of nonnative fish and amphibians from pond habitats could include the partial filling of ponds (using a

dozer) to capture bullfrogs in the pond after draining, and thereby reducing capacity (at least temporarily) or creating more of a seasonal pond to benefit native amphibians. This will reduce the likelihood that bullfrogs can disperse to other nearby aquatic habitats. If management initiatives require manipulating habitat that is already occupied by California red-legged frog or any other state- or federally listed species, permits would be needed to complete the work.

### Conservation Priorities

- Protecting aquatic and adjacent upland habitat with documented populations of California red-legged frog is imperative.
- Conservation initiatives for this species should focus on enhancement of breeding habitat that is currently protected. Mitigation actions (e.g., enhancement of existing habitat, restoration of habitat) should be implemented on lands that are already protected.
- Financial incentive programs should be created to facilitate the removal of bullfrogs and nonnative fish from ponds on public and private lands. This funding could be collected from project applicants as part of their mitigation package and used to enhance ponds with documented California red-legged frog and bullfrog populations.

### 3.5.3.6 California Tiger Salamander

#### Goal 14

Increase the California tiger salamander population in the study area to a level that allows for long-term viability of the population without human intervention.

**Objective 14.1.** Avoid and minimize direct impacts on California tiger salamander (mortality of individuals and loss of occupied aquatic or upland habitat) during project construction and indirect impacts that result from postproject activities by implementing avoidance and minimization measures outlined in Table 3-2 and 3-3.

**Objective 14.2.** Protect existing California tiger salamander populations and allow for expansion of metapopulations.

- *Conservation Action CTS-1.* Mitigate the loss of suitable California tiger salamander habitat by protecting occupied aquatic or upland habitat, restoring breeding and upland habitat, and/or creating new suitable aquatic habitat, in accordance with the mitigation guidelines outlined in Table 3-8 and the mitigation scoring parameters shown in Appendix E.

- *Conservation Action CTS-2.* Acquire parcels with documented California tiger salamander habitat inside the study area that meet the conservation goals and objectives of this strategy through fee title purchase or conservation easement.
- *Conservation Action CTS-3.* Acquire parcels supporting California tiger salamander upland habitat within 1.3 miles of a documented California tiger salamander breeding location (within the previous 3 years) through fee title purchase or conservation easement. Habitat should be contiguous (no obstructions such as roads or gradient) and accessible from occupied breeding habitat.
- *Conservation Action CTS-4.* Establish an incentive program for private landowners to guarantee management for California tiger salamanders on private lands, including incentivizing pond/wetland enhancement and allowing burrowing mammals to persist in uplands habitats.

**Objective 14.3.** Enhance suitable California tiger salamander habitat on public and private lands in the study area through implementation of management plans.

- *Conservation Action CTS-5.* Remove exotic species such as bullfrogs, nonnative crayfish, mosquitofish, nonnative predatory fish, and non-native turtles by including periodic draining of ponds or enhancing ponds to become seasonal as a measure in all management plans prepared for mitigation or conservation lands in the study area.
- *Conservation Action CTS-6.* Implement grazing management plans to increase the suitability of upland habitat surrounding aquatic California tiger salamander habitat.
- *Conservation Action CTS-7.* Manage ground squirrels using IPM principles and work toward a balance between species needs and the requirements of a working landscape.
- *Conservation Action CTS-8.* Maintain public and private properties free of bullfrogs and nonnative predatory fish.
- *Conservation Action CTS-9.* Offer financial or regulatory incentives (e.g., pond registration) to private landowners to enhance pond and wetland habitat to suit California tiger salamander, and to ensure that activities in upland habitat (e.g., dryland farming, ranching activities) support California tiger salamander movement and refuge needs.
- *Conservation Action CTS-10.* In areas where grazing pressure has reduced the quality of pond habitat for tiger salamanders due to reduced water quality in breeding habitat, provide alternate water sources that do not impact the hydrology or habitat function of the water source to manage grazing pressure and increase habitat quality.
- *Conservation Action CTS-11.* Remove California tiger salamander hybrid paedomorphs from ponds when found by a qualified biologist.

## Mitigation Guidance

The primary goal for this species is to increase the population of California tiger salamander in the study area and maintain the population without human intervention (Goal 14). Project applicants must determine if California tiger salamander or its habitat occurs within the project area. This can be determined by a qualified biologist, USFWS, and CDFG. Project applicants are encouraged to use the mitigation scoresheets (Appendix E) to determine the quality of habitat for California tiger salamander in their project area. If USFWS and CDFG determine habitat is not present, mitigation would not be necessary. If habitat is present, the project applicant has two options: (1) assume presence and mitigate in accordance with Table 3-8, or (2) have a USFWS and CDFG-approved biologist conduct species surveys using the 2003 Interim Guidance (until an update guidance is provided) to determine if California tiger salamanders are present. If tiger salamanders are present, the project applicant would proceed with avoidance, minimization, and mitigation measures. If no California tiger salamanders are present, then no mitigation is necessary; however, if there is suitable habitat on the project site and there is occupied habitat in adjacent areas (within the typical dispersal distance of California tiger salamander) then the project applicant would need to implement avoidance and minimization measures (Table 3-2 and 3-3) and mitigate accordingly.

Direct and indirect impacts on California tiger salamander and loss of occupied aquatic and upland habitat should be avoided during construction and postproject activities (Objective 14.1). Project applicants should implement avoidance measures outlined in Table 3-2 and 3-3 (Objective 14.1). The most effective form of mitigation is the protection and enhancement of existing populations of California tiger salamander. The project applicant would mitigate the loss of suitable California tiger salamander habitat by protecting occupied aquatic and upland habitat or by restoring occupied aquatic habitat in accordance with the mitigation guidelines outlined in Table 3-8. The selection of mitigation sites will be informed by the mitigation scoresheets in Appendix E (CTS-1). To complete mitigation requirements, the project applicant could acquire parcels, through fee title purchase or conservation easements, to increase the amount of California tiger salamander habitat that is protected in the study area (CTS-2 and CTS-3). Consideration should be given to the potential for the mitigation site to become isolated in the future. Mitigation sites on contiguous protected lands are more likely to remain viable over the long term.

Not all conservation for this species can be accomplished through mitigation efforts; land acquisition will also be necessary to conserve habitat for California tiger salamander. The Implementation Committee could also establish an incentive program for public and private landowners (CTS-4) that preserves aquatic and upland habitat for California tiger salamander. The incentive program would guarantee the management of California tiger salamander habitat and populations on private lands. Restoration and management plans for public and private lands would be developed to enhance suitable California

tiger salamander habitat (Objective 14.3). Management plans would include removal of nonnative species such as bullfrogs, mosquitofish, crayfish, and nonnative turtles (CTS-5); implementation of grazing management plans to manage impacts on California tiger salamander habitat (CTS-6 and CTS-10); and creation of incentive programs to enhance upland (CTS-7), pond, wetland, and stream habitats (CTS-9). Removal of nonnative fish and amphibians from pond habitats could include the partial filling of ponds (using a dozer) to capture bullfrogs in the pond after draining, and thereby reducing capacity (at least temporarily) or creating more of a seasonal pond to benefit native amphibians and reduce habitat suitability for hybrid tiger salamanders. This will reduce the likelihood that bullfrogs can disperse to other nearby aquatic habitats. In all cases, the response of the California tiger salamander population would need to be monitored to determine best management practices for the species in various habitat types.

### Conservation Priorities

- A total of 1,177 acres of designated critical habitat for California tiger salamander critical habitat are in CZ-3, none of which are currently protected. Protection of critical habitat is a high priority for this species.
- California tiger salamander modeled habitat (aquatic and upland) occurs in every conservation zone in the study area. The most acreage is in CZ-2, CZ-4, and CZ-6. Most of this habitat is on private land with no existing protections. The exception is zone CZ-4, where more than half the modeled habitat is currently protected. Expanding protected lands in this zone would greatly benefit this species.
- The focus in the study area should remain on protecting and managing breeding habitat and adjacent uplands.
- Continued monitoring of hybridization with barred tiger salamander should be a priority. The prevalence of hybrid tiger salamanders has become more apparent in recent years, and research has shown that these hybrids may outcompete native California tiger salamanders over time.

### 3.5.3.7 Foothill Yellow-Legged Frog

#### Goal 15

Increase the foothill yellow-legged frog population in each watershed where it currently occurs to a level that allows for long-term viability in the watershed without human intervention.

**Objective 15.1.** Avoid and minimize direct impacts on foothill yellow-legged frog (mortality of individuals and loss of habitat) during project construction and

indirect impacts that result from postproject activities by implementing avoidance measures outlined in Table 3-2 and 3-3.

**Objective 15.2.** Protect existing foothill yellow-legged frog populations and allow for expansion of metapopulations by protecting lands in the surrounding watershed, especially riverine habitat upstream and downstream of documented occurrences.

- *Conservation Action FYF-1.* Mitigate the loss of suitable foothill yellow-legged frog habitat by protecting occupied habitat in accordance with the mitigation guidelines outlined in Table 3-9 and the mitigation scoring parameters in Appendix E.
- *Conservation Action FYF-2.* Acquire parcels in the study area with documented foothill yellow-legged frog breeding habitat through fee title purchase or conservation easement
- *Conservation Action FYF-3.* Time releases from reservoirs to occur before or after the peak foothill yellow-legged frog egg-laying period to avoid dislodging egg masses downstream.

**Objective 15.3.** Enhance suitable foothill yellow-legged frog habitat on public and private lands in the study area through implementation of management plans.

- *Conservation Action FYF-4.* Reduce the number of exotic species such as bullfrogs, nonnative crayfish, nonnative predatory fish, and nonnative turtles to a level that would increase the overall survivorship of foothill yellow-legged frogs in stream habitat south of I-580.
- *Conservation Action FYF-5.* Consistent with Conservation Action STM-9, provide off-stream water sources to control grazing pressure in streams and associated riparian habitats.
- *Conservation Action FYF-6.* To increase the distribution of foothill yellow-legged frog in the study area, initiate a study in coordination with CDFG to determine the feasibility of translocating individuals from nearby stable populations into unoccupied suitable habitat in the study area.

## Mitigation Guidance

The primary goal for this species is to increase the population of foothill yellow-legged frogs within the study area and maintain the population without human intervention (Goal 15). The most effective way to accomplish this is to protect extant populations of the species. Of the six CNDDDB occurrences in the study area, four were in Alameda Creek, one was in the headwaters of Corral Hollow Creek, and one was at Arroyo Mocho (California Natural Diversity Database 2009). Foothill yellow-legged frogs are also found in Sunol Regional Wilderness

and Ohlone Regional Wilderness (Bobzien and DiDonato 2007). Protecting all documented populations of this species should be a priority in the study area.

Most extant populations occur in remote areas where typical project impacts (e.g., development) will not occur. In-stream maintenance activities and water conveyance (for water supply) through natural stream channels have the highest potential to affect this species. While changes in the timing of releases from reservoirs are dependent on many factors, the habitat needs of this species and the timing of releases relative to the egg-laying period should be considered. Direct and indirect impacts on foothill yellow-legged frogs and loss of individuals must be avoided at the project level (Objective 15.1). This is the primary conservation action for this species.

When in-stream projects are planned in watersheds where this species has been documented, species surveys to determine presence should be conducted prior to initiation of any activities. Gaining a better understanding of the population levels and total distribution of this species in the study area will allow for better protection of habitat and avoidance of direct and indirect impacts. When projects are conducted where habitat for this species occurs avoidance measures outlined in Tables 3-2 and 3-3 should be implemented (Objective 15.1).

When avoidance is not possible, project applicants will have to mitigate the loss of habitat. Such mitigation is typically quantified in linear feet of stream affected. Existing populations of foothill yellow-legged frogs and riverine habitat upstream and downstream of those occurrences could be protected as mitigation (Objective 15.2). All mitigation will be implemented in accordance with the mitigation guidelines outlined in Table 3-9. The selection of a mitigation site should be informed by assessing the impact site and mitigation site using the scoresheet in Appendix E (FYF-1).

Management plans for public and private lands could be developed to enhance suitable foothill yellow-legged frog habitat and contribute to the overall understanding of this species in the study area (Objective 15.3). Management plans would include removal of nonnative species such as bullfrogs, mosquitofish, crayfish, and nonnative turtles (FYF-4) and grazing management plans to decrease impacts on yellow-legged frog habitat (FYF-5). If it is determined over time that the foothill yellow-legged frog populations are not expanding and face possible extirpation, the Implementation Committee should coordinate with CDFG to study the feasibility of translocating individuals from stable populations to suitable unoccupied habitat (FYF-6).

### **Specific Conservation Opportunities**

- Protect stream and upland habitats in areas where foothill yellow-legged frog are known to currently persist (Alameda Creek, the headwaters of Corral Hollow Creek, and Arroyo Mocho).

- Fund research of the species to better determine habitat use and limiting factors for each extant population in the study area.

### 3.5.3.8 Alameda Whipsnake

#### Goal 16

Increase the Alameda whipsnake population in the designated recovery units in the study area to a level that allows for long-term viability without human intervention.

**Objective 16.1.** Avoid and minimize direct impacts on Alameda whipsnake (mortality of individuals and loss of habitat) during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Table 3-2 and 3-3.

**Objective 16.2.** Protect existing Alameda whipsnake populations and allow for expansion of metapopulations.

- *Conservation Action AWS-1.* Mitigate the loss of suitable Alameda whipsnake habitat by protecting occupied habitat in accordance with the mitigation guidelines outlined in Table 3-9.
- *Conservation Action AWS-2.* Acquire parcels with documented Alameda whipsnake populations that meet the conservation goals and objectives of this strategy through fee title purchase or conservation easement.
- *Conservation Action AWS-3.* Conduct targeted presence/absence surveys on the approval of CDFG and USFWS on private and public lands on both sides of I-580, I-680, and SR 84 to identify linkages between Recovery Unit 3 (identified in the USFWS Draft Recovery Plan for Chaparral and Scrub Species East of San Francisco Bay, California [U.S. Fish and Wildlife Service 2002]) and units to the north and south.
- *Conservation Action AWS-4.* Acquire, through fee title purchase or conservation easement, parcels that provide linkages between Recovery Units 3, 2, 5 and 7.

**Objective 16.3.** Enhance suitable Alameda whipsnake habitat on public and private lands that are within Alameda Whipsnake recovery units (identified in the USFWS Draft Recovery Plan for Chaparral and Scrub Species East of San Francisco Bay, California [U.S. Fish and Wildlife Service 2002]).

- *Conservation Action AWS-5.* Conduct research in known Alameda whipsnake population centers that investigates population response to various grazing regimes.
- *Conservation Action AWS-6.* Implement grazing management plans on all protected lands in Alameda whipsnake Recovery Units that are based on the

most up-to-date research findings on grazing levels and whipsnake population response.

- *Conservation Action AWS-7.* Using information gathered through targeted studies on fire intensity, location, and frequency conduct prescribed burns consistent with Conservation Action CCS-4 in documented population centers in Recovery Units 3 and 5 to prevent the overgrowth of shrubs and woodland to a closed canopy condition.
- *Conservation Action AWS-8.* Mechanically thin chaparral and coastal scrub consistent with Conservation Action CCS-4 to prevent the overgrowth of shrubs and woodland to a closed canopy condition. See Section 3.5.2.2m above for guidance on studies that will inform this process.

## Mitigation Guidance

The primary goal for this species is to protect a large proportion of remaining habitat and increase the overall number of individuals within the study area to maintain the population without human intervention (Goal 16)—moving toward recovery of this species in the study area. The amount of protected habitat could be increased through the acquisition parcels for mitigation purposes or through expansion of conservation lands managed in the public interest.

Alameda whipsnake populations would benefit from avoiding impacts on individuals and habitat during and after construction. Use of the mitigation scoresheet in Appendix E will inform project proponents of the quality of habitat in project areas and the quality of mitigation land needed to offset impacts on those sites. Known populations of Alameda whipsnake and areas of suitable habitat should be considered during the project design process if the project is occurring inside a conservation zone known to support the species (CZ-8 through CZ-18). If impacts cannot be avoided they will be fully mitigated. The project proponent will mitigate the loss of suitable whipsnake habitat in accordance with the mitigation guidelines outlined in Table 3-9 (AWS-1). Mitigation will occur at the level specified in Table 3-9, but a determination of the quality of habitat that is affected and thus requires mitigation would be determined using the scoresheet in Appendix E. The project proponent could acquire parcels, through fee title purchase and/or conservation easements, where known populations occur (AWS-2). This would require a survey approved by CDFG and USFWS of the property to document species presence. Similarly, protection of parcels that include parts of important linkages as described in the Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California, may qualify as mitigation locations for this species (AWS-3 and AWS-4).

Recovery goals for this species cannot be achieved through mitigation alone. Land acquisition and protection will be needed to conserve Alameda whipsnake habitat. Management plans for public and private lands within Alameda

whipsnake Recovery Units could be developed to enhance existing habitat to contribute to an increase in the total population (Objective 16.3). Management plans could include research components to determine current habitat used by Alameda whipsnake, particularly in grazed areas (AWS-5). Grazing plans could then be tailored toward practices deemed most beneficial to the species in protected lands that fall inside Alameda whipsnake Recovery Units (AWS-6). Management plans should include provisions that prevent the overgrowth of chaparral and scrub habitats to a closed canopy condition—a condition that reduces overall habitat quality for Alameda whipsnake. Thinning of chaparral and scrub communities to benefit the species would be overseen by species and vegetation experts. Thinning would likely be accomplished by conducting prescribed burns where feasible (AWS-7) or by mechanically thinning chaparral and coastal scrub to mimic those natural processes that are no longer occurring (e.g., fire) (AWS-8). If any of these activities are conducted in suitable Alameda whipsnake habitat, consultation and an incidental take permit would have to be obtained from USFWS and CDFG if effects or take of Alameda Whipsnake is possible.

### Specific Conservation Opportunities

- Protect all areas where Alameda whipsnake has been documented and suitable habitat persists.
- Conduct Alameda whipsnake surveys on private and public lands on both sides of I-580, I-680, and SR 84 to identify linkages between Recovery Unit 3 and units to the north and south. Linkages are important for breeding and genetic diversity among whipsnake populations.
- Protect suitable habitat, which includes a matrix of chaparral and scrub communities, rock outcrops, annual grasslands, and riparian corridors inside Recovery Units for Alameda whipsnake. If possible, priority for protection should be given to areas that are also designated critical habitat. This will help reach the USFWS draft recovery goals for this species.
- CZ-8, CZ-10, CZ-12, CZ-13, CZ-15, CZ-16, and CZ-17 present the greatest opportunities for increased habitat protection. Additional opportunities exist in nearly all the CZs south of I-580.

### 3.5.3.9 Golden Eagle

#### Goal 17

Maintain the nesting golden eagle population in the study area at a level that allows for long-term viability without human intervention.

**Objective 17.1.** Avoid direct impacts on golden eagle (mortality of individuals and loss of nests) during project construction or postproject activities by implementing avoidance measures outlined in Table 3-2 and 3-3.

**Objective 17.2.** Avoid and minimize direct impacts on golden eagle (loss of foraging habitat) during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Table 3-2 and 3-3.

**Objective 17.3.** Protect and monitor all golden eagle nest sites and surrounding foraging habitat in the study area.

- *Conservation Action GOEA-1.* Acquire, through fee title purchase or conservation easement, parcels with documented golden eagle nest sites in the study area.
- *Conservation Action GOEA-2.* Mitigate the loss of golden eagle foraging habitat by protecting and managing habitat in accordance with the mitigation guidelines outlined in Table 3-10.
- *Conservation Action GOEA-3.* Implement an annual monitoring program for all golden eagle nests on protected lands documenting the presence/absence of nesting pairs and nest productivity in number of young fledged; submit data to the CNDDDB and Conservation Strategy database based on earlier work done by W. Grainger Hunt.

**Objective 17.4.** Enhance suitable golden eagle habitat on public and private lands in the study area through implementation of species-specific measures in management plans.

- *Conservation Action GOEA-4.* Consistent with Conservation Action GRA-10, cease using rodenticides in protected areas and, when possible, outside protected areas. When rodent management is needed to protect the integrity of structures such as levees or stock pond dams or to prevent nuisance populations on adjacent private lands, encourage land managers to use IPM principles.

## Mitigation Guidance

Golden eagles use nearly all terrestrial habitats of the western states except densely forested areas. The primary goal for this species is to increase the population of golden eagles in the study area and maintain the population without human intervention (Goal 17). Most mitigation for this species is centered on avoiding impacts at the nest site. Loss of foraging habitat is important, but determining the foraging range of specific pairs of golden eagles and relating that range to project impacts is problematic. If a golden eagle nest site occurs on or near (within 0.5 mile) of a project site, project applicants will need to determine if the nest is active. Direct impacts on golden eagles, their

nests, and foraging habitat must be avoided during construction and postproject activities (Objective 17.1 and 17.2). Removal of golden eagle nests would require the project applicant to contact CDFG and USFWS's Migratory Bird Program. To ensure that project activities do not disrupt nesting behavior, project applicants should implement avoidance measures outlined in Tables 3-2 and 3-3 (Objective 17.1 and 17.2). Project applicants would be expected to mitigate the loss of golden eagle foraging habitat by protecting foraging habitat in accordance with the mitigation guidelines outlined in Table 3-10 (GOEA-2). The quality of foraging habitat on the project site and the selection of an adequate mitigation site would be informed by the mitigation scoresheet in Appendix E.

The project applicant could fulfill mitigation obligations by acquiring parcels through fee title purchase or conservation easements (GOEA-2). Mitigation should focus on protecting land adjacent to other protected lands to protect large landscapes that can in turn support nesting and foraging eagles. Mitigation should be focused outside the Altamont Pass Wind Resource Area and would be most effective in CZ-12, CZ-13, CZ-15, CZ-16, CZ-17, and CZ-18). Management plans for public and private lands within golden eagle foraging habitat could be developed to enhance suitable habitat and contribute to the persistence of this species in the study area (Objective 17.3). The Implementation Committee could create an incentive program to encourage private landowners to retain ground squirrels on their properties and work toward a balance between species needs and the requirements of a working landscape. This program would preclude using rodenticides in protected areas and, when possible, outside protected areas. When rodent management is needed to protect the integrity of structures such as levees or stock pond dams or to prevent nuisance populations on adjacent private lands, encourage land managers to use IPM principles.

### **Conservation Priorities**

- Implement annual surveys that document presence/absence of nesting pairs and nest productivity in number of young fledged and submit findings to the CNDDDB and Conservation Strategy database.
- Fund outreach programs for public and private landowners about IPM programs.
- Coordinate conservation efforts with the Altamont Pass Wind Resource Area NCCP/HCP.

### 3.5.3.10 Tricolored Blackbird

#### Goal 18

Increase the number of tricolored blackbird nest colonies in the study area.

**Objective 18.1.** Avoid direct impacts on tricolored blackbirds (mortality of individuals and loss of nests) during project construction or postproject activities by implementing avoidance measures outlined in Tables 3-2 and 3-3.

**Objective 18.2.** Avoid and minimize direct loss of tricolored blackbird foraging habitat during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Tables 3-2 and 3-3.

**Objective 18.3.** Protect and monitor all tricolored blackbird nest colonies and surrounding foraging habitat in the study area.

- *Conservation Action TRBL-1.* Acquire, through fee title purchase or conservation easement, parcels with documented nest colonies in the study area.
- *Conservation Action TRBL-2.* Mitigate the loss of tricolored blackbird foraging habitat within 2 miles of known nest colonies by protecting habitat in accordance with the mitigation guidelines outlined in Table 3-10.
- *Conservation Action TRBL-3.* Implement an annual monitoring program in coordination with local conservation groups, and California Audubon to implement an annual monitoring program on all tricolored blackbird nest colonies on protected lands using monitoring protocols established by California Audubon; submit results to the Tricolored Blackbird Portal (U.C. Davis), CNDDDB, and the Conservation Strategy database.
- *Conservation Action TRBL-4.* To supplement surveys of known nest colony locations, implement a systematic survey effort on a 3-year rotation, coordinated with California Audubon, to survey potential nest colony locations on public and private lands in the study area.

**Objective 18.4.** Enhance suitable tricolored blackbird habitat on public and private lands in the study area through implementation of species-specific measures in management plans.

- *Conservation Action TRBL-5.* Purchase agricultural easements on land surrounding tricolored blackbird nest colonies or potential nest sites to ensure that the parcel will remain in types of irrigated pasture or dryland agriculture that provide foraging habitat for nesting tricolored blackbirds.
- *Conservation Action TRBL-6.* Provide alternate water sources to control grazing pressure in streams, wetlands, and ponds and during key times of the year (e.g., breeding season).

- *Conservation Action TRBL-7.* Offer financial or regulatory incentives to private landowners to enhance pond and marsh habitat to suit breeding tricolored blackbirds and to ensure that dryland farming and ranching activities support breeding tricolored blackbirds.

## Protection

Tricolored blackbirds have three basic requirements for selecting their breeding colony sites: open, accessible water; a protected nesting substrate, including either flooded, thorny, or spiny vegetation; or a suitable foraging space providing adequate insect prey within a few miles of the nesting colony (Hamilton et al. 1995; Beedy and Hamilton 1997, 1999). The primary goal for this species is to increase the number of tricolored blackbird nest colonies in the study area (Goal 18). Accomplishing this goal is uncertain due to the ephemeral behavior of this species and its selection of nest sites.

Avoiding direct or indirect impacts on nest colonies, if they occur in the study area, is imperative (Objective 18.1 and 18.2). Due to the low number of nest colonies present each year and the low number of individual birds at each colony, conservation of this species cannot occur in the study area if impacts occur on recently occupied nest habitat. An annual accounting of where nest colonies occur is the best way to ensure avoidance of impacts. To determine if a project area has habitat for tricolored blackbirds, project applicants should use the mitigation scoresheet (Appendix E). If habitat is present, the project applicant should implement avoidance measures as outlined in Table 3-2 and Table 3-3 (Objective 18.1 and 18.2). Most impacts will affect foraging habitat. Studies have shown that tricolored blackbirds typically forage within 2 miles of nest colonies. Mitigation would be required for projects that remove foraging habitat (suitable land cover within 2 miles of a recently active nest site).

Mitigation could be accomplished through acquisition of habitat through fee title purchase or conservation easement (TRBL-1). The selection of a mitigation site that will adequately offset project impacts should be informed by the mitigation scoresheet for this species (Appendix E).

Additionally, project applicants could work with the Implementation Committee to fund an entity to perform annual surveys to document tricolored blackbird nest colonies on protected lands using monitoring protocols established by California Audubon. Results should be submitted to the Tricolored Blackbird Portal (U.C. Davis), CNDDDB, and the Conservation Strategy database (TRBL-3). Additional nest colony surveys of known locations, coordinated with California Audubon on a 3-year rotation, would inform the Implementation Committee of additional colonies in the study area (TRBL-4).

In addition to protecting new lands, many improvements can be made on public and private lands that would benefit this species. Specific measures for

tricolored blackbird in management plans would include purchasing agricultural easements on land surrounding tricolored blackbird nest colonies or potential nest sites as foraging habitat (TRBL-5). Another beneficial measure would be to provide alternate water sources to control grazing pressure in streams, wetlands, and ponds during key times of the year (e.g., breeding season) (TRBL-6). Private landowners could be offered financial or regulatory incentives to enhance pond and marsh habitat to suit breeding tricolored blackbirds (including planting vegetation that could support nest colonies), and to ensure that dryland farming and ranching activities support foraging tricolored blackbirds (TRBL-7).

### Conservation Priorities

- Protect all consistently occupied nest colonies and surrounding foraging habitat in the study area.
- Fund surveys of all historically documented tricolored blackbird colonies to gain an understanding of the annual presence of this species in the study area.

[**Note:** A 2008 census documented only one active colony in Alameda County, at Ames and Doolan roads near Livermore (April 27, 2008, 27 nesting pairs) (Kelsey 2008). In 2009, a colony was observed off Andrade Road in the Sunol Area in quarry ponds near Alameda Creek (T. Rahmig and H. Peeters pers. obs.). In early 2010 a colony was observed north of Bethany Reservoir in C-27 (DiDonato pers. obs.). Other historic colony sites have been documented at Altamont Creek, Broadmoor Pond, Dagnino Road, Dyer Road, Laughlin Road, North Flynn Road, and Vallecitos Lane (Kelsey 2008).]

#### 3.5.3.11 Burrowing Owl

##### Goal 19

Increase the burrowing owl nesting population (number of nesting pairs) and number of nesting locations in the study area.

**Objective 19.1.** Avoid direct impacts on burrowing owls (mortality of individuals and loss of nests) during project construction or postproject activities by implementing avoidance measures outlined in Table 3-2 and 3-3.

**Objective 19.2.** Avoid and minimize direct loss of burrowing owl habitat (loss of breeding and non-breeding habitat) during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Table 3-2 and 3-3.

**Objective 19.3.** Protect and monitor all burrowing owl nest sites, including surrounding foraging habitat, in the study area.

- *Conservation Action BUOW-1.* Acquire, through fee title purchase or conservation easement, parcels with documented burrowing owl nests in the study area.
- *Conservation Action BUOW-2.* Acquire, through fee title purchase or conservation easement, parcels inside the study area with a history of burrowing owl occupation and/or nesting activity during the previous three breeding seasons.
- *Conservation Action BUOW-3.* Mitigate the loss of burrowing owl nesting habitat (suitable habitat within 0.5 mile of documented nest occurrence during previous 3 years), by protecting habitat in accordance with the mitigation guidelines outlined in Table 3-10.
- *Conservation Action BUOW-4.* Implement an annual monitoring program in coordination with local conservation groups, Institute for Bird Populations, and California Audubon of all burrowing owl nest colonies on protected lands using monitoring protocols established by the California Burrowing Owl Consortium; submit results to the CNDDDB and the Conservation Strategy database.
- *Conservation Action BUOW-5.* To supplement surveys of known nest colonies, implement a systematic survey effort consistent with methodologies used by the Institute for Bird Populations to survey potential nest colony locations on public and private lands in the study area.

**Objective 19.4.** Enhance suitable burrowing owl habitat on public and private lands in the study area through implementation of species-specific measures in management plans.

- *Conservation Action BUOW-6.* Purchase easements on land surrounding burrowing owl nest colonies or potential nest sites to ensure that the parcel will remain in types of grazing land, irrigated pasture, or dryland agriculture that provide foraging habitat for nesting burrowing owls.
- *Conservation Action BUOW-7.* Create an incentive program that will encourage private landowners to manage ground squirrels on their property using IPM principles and work toward a balance between species needs and the requirements of a working landscape.
- *Conservation Action BUOW-8.* Consistent with GRA-10, cease using rodenticides in protected areas and, when possible, outside protected areas. When rodent management is needed to protect the integrity of structures such as levees and stock pond dams or to prevent nuisance populations on adjacent private lands, encourage land managers to use IPM principles.

## Mitigation Guidance

Throughout their range, burrowing owls require habitats with three basic attributes: open, well-drained terrain; short, sparse vegetation; and underground burrows or burrow facsimiles (Klute et al. 2003). There are 52 known occurrences of burrowing owls in the study area (California Natural Diversity Database 2009). Of those, 36 are occurrence records from the breeding season (February 1–August 30). All occurrences are in the northern portion of the study area in open fields, annual grassland, alkali sinks, and near business developments (California Natural Diversity Database 2009). The primary goal for this species is to increase the number of nesting pairs of burrowing owls and the number of nest locations in the study area (Goal 19).

Two factors that affect burrowing owls are direct effects on nesting habitat and loss of foraging habitat around nest sites. Project applicants should use the mitigation scoresheet (Appendix E) to determine if the project site supports habitat for burrowing owl. In general, if the project site supports grassland or ruderal vegetation and has ground squirrel burrows it has the potential to support burrowing owls. If habitat is present, the project applicant should have a qualified burrowing owl biologist conduct protocol-level surveys (California Burrowing Owl Consortium 1993). If the species is present, direct impacts on burrowing owls, their nests, and foraging habitat should be avoided during construction and postproject activities (Objectives 19.1 and 19.2). The project applicant should implement avoidance measures as outlined in Table 3-2 and 3-3 (Objective 19.1 and 19.2). Existing burrowing owl nest sites and foraging habitat should be protected and monitored (Objective 19.3).

If avoidance of burrowing owl habitat is not possible, the project applicant should mitigate the loss of habitat by protecting habitat in accordance with the mitigation guidelines outlined in Table 3-10 (BUOW-3). The project applicant could acquire parcels, through fee title purchase or conservation easement, where known nesting sites occur or where nesting sites have occurred in the previous three nesting seasons (BUOW-1 and BUOW-2). Additionally, the project applicant could work with the Implementation Committee to fund the implementation of an annual monitoring program in coordination with local conservation groups on all burrowing owl nest colonies on protected lands using monitoring protocols established by the California Burrowing Owl Consortium (1993). The results of these surveys would be submitted to the CNDDDB and the Conservation Strategy database (BUOW-4 and BUOW-5). This would allow for informed avoidance of impacts in the future.

To adequately conserve this species, management of burrowing owl habitat on public and private land also needs to occur (Objective 19.4). Specific measures for burrowing owls in management plans would include purchasing agricultural easements on land surrounding burrowing owl nest colonies or potential nest sites (BUOW-6). The Implementation Committee could create an incentive program to encourage private landowners to manage ground squirrels on their

property using IPM principles and work toward a balance between species needs and the requirements of a working landscape. This would preclude using rodenticides in protected areas and, when possible, outside protected areas. When rodent management is needed to protect the integrity of structures such as levees and stock pond dams or to prevent nuisance populations on adjacent private lands, encourage land managers to use IPM principles.

### Conservation Priorities

- Protect all known nest locations with priority given to those that are at risk of being lost to development.
- Fund an annual monitoring program to track occupied burrowing owl nest sites and to estimate the number of nesting pairs.
- Coordinate conservation actions with the Altamont Pass Wind Resource Area NCCP/HCP.
- Fund outreach programs for public and private landowners about IPM programs.

#### 3.5.3.12 American Badger

##### Goal 20

Maintain the American badger population while protecting and enhancing important regional linkages for the species in the study area.

**Objective 20.1.** Avoid and minimize direct impacts on American badger (mortality of individuals and loss of den sites) during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Tables 3-2 and 3-3.

**Objective 20.2.** Maintain the American badger population in the study area at a level that allows for long-term viability of the population.

- *Conservation Action AMB-1.* Mitigate the loss of suitable American badger habitat by protecting habitat in accordance with the mitigation guidelines outlined in Table 3-10.
- *Conservation Action AMB-2.* Acquire parcels in the study area with documented American badger populations through fee title purchase or conservation easement.
- *Conservation Action AMB-3.* Conduct targeted presence/absence surveys on private and public lands on both sides of I-580 and I-680 to identify linkages across these barriers.

- *Conservation Action AMB-4.* Acquire parcels that protect linkages across I-580 and I-680 through fee title purchase, conservation easement, or agricultural easement.

**Objective 20.3.** Enhance suitable American badger habitat on public and private lands in the study area through implementation of species-specific measures in management plans.

- *Conservation Action AMB-5.* Create an incentive program that will encourage private landowners to manage ground squirrels on their property using IPM principles and work toward a balance between species needs and the requirements of a working landscape.
- *Conservation Action AMB-6.* Allow the expansion of California ground squirrel colonies on all protected lands except when needed to protect the integrity of structures such as levees or stock pond dams or to prevent nuisance populations on adjacent private lands
- *Conservation Action AMB-7.* Consistent with GRA-10 and BUOW-8, cease using rodenticides in protected areas and, when possible, outside protected areas. When rodent management is needed to protect the integrity of structures such as levees or stock pond dams or to prevent nuisance populations on adjacent private lands, encourage land managers to use IPM principles.

## Mitigation Guidance

The primary goal for this species is to maintain the population level and protect and enhance linkages in the study area (Goal 20). Mitigation is not generally required for this species. Under this Conservation Strategy, the species was used as an umbrella species to better understand habitat linkages, particularly in grassland habitats in the eastern part of the study area. To determine if mitigation would be required for this species, project applicants should assess their project area using the mitigation scoresheet (Appendix E).

Mitigation would only be required if an American badger den were documented on the project site. If a den is documented on a project site, direct and indirect impacts on the den should be avoided during construction and postproject activities (Objective 20.1). Project applicants would implement avoidance measures outlined in Table 3-2 and 3-3 to help avoid any impacts on potential den sites (Objective 20.1 and AMB-1). Removal of the den would only occur following coordination with CDFG.

If the den site cannot be avoided, the project applicant will be required to mitigate the habitat loss. Habitat mitigation would be consistent with mitigation ratios in Table 3-10. The selection of an adequate mitigation site would be informed by the mitigation scoresheet (Appendix E). Existing habitat in the study area could be protected by acquiring parcels that support it. The project

applicant could acquire parcels, through fee title purchase or conservation easements, where known badger dens occur or where habitat linkages have been identified across I-580 and I-680 (AMB-2 and AMB-4). Alternatively, the project applicant could work with the Implementation Committee to fund presence/absence surveys in the study area to identify existing linkages on both sides of I-580 and I-680 and between other protected areas (AMB-3).

Most conservation for this species will not result from mitigation. The most effective conservation will occur on public or private lands. Management plans on public and private lands in American badger habitat could be developed to enhance suitable habitat and ultimately prevent decline of the population (Objective 20.3). Specific measures for American badger in management plans would create incentive plans for private landowners that include allowing expansion of ground squirrel populations and managing populations of California ground squirrels using IPM practices rather than rodenticides, which are harmful to badgers (AMB-5, AMB-6 and AMB-7). Ground squirrels provide prey for American badgers and are important for their survival.

### Conservation Priorities

- Fund surveys in public lands to document occupied badger burrows.
- Fund surveys that will document American badger movement through the study area to help identify important habitat linkages and potential passages across key barriers (e.g., freeways, aqueducts).
- Fund outreach programs for public and private landowners about IPM programs.

### 3.5.3.13 San Joaquin Kit Fox

#### Goal 21

Increase the San Joaquin kit fox population while protecting and enhancing suitable habitat and important regional linkages for the species in the study area.

**Objective 21.1.** Avoid and minimize direct impacts on San Joaquin kit fox (mortality of individuals and loss of den sites) during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Tables 3-2 and 3-3.

**Objective 21.2.** Increase the San Joaquin kit fox breeding population in the study area.

- *Conservation Action SJKF-1.* Mitigate the loss of suitable San Joaquin kit fox habitat by protecting habitat in accordance with the mitigation guidelines outlined in Table 3-11.
- *Conservation Action SJKF-2.* Acquire parcels with documented San Joaquin kit fox den sites in the study area that meet the conservation goals and objectives of this strategy through fee title purchase and/ or conservation easement and using funding that comes from non-mitigation sources (e.g., grant funding, local fundraising efforts).

**Objective 21.3.** Increase connectivity of suitable habitat across major infrastructure barriers in the study area.

- *Conservation Action SJKF-3.* Conduct targeted presence/absence surveys, including scat scent surveys with dogs, on private and public lands on both sides of I-580 and along the California Aqueduct to identify linkages between and across these barriers.
- *Conservation Action SJKF-4.* Acquire parcels and manage vegetation in areas that protect linkages across infrastructure barriers and that meet the conservation goals and objectives of this strategy through fee title purchase or conservation easement.
- *Conservation Action SJKF-5.* Create new passages (undercrossings or overcrossings) across I-580 between Livermore and the Alameda/San Joaquin County Line and overcrossings at key locations along the California Aqueduct that are large enough to accommodate movement of terrestrial mammals, including San Joaquin kit fox.

**Objective 21.3.** Enhance suitable San Joaquin kit fox habitat on public and private lands in the study area through implementation of species-specific measures in management plans.

- *Conservation Action SJKF-5.* Create an incentive program that will encourage private landowners to manage ground squirrels on their property using IPM principles and work toward a balance between species needs and the requirements of a working landscape.
- *Conservation Action SFJK-6.* Allow the expansion of California ground squirrel colonies on all protected lands except when needed to protect the integrity of structures such as levees or stock pond dams or to prevent nuisance populations on adjacent private lands.
- *Conservation Action SFJK-7.* Consistent with GRA-10, cease using rodenticides in protected areas and, when possible, outside protected areas. When rodent management is needed to protect the integrity of structures such as levees or stock pond dams or to prevent nuisance populations on adjacent private lands, encourage land managers to use IPM principles.

## Mitigation Guidance

The primary goal for this species is to maintain the population and protect and enhance linkages in the study area (Goal 21). To determine if a project area supports San Joaquin kit fox habitat, project applicants should assess the area using the mitigation scoresheet (Appendix E). If foraging or dispersal habitat or a potential den site is located, the project applicant would have two options: (1) assume presence, avoid impacts on the den site through coordination with CDFG and USFWS, and mitigate the loss of any habitat that cannot be avoided; or (2) conduct approved protocol-level surveys for kit fox. Those surveys would have to be conducted by a USFWS- and CDFG-approved biologist. [Note: *it is difficult to prove absence of San Joaquin kit fox on a parcel in this part of its range because population densities are so low*].

If a potential den site is identified on the project site, direct and indirect impacts should be avoided during construction and postproject activities (Objective 21.1). The project applicant can accomplish this by implementing avoidance measures outlined in Tables 3-2 and 3-3 (Objective 21.1 and SJKF-1). If suitable habitat is present, then the project site should be scored using the mitigation scoresheet (Appendix E). Mitigation for the loss of habitat would be consistent with the mitigation ratios for this species in Table 3-11. The selection of an adequate mitigation site would be informed by using the mitigation scoresheet in Appendix E.

In addition to standard project-level mitigation, additional study of kit fox in the study area would allow for more effective conservation. Project applicants in need of mitigation could work with the Implementation Committee to identify key linkages for kit fox in the study area (Objective 21.3). Surveys could be conducted in the study area to identify existing linkages on both sides of I-580, I-680, and the California Aqueduct (SJKF-3). Parcels in the linkage areas could be acquired through fee title purchase and/or conservation easement. Those acquisitions could be brokered with mitigation funds if the timing is appropriate, but they would more likely be acquired with kit fox recovery funds or funding from other conservation groups in Alameda County. If it is determined that linkages are compromised or if evidence suggests that new crossings would be beneficial to the species, additional overcrossings or undercrossings could be constructed to allow passage over I-580 and the California Aqueduct. These crossings would allow for safe passage between habitats.

In addition to new land acquisition, management of lands that are already protected would also benefit this species. Management plans for public and private lands in San Joaquin kit fox habitat could be developed to enhance suitable habitat and contribute to the recovery of this species (Objective 21.3). Specific measures for kit fox in management plans would create incentive plans for private landowners that include allowing expansion of ground squirrel populations and managing populations of California ground squirrels using IPM practices rather than rodenticides, which are harmful to San Joaquin kit fox, and

to reduce their control of coyotes on their lands. Coyote control can easily lead to non-targeted take of San Joaquin kit fox (SJKF-5, SJKF -6 and SJKF -7). Ground squirrels provide prey and burrowing sites for San Joaquin kit foxes and are important for their continued survival.

### Conservation Priorities

- Preserve suitable habitat within the range of San Joaquin kit fox.
- Identify key linkages (corridors) for San Joaquin kit fox in the study area.
- Protect land on both sides of infrastructure barriers (i.e., roadways, canals) where passage currently occurs. Enhance those passages to facilitate kit fox movement.
- Fund outreach programs for public and private landowners about IPM programs.

#### 3.5.3.14 Central California Coast Steelhead

##### Goal 22

Increase the central California coast (CCC) steelhead distinct population segment by enhancing and providing access to habitat in the study area.

**Objective 22.1.** Avoid and minimize direct impacts on potential CCC steelhead habitat during project construction and indirect impacts that result from postproject activities by implementing avoidance measures in Tables 3-2 and 3-3.

**Objective 22.2.** Increase the CCC steelhead population in the study area.

**Objective 22.3.** Support existing efforts to remove/modify fish barriers in the Alameda Creek watershed to enable access to a wide variety of streams and habitats in the study area.

**Objective 22.4.** Ensure that all new road crossings and crossing upgrades in areas of potential CCC steelhead habitat are designed to facilitate passage of adult and juvenile steelhead.

**Objective 22.5.** Work with local flood control agencies to develop and implement fish-friendly flood control practices (e.g., Zone 7's Stream Maintenance Program).

**Objective 22.6.** Increase complexity of stream resources (e.g., woody debris) within the Conservation Strategy study area.

- *Conservation Action CCCS-1.* Provide education for local jurisdictions with stream maintenance initiatives and landowners regarding removal of large woody material from streams.
- *Conservation Action CCCS-2.* Use biotechnical techniques and applications for bank stabilization.
- *Conservation Action CCCS-3.* Purchase floodplain properties that will allow stream channels to meander.
- *Conservation Action CCCS-4.* Consistent with Conservation Actions RIP-1 to RIP-10 and STM-1 to STM-9, protect, restore, and enhance riparian vegetation in the study area.

**Objective 22.3.** Increase access to CCC steelhead spawning and rearing habitat in the study area.

- *Conservation Action CCCS-6.* Where possible, remove or modify existing barriers in the Alameda Creek watershed to allow passage to spawning and rearing habitat in the upper watershed.
- *Conservation Action CCCS-7.* Increase instream flows by releasing water from existing reservoirs in the Alameda Creek watershed to allow adult steelhead passage to spawning and rearing habitat in the upper watershed.
- *Conservation Action CCCS-8.* Increase stream flows to provide better juvenile rearing conditions by decreasing water temperatures, providing ample food, providing more habitat, and facilitating downstream juvenile migration.

### Mitigation Guidance

Currently, CCC steelhead is not present in the study area. Should the species return to the study area through the removal of barriers or by other means, mitigation guidance will be created for the species and included in this Conservation Strategy. In the interim, project applicants should rely on the mitigation guidance offered above for riparian forest and scrub habitat while considering the conservation goals and objectives outlined for this species.

### 3.5.3.15 Focal Plant Species

#### Goal 23

Protect existing populations and maintain habitat for focal plant species (San Joaquin spearscale, big tarplant, Congdon's tarplant, palmate-bracted bird's-beak, Livermore Valley tarplant, and recurved larkspur).

**Objective 23.1.** Avoid and minimize direct impacts on focal plant populations during project construction and indirect impacts that result from postproject activities by implementing avoidance measures outlined in Tables 3-2 and 3-3.

**Objective 23.2.** Protect existing focal plant populations.

- *Conservation Action PLA-1.* Mitigate the loss of focal plant populations and suitable habitat for those species by protecting occupied habitat or by creating or restoring suitable habitat in accordance with the mitigation guidelines outlined in Table 3-12.
- *Conservation Action PLA-2.* Acquire parcels with known occurrences of focal plant populations and suitable habitat in areas near known populations through fee title purchase or conservation easement.
- *Conservation Action PLA-3.* Establish an incentive program for private landowners to allow for botanical surveys on their property and to guarantee the management of habitats with focal plant populations to suppress nonnative invasive vegetation and promote regeneration and recruitment of native species while supporting the natural processes typically found in the communities that support the focal plant species.
- *Conservation Action PLA-4.* Identify source populations for potential banking of seeds for use in future reintroduction of focal plant species into suitable habitat.

**Objective 23.3.** Enhance suitable habitat for focal plant species on public and private lands in the study area through implementation of management plans that include beneficial management actions, seed banking, and reintroduction to suitable habitat.

- *Conservation Action PLA-5.* Continue or introduce livestock grazing in a variety of grazing regimes with the appropriate timing and intensity for native plant species in grassland and scrub habitats.
- *Conservation Action PLA-6.* Conduct prescribed burns. Use targeted studies to inform location and frequency.
- *Conservation Action PLA-7.* Conduct mowing in selected areas to reduce plant height and biomass cover where use of livestock is impractical.
- *Conservation Action PLA-8.* Identify locations in the study area where shrub- or tree-dominated plant communities are encroaching on grassland communities (including alkali meadow and scald, California annual grassland, and non-serpentine bunchgrass grassland) and, if appropriate, work to reduce the encroachment through mechanical removal.

## Mitigation Standards

The focal plant species in the study area are San Joaquin spearscale, big tarplant, Congdon's tarplant, palmate-bracted bird's-beak, Livermore Valley tarplant, and recurved larkspur (Goal 23). The primary goal for focal plant species is to protect existing populations and maintain their habitats. Though protecting extant populations should be a priority, there is also conservation value in conducting additional surveys for new occurrences in suitable habitat. The conservation zones where those surveys would be most beneficial are discussed below in *Specific Conservation Priorities*.

- San Joaquin spearscale typically occurs in alkali grassland and alkali meadow or on the margins of alkali scrub.
- Big tarplant occurs in annual grassland on clay to clay-loam soils, usually on slopes and often in burned areas, below 1,500 feet (California Natural Diversity Database 2009).
- Congdon's tarplant occurs in annual grassland on lower slopes, flats, and swales below 800 feet. This species can be associated with alkaline or saline soils. A new population was discovered on private lands in CZ-6 in 2010 (Didonato pers. obs.).
- Palmate-bracted bird's-beak is associated with alkaline sites in grassland and chenopod scrub at elevations of 10–500 feet. Seeds are dispersed by water, making the local hydrology very important to the extent of a population.
- Livermore Valley tarplant occurs in seeps and meadows, often associated with alkali meadows at elevations of 500–600 feet.
- Recurved larkspur occurs on sandy or clay alkaline soils, generally in annual grasslands or in association with saltbush scrub or valley sink scrub habitats, format elevations of 100–2,000 feet (California Natural Diversity Database 2009).

Direct and indirect impacts on focal plant species should be avoided during construction and postproject activities (Objective 23.1). Project applicants should implement avoidance measures outlined in Tables 3-2 and 3-3 to avoid any impacts and should mitigate any loss of habitat (Objective 23.1 and PLA-1). Mitigation will be required for impacts that cannot be avoided. An assessment of how the project and construction activities will affect the focal plant population must be completed. The methodology for this will vary by species and site-specific conditions. Impact assessment methodologies will need to be approved by USFWS (federally listed species) and CDFG. In all cases, an adequate floristic survey of the site must have been completed within the preceding 3 years (under normal rainfall conditions), and spatially explicit data on the extent of the focal plant population must be available. To mitigate impacts on a plant population, a parcel where the focal plant species occurs could be acquired through fee title purchase or conservation easement (PLA-2).

An assessment of the plant population on both the impact site and the proposed mitigation site must be conducted by a qualified botanist. The mitigation population must be the same or better in terms of population size and vigor than the population affected at the project site.

Enhancement plans for public and private lands that provide suitable habitat for focal plant species could be developed to enhance suitable habitat and contribute to meeting the conservation objectives (Objective 23.3). Specific measures for focal plant species in management plans would promote livestock grazing in grassland and scrub habitat (PLA-5), conducting prescribed burns (PLA-6), conducting mowing (PLA-7), and identifying locations in the study area where shrub- or tree-dominated plant communities are encroaching on grasslands communities (alkali meadow and scald, California annual grassland, and non-serpentine bunchgrass grassland) (PLA-8).

## Specific Conservation Opportunities

### Big Tarplant

- CZ-5, CZ-6. Survey for new occurrences in suitable habitat.
- CZ-9. Protect extant populations (one CNDDDB record) and survey for new occurrences.
- CZ-10. This CZ contains five of six documented CNDDDB occurrences in the study area. Protection of those occurrences and surveys for additional occurrences in suitable habitat are the conservation priority.

### Congdon's Tarplant

- CZ-2. Protect existing populations (three CNDDDB records) and survey for new occurrences.
- CZ-3. Protect existing populations (three CNDDDB records) and survey for new occurrences. This CZ contains nearly half of all modeled suitable habitat for this species in the study area.
- CZ-4. Protect existing populations (one CNDDDB record) and survey for new occurrences.
- CZ-6. Protect newly discovered population on private lands and survey for new occurrences.
- CZ-5, CZ-11, and CZ-16. Conduct surveys for new occurrences in suitable habitat.

### Livermore Valley Tarplant

- CZ-7. Protect existing populations and survey for new occurrences.

**Palmate-Bracted Bird's Beak**

- CZ-4. Protect only known extant population of this species and conduct annual surveys to better document contraction and expansion of the population.

**Recurved Larkspur**

- CZ-7. Protect the only known occurrences of this species in the study area and survey for new occurrences.

**San Joaquin Spearscale**

- CZ-2. Protect existing populations (two CNDDB records) and survey for new occurrences.
- CZ-3. Protect existing populations (five CNDDB records) and survey for new occurrences.
- CZ-4. Protect existing populations (two CNDDB records) and survey for new occurrences.
- CZ-5. Protect existing populations (two CNDDB records) and survey for new occurrences.
- CZ-6. Protect existing populations (one CNDDB record) and survey for new occurrences.
- CZ-7. Protect existing populations (one CNDDB record) and survey for new occurrences.
- CZ-10. Survey for new occurrences in suitable habitat.

**Table 3-1. Conservation Goals for Land Cover within the East Alameda County Conservation Strategy Study Area.**

Land Cover	Total in Study Area (acres)	Open Space Type 1	Open Space Type 2	Open Space Type 3	Open Space Type 4	Not in Open Space (acres)	Protection Goal: percent of total in study area	Acres Already Protected: Type 1 or 2 Open Space	Acres Not Protected (Not in Type 1 or 2 Open Space)	Additional Protected Acres Needed to Meet Conservation Goal
<b>Grassland</b>										
Alkali Meadow and Scalds	977	41	65	4	4	863	90%	106	871	773
California Annual Grassland	116,828	3,118	8,961	13,956	2,172	88,621	75%	12,079	104,749	75,542
Non-serpentine Native Bunchgrass Grasslands	<i>Acreage not known</i>									
Rock Outcrop	99	2	44	11	11	31	90%	46	53	43
Serpentine Bunchgrass Grassland	241	0	157	55		29	90%	157	84	60
Valley Sink Scrub	410	54	201	3	0	152	90%	255	155	114
<b>Chaparral and Coastal Scrub</b>										
Mixed Serpentine Chaparral	3,788		48	24	0	3,716	90%	48	3,740	3,361
Northern Coastal Scrub / Diablan Sage Scrub	2,700	280	494	752	130	1,044	75%	774	1,926	1,251
Northern Mixed Chaparral / Chamise Chaparral	2,684	0	0	129	233	2,322	75%	0	2,684	2,013
<b>Oak Woodland</b>										
Blue Oak Woodland	26,321	273	3,854	3,656	206	18,332	75%	4,127	22,194	15,614
Coast Live Oak Forest and Woodland	1,221	38	184	209	1	788	75%	222	999	694
Mixed Evergreen Forest / Oak Woodland	32,497	635	7,105	5,217	1,022	18,518	75%	7,740	24,757	16,633
<b>Conifer Woodland</b>										
Coulter Pine Woodland	74	0	60	13	0	0	75%	60	14	0
Foothill Pine-Oak Woodland	22,695	0	1,944	260	128	20,363	75%	1,944	20,751	15,077
Sargent Cypress Woodland	653	0	0	0	0	653	90%	0	653	588
<b>Riparian Forest and Scrub</b>										
Mixed Riparian Forest and Woodland	2,323	37	176	412	220	1,477	75%	214	2,110	1,529
Mixed Willow Riparian Scrub	664	0	0	11	120	533	75%	0	664	498
Sycamore Alluvial Woodland	597	0	299	239	26	33	90%	299	298	238
<b>Wetlands</b>										
Alkali Wetland	717	16	80	7	1	613	90%	96	621	549
Perennial Freshwater Marsh	62	0	0	31	22	9	90%	0	62	56
Seasonal Wetland	547	3	12	4	27	501	90%	15	532	477
<b>Open Water</b>										
Pond	413	30	24	51	23	285	75%	54	359	256
Quarry Pond	1,246	0	0	96	103	1,048	75%	0	1,246	934
Reservoir (defined by management)	1,886	0	0	1,020	867	0	75%	0	1,886	1,414
Streams <sup>1</sup>	244	3	26	55	15	145	90%	29	215	191
Canal / Aqueduct	198	0	0	0	8	190	0%	0	198	0
<b>Subtotal All Natural or Water Land-Cover Types</b>	<b>219,844</b>	<b>4,218</b>	<b>23,971</b>	<b>24,740</b>	<b>7,271</b>	<b>159,643</b>				
<b>Developed Agriculture</b>										
Developed Agriculture	526	4	1	207	7	308	0%	4	522	
Cropland	7,923	3	4	653	1,002	6,261	0%	7	7,916	
Orchard	203	0	27	42	5	128	0%	27	175	
Vineyard	2,684	0	3	473	1,672	537	0%	3	2,682	
Ornamental Woodland	40	0	10	14	4	11	0%	10	30	
<b>Subtotal All Agricultural Land Cover Types</b>	<b>11,376</b>	<b>7</b>	<b>44</b>	<b>1,389</b>	<b>2,691</b>	<b>7,245</b>				
<b>Urban - Suburban</b>										
Urban - Suburban	28,973	11	33	977	668	27,283	0%	44	28,929	
Rural Residential (<1 unit per 2.5 Acres)	3,198	2	48	124	125	2,900	0%	50	3,148	
Golf Courses / Urban Parks	2,759	0	0	62	1,119	1,577	0%	0	2,759	
Landfill	536	0	0	0	0	536	0%	0	536	
Ruderal	4,798	0	10	179	286	4,324	0%	10	4,789	
<b>Subtotal All Developed Land-Cover Types</b>	<b>40,264</b>	<b>13</b>	<b>91</b>	<b>1,343</b>	<b>2,198</b>	<b>36,620</b>				
<b>Total Landcover in Study Area</b>	<b>271,485</b>	<b>4,238</b>	<b>24,106</b>	<b>27,472</b>	<b>12,160</b>	<b>203,509</b>				

<sup>1</sup> All numbers in table for streams are represented as miles.

**Table 3-2. General Avoidance and Minimization Measures to Reduce Effects on Focal Species**

AMM Code	Avoidance and Minimization Measure
GEN-01	Employees and contractors performing construction activities will receive environmental sensitivity training. Training will include review of environmental laws and Avoidance and Minimization Measures (AMMs) that must be followed by all personnel to reduce or avoid effects on covered species during construction activities.
GEN-02	Environmental tailboard trainings will take place on an as-needed basis in the field. The environmental tailboard trainings will include a brief review of the biology of the covered species and guidelines that must be followed by all personnel to reduce or avoid negative effects to these species during construction activities. Directors, Managers, Superintendents, and the crew foremen and forewomen will be responsible for ensuring that crewmembers comply with the guidelines.
GEN-03	Contracts with contractors, construction management firms, and subcontractors will obligate all contractors to comply with these requirements, AMMs.
GEN-04	The following will not be allowed at or near work sites for covered activities: trash dumping, firearms, open fires (such as barbecues) not required by the activity, hunting, and pets (except for safety in remote locations).
GEN-05	Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.
GEN-06	Off-road vehicle travel will be minimized.
GEN-07	Vehicles will not exceed a speed limit of 15 mph on unpaved roads within natural land-cover types, or during off-road travel.
GEN-08	Vehicles or equipment will not be refueled within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area is constructed.
GEN-09	Vehicles shall be washed only at approved areas. No washing of vehicles shall occur at job sites.
GEN-10	To discourage the introduction and establishment of invasive plant species, seed mixtures/straw used within natural vegetation will be either rice straw or weed-free straw.
GEN-11	Pipes, culverts and similar materials greater than four inches in diameter, will be stored so as to prevent covered wildlife species from using these as temporary refuges, and these materials will be inspected each morning for the presence of animals prior to being moved.
GEN-12	Erosion control measures will be implemented to reduce sedimentation in wetland habitat occupied by covered animal and plant species when activities are the source of potential erosion problems. Plastic mono-filament netting (erosion control matting) or similar material containing netting shall not be used at the project. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.
GEN-13	Stockpiling of material will occur such that direct effects to covered species are avoided. Stockpiling of material in riparian areas will occur outside of the top of bank, and preferably outside of the outer riparian dripline and will not exceed 30 days.
GEN-14	Grading will be restricted to the minimum area necessary.
GEN-15	Prior to ground disturbing activities in sensitive habitats, project construction boundaries and access areas will be flagged and temporarily fenced during construction to reduce the potential for vehicles and equipment to stray into adjacent habitats.
GEN-16	Significant earth moving-activities will not be conducted in riparian areas within 24 hours of predicted storms or after major storms (defined as 1-inch of rain or more).
GEN-17	Trenches will be backfilled as soon as possible. Open trenches will be searched each day prior to construction to ensure no covered species are trapped. Earthen escape ramps will be installed at intervals prescribed by a qualified biologist.

**Table 3-3. Species-Specific AMMs**

Species AMM	Species	Habitat	Avoidance and Minimization Measure
INV-1	Vernal pool fairy shrimp, longhorn fairy shrimp	Vernal pools/clay flats, alkaline pools/rock outcrops/sandstone pools	<ul style="list-style-type: none"> <li>• A qualified biological monitor will be present if work is conducted outside of designated work corridors or off of existing access roads.</li> <li>• If vernal pools, clay flats, alkaline pools, ephemeral stock tanks, or sandstone pools, or roadside ditches are present, a qualified biologist will stake and flag an exclusion zone prior to construction activities. The exclusion zone will be fenced with orange construction zone and erosion control fencing (to be installed by construction crew). The exclusion zone will encompass the maximum practicable distance from the worksite and at least 250 feet from the aquatic feature wet or dry.</li> <li>• Work will be avoided after the first significant rain until June 1, or until pools remain dry for 72 hours.</li> <li>• No herbicide will be applied within 100 feet of exclusion zones, except when applied to cut stumps or frilled stems or injected into stems. No broadcast applications will be applied.</li> <li>• Avoid modifying or changing the hydrology of the habitat.</li> </ul>
INV-2	Callippe silverspot butterfly	Grassland with host/nectar plants present	<ul style="list-style-type: none"> <li>• No herbicide will be applied within 100 feet of host plant populations. Spot application to cut stumps, frilled stems, or injected into stems are acceptable. No broadcast applications will be applied.</li> <li>• Cut trees that are removed in the vicinity of host plants will be hand carried rather than dragged to disposal areas.</li> <li>• Avoid or minimize the removal of host plant, Johnny jump-up (<i>Viola pedunculata</i>)</li> <li>• Avoid work in suitable habitat during the flight and mating season (mid-May to mid-July); establish a minimum 50-foot buffer around host plants.</li> </ul>
AMPH-1	<u>Amphibians</u> California tiger salamander California red-legged frog Foothill yellow-legged frog	Streams, wetlands, ponds, vernal pools	<ul style="list-style-type: none"> <li>• If aquatic habitat is present, a qualified biologist will stake and flag an exclusion zone prior to activities. The exclusion zone will be fenced with orange construction zone and erosion control fencing (to be installed by construction crew). The exclusion zone will encompass the maximum practicable distance from the work site and at least 500 feet from the aquatic feature wet or dry.</li> </ul>
AMPH-2	<u>Amphibians</u> California tiger salamander California red-legged frog Foothill yellow-legged frog	Riparian habitat and grasslands within 2-miles of aquatic habitat.	<ul style="list-style-type: none"> <li>• A qualified biologist will conduct preconstruction surveys prior to activities define a time for the surveys (before ground breaking). If individuals are found, work will not begin until they are moved out of the construction zone to a USFWS/CDFG approved relocation site.</li> <li>• A Service-approved biologist should be present for initial ground disturbing activities.</li> <li>• If the work site is within the typical dispersal distance (contact USFWS/CDFG for</li> </ul>

Species AMM	Species	Habitat	Avoidance and Minimization Measure
REPT-1	Alameda whipsnake	Chaparral, scrub, grassland, riparian, oak woodland	<p>latest research on this distance for species of interest) of potential breeding habitat, barrier fencing will be constructed around the worksite to prevent amphibians from entering the work area. Barrier fencing will be removed within 72 hours of completion of work.</p> <ul style="list-style-type: none"> <li>• No monofilament plastic will be used for erosion control.</li> <li>• Construction personnel will inspect open trenches in the morning and evening for trapped amphibians.</li> <li>• A qualified biologist possessing a valid ESA Section 10(a)(1)(A) permit or Service approved under an active biological opinion, will be contracted to trap and to move amphibians to nearby suitable habitat if amphibians are found inside fenced area.</li> <li>• Work will be avoided within suitable habitat from October 15 (or the first measurable fall rain of 1" or greater, to May 1.</li> </ul> <ul style="list-style-type: none"> <li>• No monofilament plastic will be used for erosion control</li> <li>• Barrier fencing may be used to exclude focal reptiles. Barrier fencing will be removed within 72 hours of completion of work.</li> <li>• Construction crews or on-site biological monitor will inspect open trenches in the morning and evening for trapped reptiles.</li> <li>• Ground disturbance in suitable habitat will be minimized.</li> <li>• A USFWS and CDFG-approved biological monitor will be present for all ground disturbing activities in suitable habitat.</li> <li>• A qualified biologist possessing a valid ESA Section 10(a)(1)(A) permit or Service approved under an active biological opinion, and approved by CDFG will be contracted to trap and to move reptiles to nearby suitable habitat if listed reptiles are found inside fenced area.</li> </ul>
BIRD-1	Golden eagle	Cliffs and large trees surrounded by open grassland.	<ul style="list-style-type: none"> <li>• If an active nest is identified near a proposed work area work will be conducted outside of the nesting season (February 1 to September 1).</li> <li>• If an active nest is identified near a proposed work area and work cannot be conducted outside of the nesting season, a no-activity zone will be established by a qualified biologist. The no-activity zone will be large enough to avoid nest abandonment and will at a minimum be 250-foot radius from the nest.</li> <li>• If an effective no-activity zone cannot be established in either case, an experienced golden eagle biologist will develop a site-specific plan (i.e., a plan that considers the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the eagles, and the dissimilarity of the proposed activity with background activities) to minimize the potential to affect the reproductive success of the eagles.</li> </ul>

Species AMM	Species	Habitat	Avoidance and Minimization Measure
BIRD-2	Burrowing owl	Grasslands or ruderal areas with burrows	<ul style="list-style-type: none"> <li>• If an active nest is identified near a proposed work area work will be conducted outside of the nesting season (March 15 to September 1).</li> <li>• If an active nest is identified near a proposed work area and work cannot be conducted outside of the nesting season, a no-activity zone will be established by a qualified biologist. The no-activity zone will be large enough to avoid nest abandonment and will at a minimum be 250-foot radius from the nest.</li> <li>• If burrowing owls are present at the site during the non-breeding period, a qualified biologist will establish a no-activity zone of at least 150 feet.</li> <li>• If an effective no-activity zone cannot be established in either case, an experienced burrowing owl biologist will develop a site-specific plan (i.e., a plan that considers the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the owls, and the dissimilarity of the proposed activity with background activities) to minimize the potential to affect the reproductive success of the owls.</li> </ul>
BIRD-3	Tricolored blackbird	Wetlands, ponds with emergent vegetation	<ul style="list-style-type: none"> <li>• If an active nest colony is identified near a proposed work area work will be conducted outside of the nesting season (March 15 to September 1).</li> </ul>
MAMM-1	San Joaquin kit fox, (American badger)	Grassland, generally with ground squirrel burrows	<ul style="list-style-type: none"> <li>• If potential dens are present, their disturbance and destruction will be avoided.</li> <li>• If potential dens are located within the proposed work area and cannot be avoided during construction, qualified biologist will determine if the dens are occupied or were recently occupied using methodology coordinated with the USFWS and CDFG. If unoccupied, the qualified biologist will collapse these dens by hand in accordance with USFWS procedures (U.S. Fish and Wildlife Service 1999).</li> <li>• Exclusion zones will be implemented following USFWS procedures (U.S. Fish and Wildlife Service 1999) or the latest USFWS procedures available at the time. The radius of these zones will follow current standards or will be as follows: Potential Den—50 feet; Known Den—100 feet; Natal or Popping Den—to be determined on a case-by-case basis in coordination with USFWS and CDFG.</li> <li>• Pipes will be capped and trenches will contain exit ramps to avoid direct mortality while construction areas is active.</li> </ul>
FISH-1	Central California coast steelhead	Stream habitats	<ul style="list-style-type: none"> <li>• If any life stage of any listed species may be present during in-water activities or substantial disturbance, capture, handling, exclusion, salvage, and relocation will be considered for the listed species. A take permit from NMFS would be required for this unless it is for emergency, then DFG.</li> <li>• With the exception of streams identified by NMFS, and CDFG as not supporting spawning habitat, conduct all in-water activities outside the spawning and incubation season for listed fish species or to periods identified in cooperation with NMFS, and CDFG to accommodate site-specific conditions.</li> </ul>

Species AMM	Species	Habitat	Avoidance and Minimization Measure
			<ul style="list-style-type: none"> <li>• Preserve stream width, depth, velocity, and slope that provide upstream and downstream passage of adult and juvenile salmonid fish according to NMFS and CDFG guidelines and criteria or as developed in cooperation with NMFS and CDFG to accommodate site-specific conditions.</li> <li>• Remove the minimum amount of wood, sediment and gravel, and other natural debris necessary to maintain and protect culvert and bridge function, ensure suitable fish passage conditions, and minimize disturbance of the streambed, using hand tools where feasible.</li> <li>• Instream woody material (IWM) subject to damage or removal shall be retained and replaced on site after project completion or used for other mitigation/restoration projects near the project site where feasible.</li> <li>• Minimize disturbed areas by locating temporary work areas to avoid patches of native aquatic vegetation, substantial large woody debris, and spawning gravel.</li> <li>• Where spawning gravel removal is temporary to support construction activities, replace spawning gravel to approximate the pre-construction conditions and using gravel removed from the site.</li> <li>• Gravel and LWD excavated from the channel that is temporarily stockpiled for reuse in the channel will be stored in a manner that prevents mixing with stream flows.</li> <li>• For diversion from streams, rivers, and other water bodies, any water intake structure shall be installed, operated, and maintained in accordance with NMFS, and DFG criteria for the species and life stages of concern or as developed in cooperation with NMFS, USFWS, and DFG to accommodate site-specific conditions.</li> <li>• Avoid extending existing areas of stream bank rock slope protection (RSP) or other bank protection (e.g., sheet piles) and limit the extent of bank and channel armoring to the minimum necessary to protect essential infrastructure.</li> <li>• Where rock slope protection (RSP) is necessary, incorporate native riparian vegetation and/or LWD in RSP.</li> <li>• Stream flow through new and replacement culverts, bridges, and over stream gradient control structures must meet the velocity depth, and other passage criteria for salmonid streams as described by NMFS and DFG guidelines or as developed in cooperation with NMFS and DFG to accommodate site-specific conditions.</li> <li>• Pile driving shall be conducted outside of the stream channel whenever feasible or practical.</li> <li>• Drive piles with a vibratory hammer when feasible.</li> <li>• For drop or hydraulic hammers, use the smallest pile driver and the minimum force necessary to complete the work – set the hammer drop height to the minimum necessary to drive the pile.</li> <li>• Where listed species cannot be captured, handled, excluded, or relocated (e.g.,</li> </ul>

Species AMM	Species	Habitat	Avoidance and Minimization Measure
			<p>salmonid redd), avoid or delay actions that could injure or kill individual organism until the species leaves the affected area or the organism reaches a stage that can be captured, handled, excluded, or relocated . This activity would need to be coordinated with NMFS and the biologist conducting the work would need a take permit.</p> <ul style="list-style-type: none"> <li>• Within occupied habitat, capture, handling, exclusion, and relocation activities shall be completed no earlier than 48 hours before construction begins to minimize the probability that listed species will recolonize the affected areas. This activity would need to be coordinated with NMFS and the biologist conducting the work would need a take permit.</li> <li>• Within temporarily drained stream channel areas, salvage activities shall be initiated before or at the same time as stream area draining and completed within a time frame necessary to avoid injury and mortality of listed species. This activity would need to be coordinated with NMFS and the biologist conducting the work would need a take permit.</li> </ul>

**Table 3-4. Standardized Mitigation Ratios for Vernal Pool Fairy Shrimp in the EACCS Study Area**

Location of Impact <sup>1</sup>	Location of Mitigation <sup>1,2</sup>			Notes	
	Inside Critical Habitat in EACCS study area	Outside Critical Habitat and Inside Vernal Pool Recovery Unit	Outside Critical Habitat and Outside Vernal Pool Recovery Unit		Outside EACCS Study Area
Inside Critical Habitat in EACCS study area	9:1—(6 acres preservation; 3 acres restoration) *requires site-specific USFWS approval	10:1—(6.5 acres preservation; 3.5 acres restoration) *requires site-specific USFWS approval	11:1—(7 acres preservation; 4 acres restoration) *requires site-specific USFWS approval	Requires site-specific agency approval	In order to preserve 90% of vernal pool fairy shrimp habitat, consistent with the goals and objectives of the EACCS, a high ratio is required due to the rarity of this habitat type.
Outside Critical Habitat and Inside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	Requires site-specific agency approval	
Outside Critical Habitat and Outside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	11:1—(7 acres preservation; 4 acres restoration)	Requires site-specific agency approval	

<sup>1</sup> Reference Figure 3-6 for the location of key mitigation features for vernal pool fairy shrimp.

<sup>2</sup> In order to meet CDFG’s standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

**Table 3-5. Standardized Mitigation Ratios for Longhorn Fairy Shrimp in the EACCS Study Area**

Location of Impact <sup>1</sup>	Location of Mitigation <sup>1,2</sup>			Outside EACCS Study Area	Notes
	Inside Critical Habitat in EACCS study area	Outside Critical Habitat and Inside Vernal Pool Recovery Unit	Outside Critical Habitat and Outside Vernal Pool Recovery Unit		
Inside Critical Habitat in EACCS study area	9:1—(6 acres preservation; 3 acres restoration) *requires site-specific USFWS approval	10:1—(6.5 acres preservation; 3.5 acres restoration) *requires site-specific USFWS approval	11:1—(7 acres preservation; 4 acres restoration) *requires site-specific USFWS approval	Requires site-specific agency approval	In order to preserve 90% of longhorn fairy shrimp habitat, consistent with the goals and objectives of the EACCS, a high ratio is required due to the rarity of this habitat type.
Outside Critical Habitat and Inside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	Requires site-specific agency approval	
Outside Critical Habitat and Outside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	11:1—(7 acres preservation; 4 acres restoration)	Requires site-specific agency approval	

<sup>1</sup> Reference Figure 3-7 for the location of key mitigation features for longhorn fairy shrimp.

<sup>2</sup> In order to meet CDFG’s standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

**Table 3-6. Standardized Mitigation Ratios for Callippe Silverspot Butterfly in the EACCS Study Area**

Location of Impact	Location of Mitigation <sup>1,2</sup>			Notes
	Within CZ where impact occurred	Adjacent to CZ where impact occurred and inside mitigation area shown in Figure 3-8	In CZ Not Adjacent to CZ where impact occurred but inside mitigation area shown in Figure 3-8	
Inside Conservation Zones CZ1, CZ8, CZ11, CZ12, CZ14, CZ15, CZ16	3:1	3.5:1	4:1	Requires site-specific agency approval

<sup>1</sup> Reference Figure 3-8 for the location of key mitigation features for callippe silverspot butterfly.

<sup>2</sup> In order to meet CDFG’s standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

**Table 3-7. Standardized Mitigation Ratios for California Red-Legged Frog in the EACCS Study Area**

Location of Impact <sup>1</sup>	Location of Mitigation <sup>1,2</sup>				Outside EACCS Study Area	Notes
	Inside Critical Habitat in EACCS study area in same CRLF Mitigation Area based on Figure 3-9	Inside Critical Habitat in EACCS study area in different CRLF Mitigation Area based on Figure 3-9	Outside Critical Habitat but inside same CRLF Mitigation Area based on Figure 3-9	Outside Critical Habitat in EACCS study area in different CRLF Mitigation Area based on Figure 3-9		
Inside Critical Habitat in EACCS study area	3:1	Requires site specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	
Outside Critical Habitat in EACCS study area	2.5:1	3:1	3:1	3.5:1	Requires site-specific agency approval	

<sup>1</sup> Reference Figure 3-9 for the location of key mitigation features for California red-legged frog.

<sup>2</sup> In order to meet CDFG’s standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

**Table 3-8. Standardized Mitigation Ratios for California Tiger Salamander in the EACCS Study Area**

Location of Impact <sup>1</sup>	Location of Mitigation <sup>1,2</sup>						Notes
	Inside Critical Habitat in EACCS study area	Outside Critical Habitat but inside CTS North Mitigation Area, north of I-580	Outside Critical Habitat but inside CTS North Mitigation Area, south of I-580	Outside Critical Habitat but inside CTS South Mitigation Area, west of I-680	Outside Critical Habitat but inside CTS South Mitigation Area, east of I-680	Outside of EACCS Study Area	
Inside Critical Habitat in EACCS study area	3:1	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	
Outside Critical Habitat but inside CTS North Mitigation Area, north of I-580	2.5:1	3:1	3.5:1	4:1	4:1	Requires site-specific agency approval	Shaffer et al. 2004 found that there is some genetic distinction between CTS in the Central Valley Ecological Zone and the Western California Ecological Zone. Those zones were used to create CTS North and South Mitigation Areas.
Outside Critical Habitat but inside CTS North Mitigation Area, south of I-580	3:1	3.5:1	3:1	4:1	4:1	Requires site-specific agency approval	
Outside Critical Habitat but inside CTS South Mitigation Area, west of I-680	3:1	4:1	4:1	3:1	3.5:1	Requires site-specific agency approval	
Outside Critical Habitat but inside CTS South Mitigation Zone, east of I-680	3:1	4:1	4:1	3.5:1	3:1	Requires site-specific agency approval	

<sup>1</sup> Reference Figure 3-10 for the location of key mitigation features for California tiger salamander.

<sup>2</sup> In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

**Table 3-9. Standardized Mitigation Ratios for Alameda Whipsnake in the EACCS Study Area**

Location of Impact <sup>1</sup>	Location of Mitigation <sup>1</sup>						Notes
	Inside Critical Habitat Unit in same recovery unit <sup>2</sup>	Inside Critical Habitat Unit in different recovery unit	Outside Critical Habitat but Inside Same Recovery Unit	Outside Critical Habitat and Inside Different Recovery Unit	Outside Critical Habitat and Outside Recovery Unit	Outside EACCS Study Area	
Inside Critical Habitat	3:1	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	
Outside Critical Habitat but Inside Recovery Unit	2.5:1	3:1	3:1	3.5:1	4:1	Requires site-specific agency approval	
Outside Critical Habitat and Outside Recovery Unit	2.5:1	2.5:1	3:1	3:1	3:1	Requires site-specific agency approval	

<sup>1</sup> Reference Figure 3-12 for the location of key mitigation features for Alameda whipsnake.

<sup>2</sup> Agency approval will be required to mitigate impacts that occur inside Critical Habitat Unit 5a in Critical Habitat Unit 5b and vice versa, even though they are inside the same recovery unit.

**Table 3-10. Standardized Mitigation Ratios for Non-Listed Species in the EACCS Study Area**

Location of Impact <sup>1</sup>	Location of Mitigation <sup>1,2</sup>					Notes
	Within East Bay Hills Mitigation Area	Within Livermore Valley Mitigation Area	Within Altamont Hills Mitigation Area	Within Northern Diablo Range Mitigation Area	Outside EACCS Study Area	
Within East Bay Hills Mitigation Area	3:1	3.5:1	4:1	3.5:1	Requires site-specific agency approval	
Within Livermore Valley Mitigation Area	3.5:1	3:1	3.5:1	3.5:1	Requires site-specific agency approval	
Within Altamont Hills Mitigation Area	4:1	3.5:1	3:1	3.5:1	Requires site-specific agency approval	
Within Northern Diablo Range Mitigation Area	3.5:1	3.5:1	3.5:1	3:1	Requires site-specific agency approval	

<sup>1</sup> Reference Figure 3-11 for the location of key mitigation features for non-listed species in the EACCS study area.

<sup>2</sup> In order to meet CDFG’s standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

**Table 3-11. Standardized Mitigation Ratios for San Joaquin Kit Fox in the EACCS Study Area**

Location of Impact <sup>1</sup>	Location of Mitigation <sup>1, 2</sup>				Outside of EACCS Study Area	Notes
	Inside SJKF North Mitigation Area as shown in Figure 3-13	Inside SJKF East Mitigation Area as shown in Figure 3-13	Inside SJKF South Mitigation Area as shown in Figure 3-13	Inside SJKF Central-West Mitigation Area as shown in Figure 3-13		
Inside SJKF North Mitigation Area as shown in Figure 3-13	3:1	3:1	3:1	N/A	Requires site-specific agency approval	Ratios may rise in areas of documented high occurrence or movement corridors.
Inside SJKF East Mitigation Area as shown in Figure 3-13	3.5:1	3:1	3.5:1	N/A	Requires site-specific agency approval	
Inside SJKF South Mitigation Area as shown in Figure 3-13	3.5:1	3:1	3:1	N/A	Requires site-specific agency approval	
Inside SJKF Central-West Mitigation Area as shown in Figure 3-13	N/A	N/A	N/A	N/A	Requires site-specific agency approval	

<sup>1</sup> Reference Figure 3-13 for the location of mitigation areas for San Joaquin kit fox.

<sup>2</sup> In order to meet CDFG’s standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

**Table 3-12. Standardized Mitigation Ratios for Focal Plant Species in the EACCS Study Area<sup>1</sup>**

Location of Impact <sup>2</sup>	Location of Mitigation <sup>2,3</sup>					Notes
	Within East Bay Hills Mitigation Area	Within Livermore Valley Mitigation Area	Within Altamont Hills Mitigation Area	Within Northern Diablo Range Mitigation Area	Outside EACCS Study Area	
Within East Bay Hills Mitigation Area	5:1	With agency approval	With agency approval	With agency approval	With agency approval	
Within Livermore Valley Mitigation Area	With agency approval	5:1	With agency approval	With agency approval	With agency approval	
Within Altamont Hills Mitigation Area	With agency approval	With agency approval	5:1	With agency approval	With agency approval	
Within Northern Diablo Range Mitigation Area	With agency approval	With agency approval	With agency approval	5:1	With agency approval	

<sup>1</sup> Mitigation ratios for focal plant species refer to the size of the population that is effected or protected. Restoration ratio refers to reestablishing or increasing the size of an existing population. The quality/vigor of a population would need to be considered when making final determinations.

<sup>2</sup> Reference Figure 3-11 for the location of key mitigation features for plants and non-listed species in the EACCS study area.

<sup>3</sup> In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

**Figure 3-1  
Conservation Zones**

October 2010

**Legend**

-  Study Area Boundary
-  Watershed Boundary
-  Streams
-  Highways
-  Reservoirs
-  Conservation Zones (CZ)

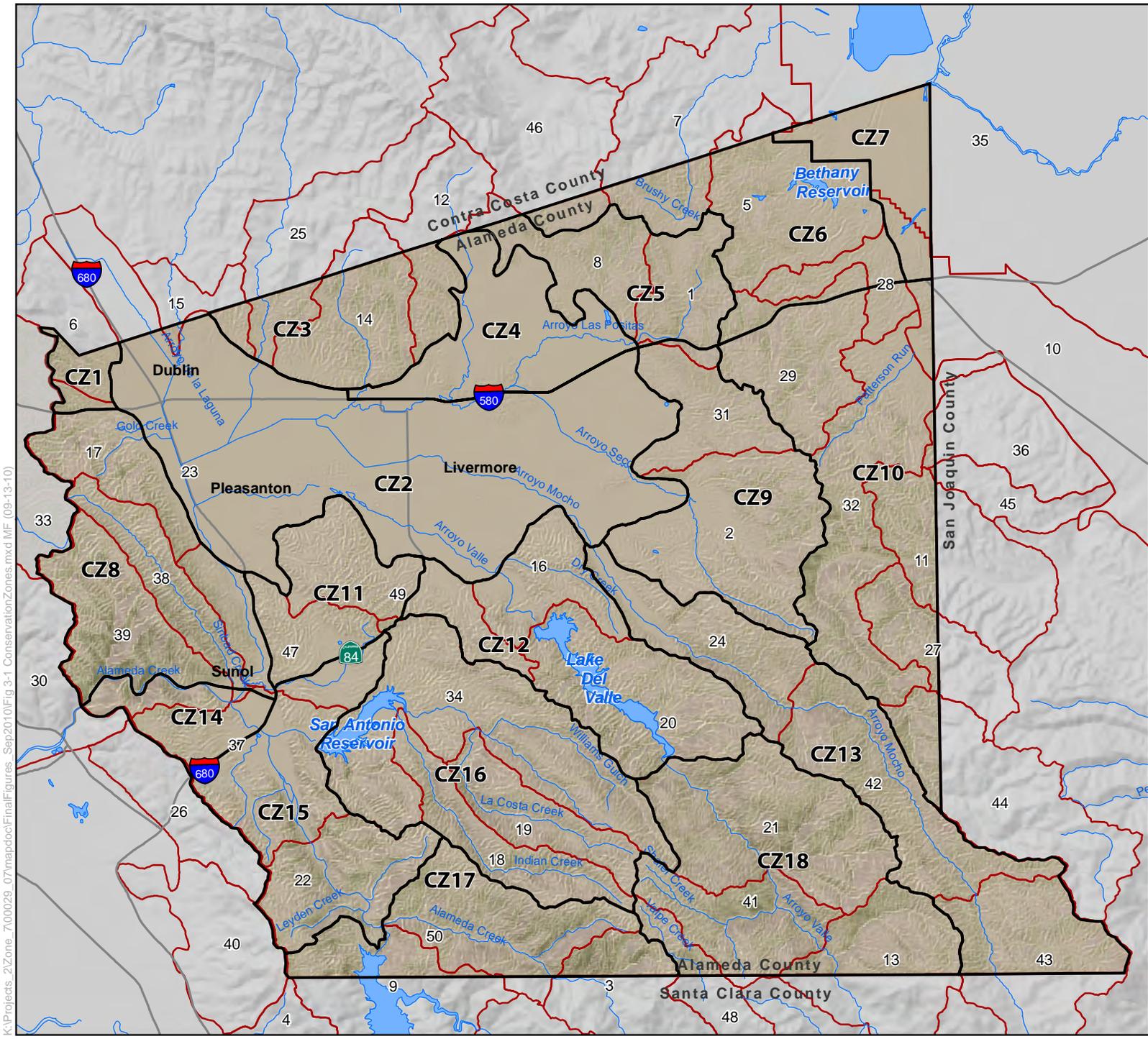
**Watershed Key**

- |                         |                            |
|-------------------------|----------------------------|
| 1. Altamont Creek       | 26. Mission Creek          |
| 2. Arroyo Seco          | 27. Mitchell Ravine        |
| 3. Baby Peak            | 28. Mountain House         |
| 4. Berryessa Creek      | 29. Mtn. House Ck.         |
| 5. Bethany Reservoir    | 30. Oakland                |
| 6. Big Canyon           | 31. Patterson Pass         |
| 7. Brushy Creek         | 32. Patterson Run          |
| 8. Brushy Peak          | 33. Polomares Creek        |
| 9. Calaveras Reservoir  | 34. San Antonio Res.       |
| 10. Carbona             | 35. San Joaquin Delta      |
| 11. Carnegie            | 36. SE of Midway           |
| 12. Cayetano Creek      | 37. Sheridan Creek         |
| 13. Coffee Mill Creek   | 38. Sinbad Creek           |
| 14. Cottonwood Creek    | 39. Stoneybrook Canyon     |
| 15. Daugherty Hills     | 40. Toroges Creek          |
| 16. Dry Creek           | 41. Trout Creek            |
| 17. Gold Creek          | 42. Tunnel Creek           |
| 18. Indian Creek        | 43. Upper Arroyo Mocho     |
| 19. La Costa Creek      | 44. Upr. Corral Hollow Ck. |
| 20. Lake Del Valle      | 45. Upper Elk Ravine       |
| 21. Lang Canyon         | 46. Upper Kellogg Creek    |
| 22. Leyden Creek        | 47. Vallecitos Creek       |
| 23. Livermore           | 48. Valpe Creek            |
| 24. Lower Arroyo Mocho  | 49. Vern                   |
| 25. Lower Tassajara Ck. | 50. Whitlock Creek         |





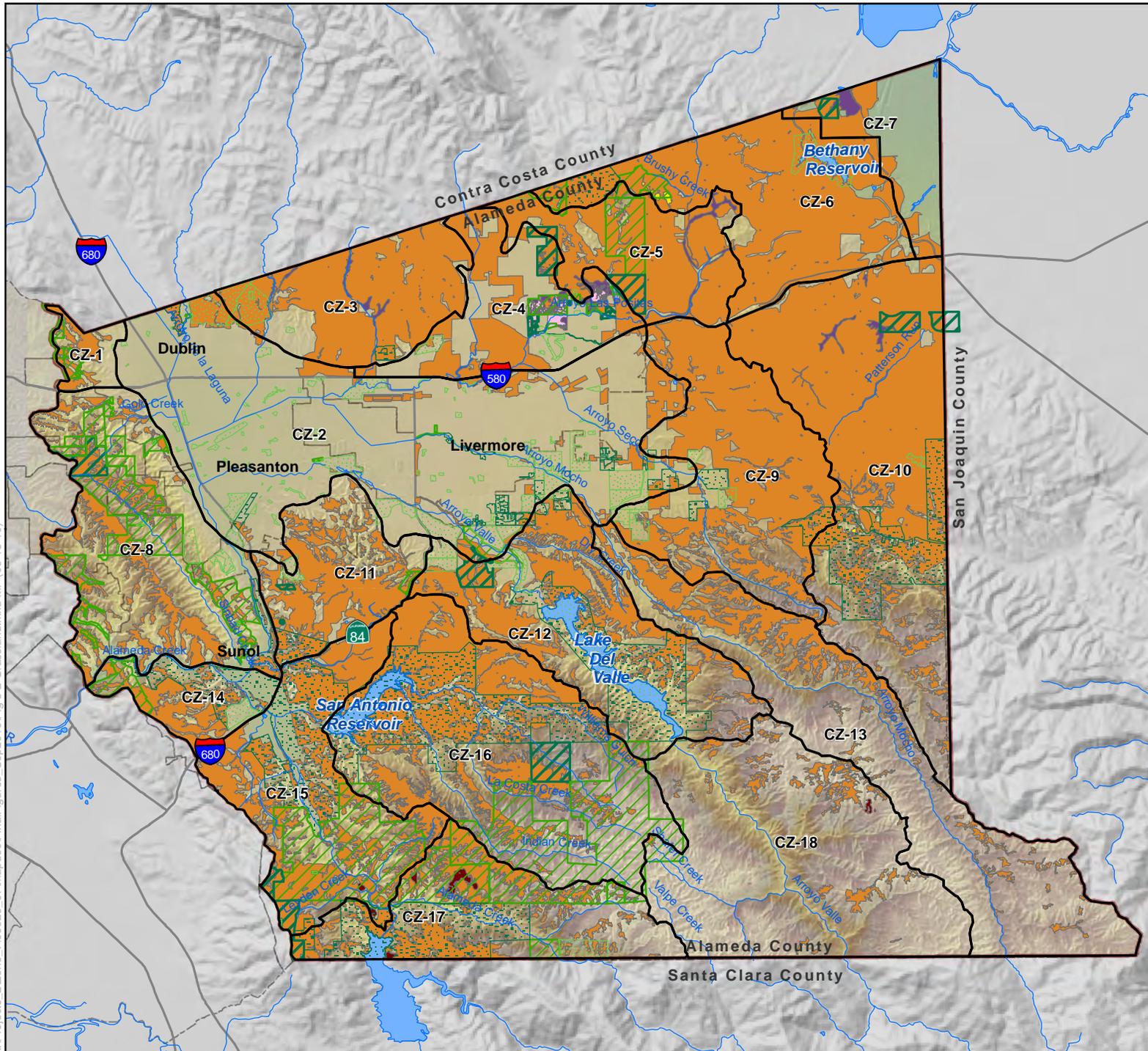
Miles



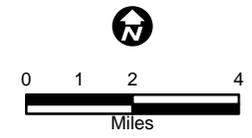
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**Figure 3-2  
Grassland Land Cover**

October 2010



- Study Area Boundary
- City Limits
- Conservation Zones
- Highways
- Streams
- Reservoirs
- Grassland Landcover**
- Alkali Meadow and Scalds
- Valley Sink Scrub
- California Annual Grassland
- Rock Outcrop
- Serpentine Bunchgrass Grassland
- Open Space**
- Type 1
- Type 2
- Type 3
- Type 4

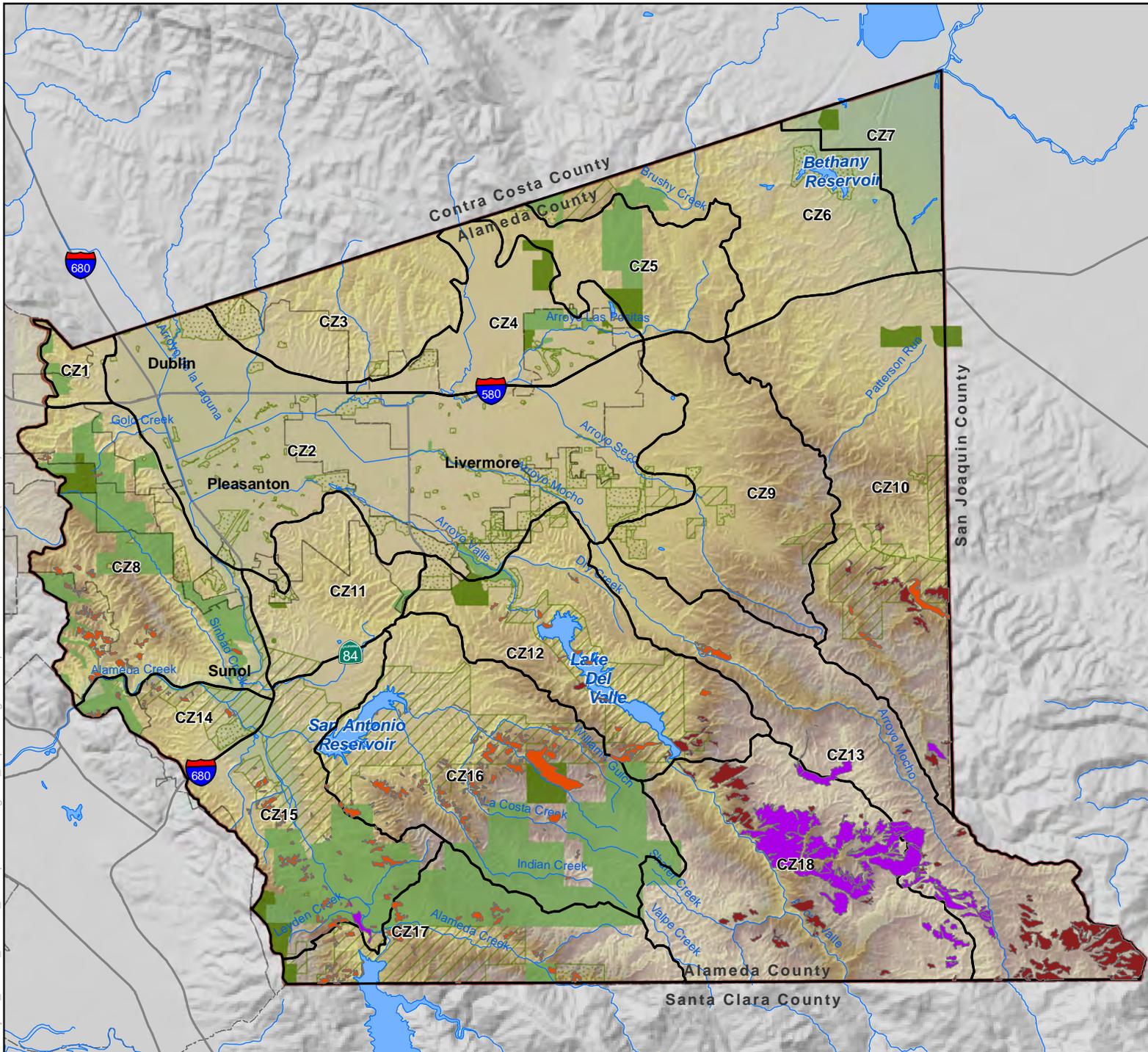


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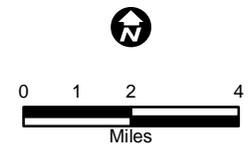
**Figure 3-3  
Chaparral and Coastal  
Scrub Land Cover**

October 2010

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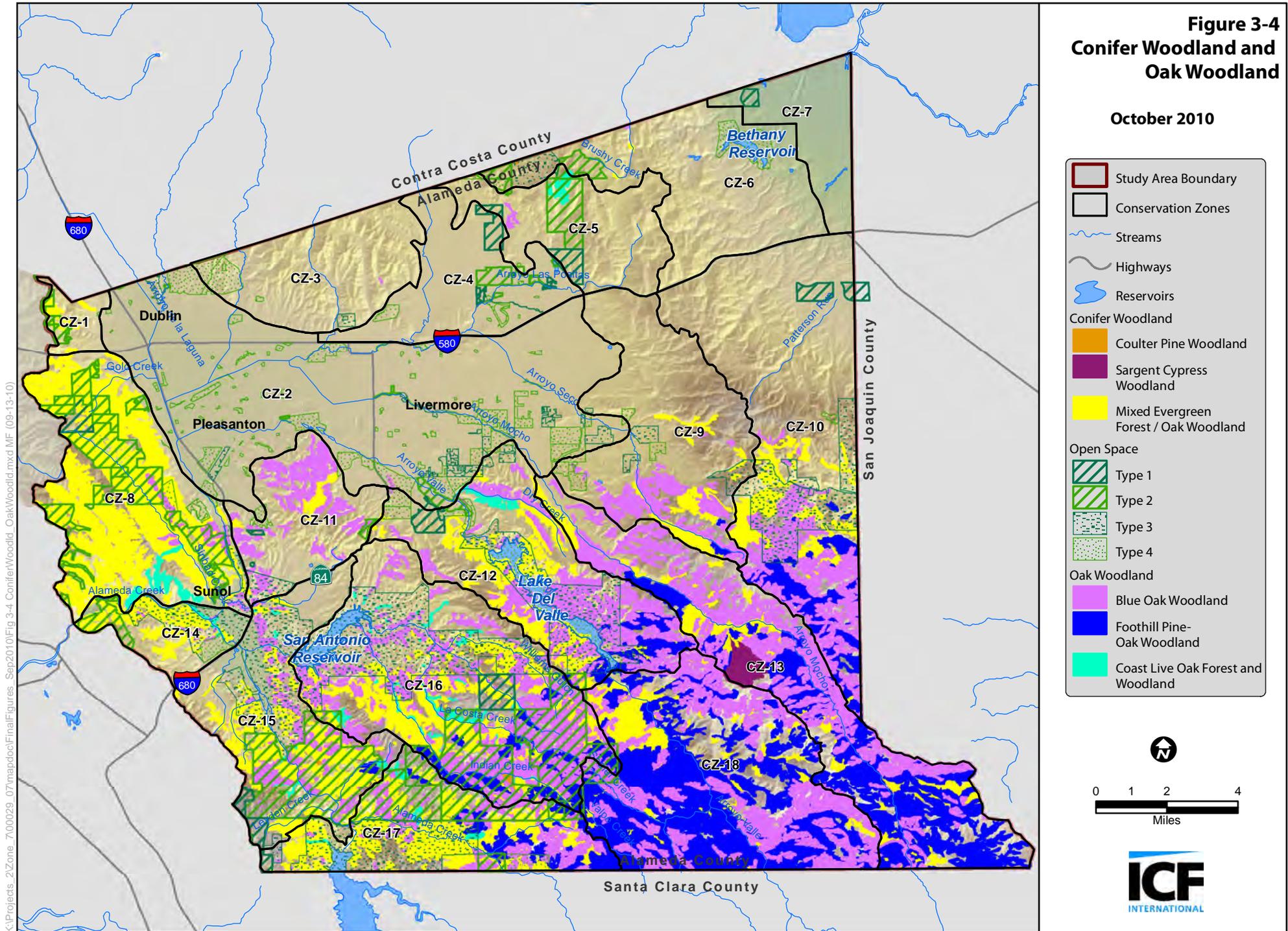


	Study Area Boundary
	City Limits
	Conservation Zones
	Highways
	Streams
	Reservoirs
<b>Chaparral Coastal Scrub Landcover</b>	
	Mixed Serpentine Chaparral
	Northern Coastal Scrub / Diablan Sage Scrub
	Northern Mixed Chaparral / Chamise Chaparral
<b>Open Space</b>	
	Type 1
	Type 2
	Type 3
	Type 4



**Figure 3-4  
Conifer Woodland and  
Oak Woodland**

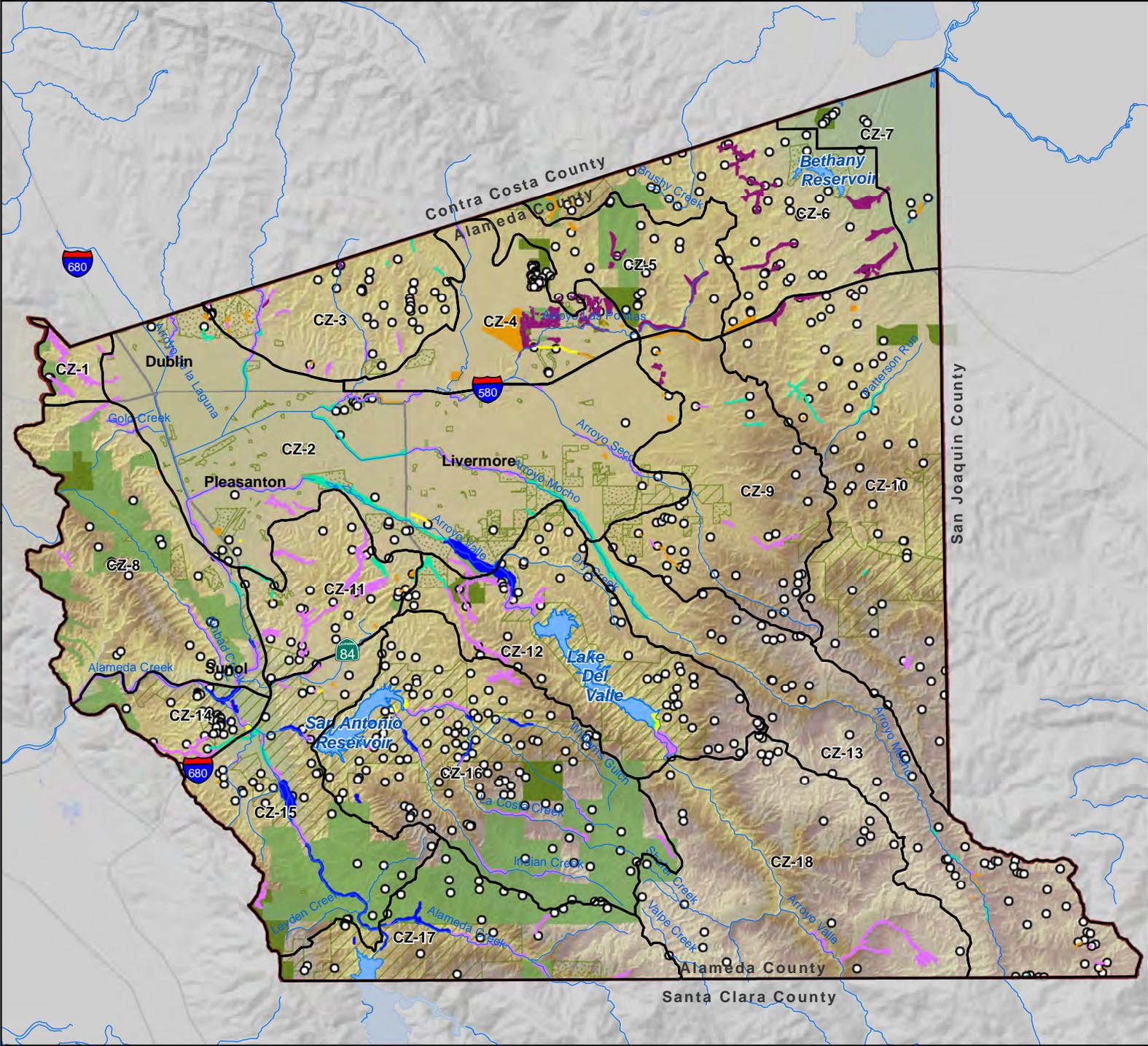
October 2010



**Figure 3-5  
Aquatic Landcover**

**October 2010**

	Study Area Boundary
	Conservation Zones
	Highways
	Streams
	Reservoirs
	Ponds
<b>Riparian Forest and Scrub</b>	
	Mixed Riparian Forest/Woodland
	Mixed Willow Riparian Scrub
	Sycamore Alluvial Woodland
<b>Open Space</b>	
	Type 1
	Type 2
	Type 3
	Type 4
<b>Wetland Landcover</b>	
	Alkali Wetland
	Seasonal Wetland
	Perennial Freshwater Marsh



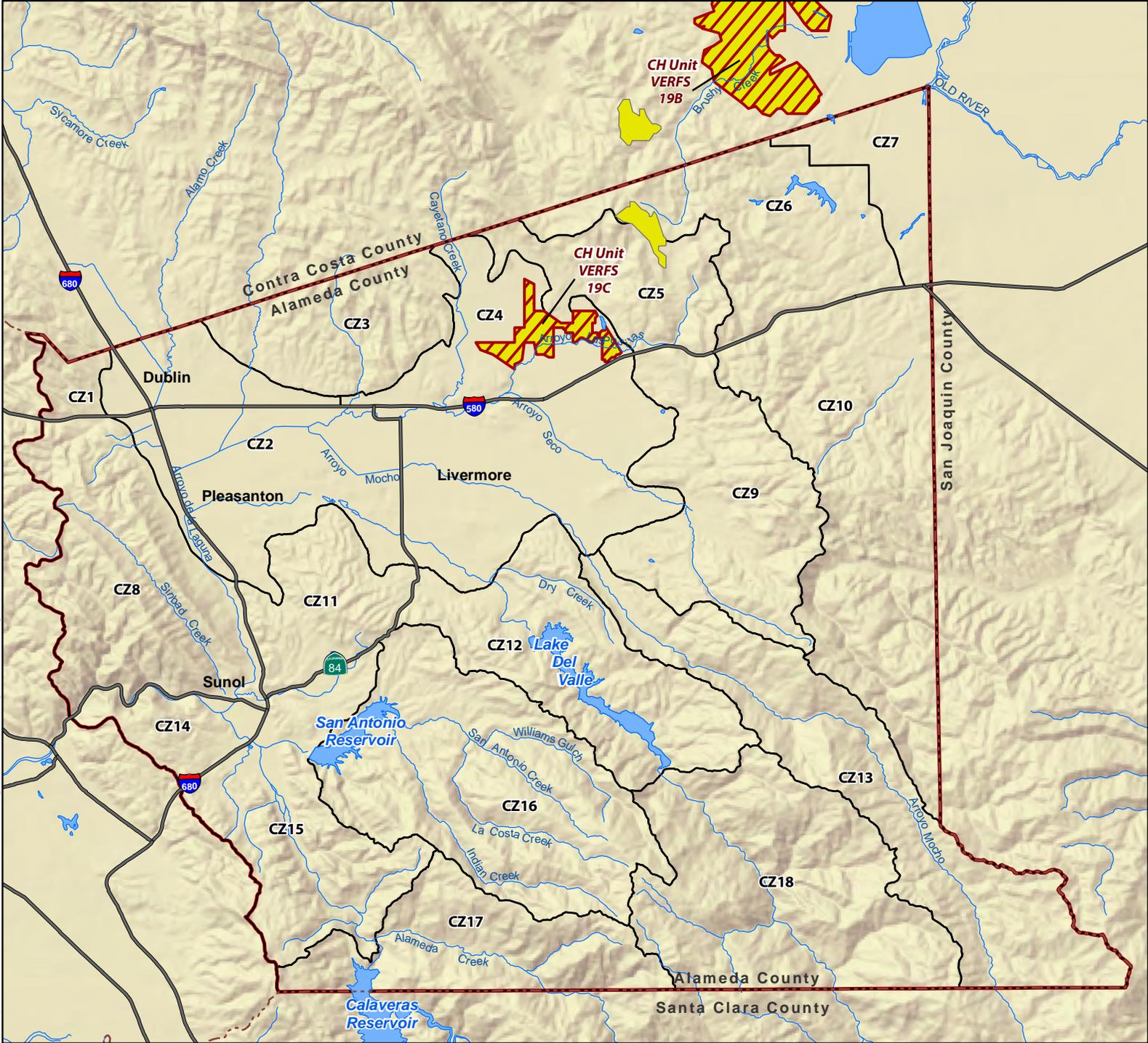
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**Figure 3-6  
Vernal Pool Fairy Shrimp  
Standardized Mitigation  
Reference Map**

October 2010

-  Study Area Boundary
-  Conservation Zones
-  Critical Habitat
-  Highways
-  Streams
-  Reservoirs
-  Vernal Pool Recovery Unit: Altamont Hills

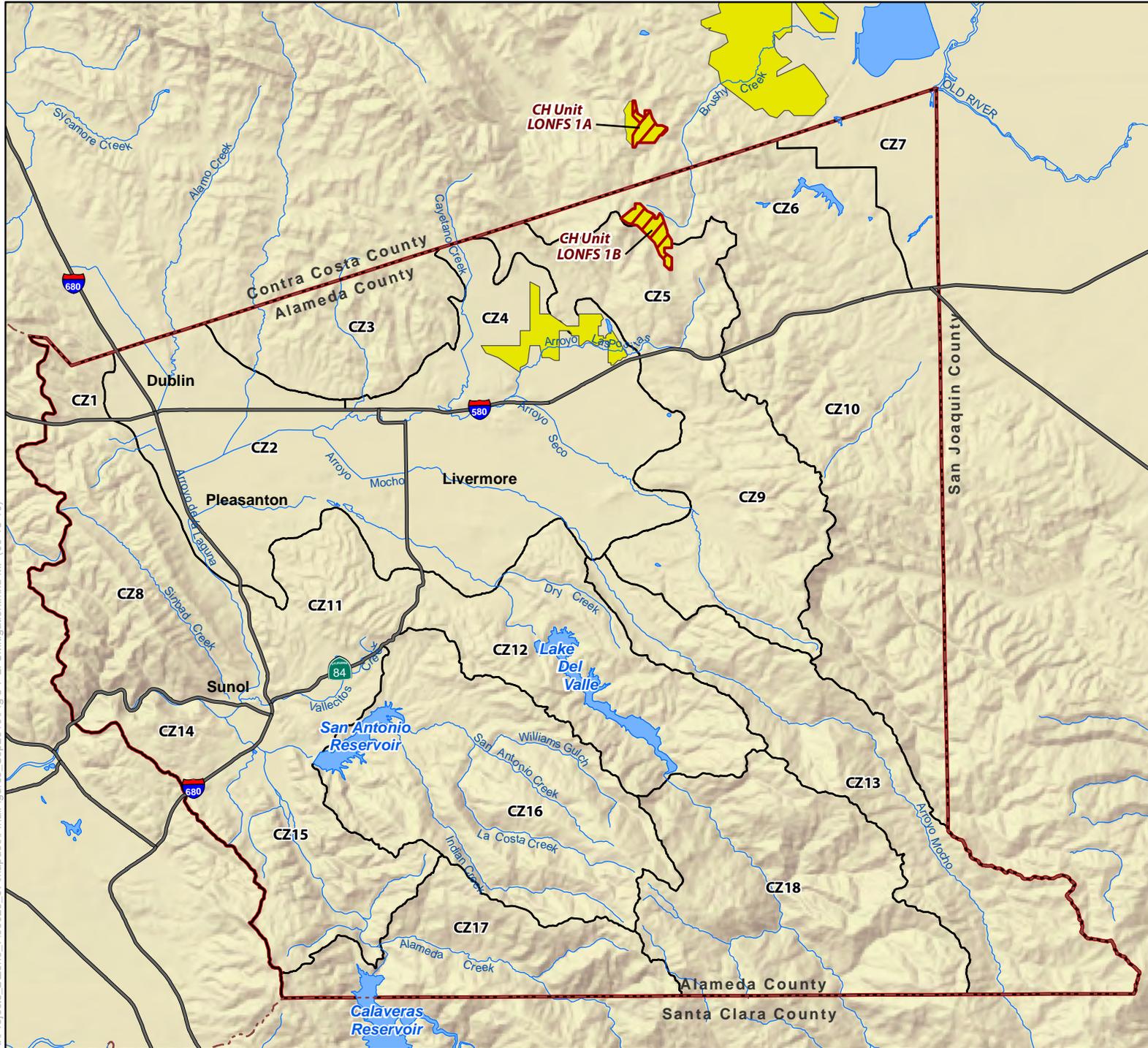
Source: California Spatial Information Library; FR listing and critical habitat documents.



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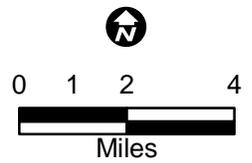
**Figure 3-7  
Longhorn Fairy Shrimp  
Standardized Mitigation  
Reference Map**

October 2010



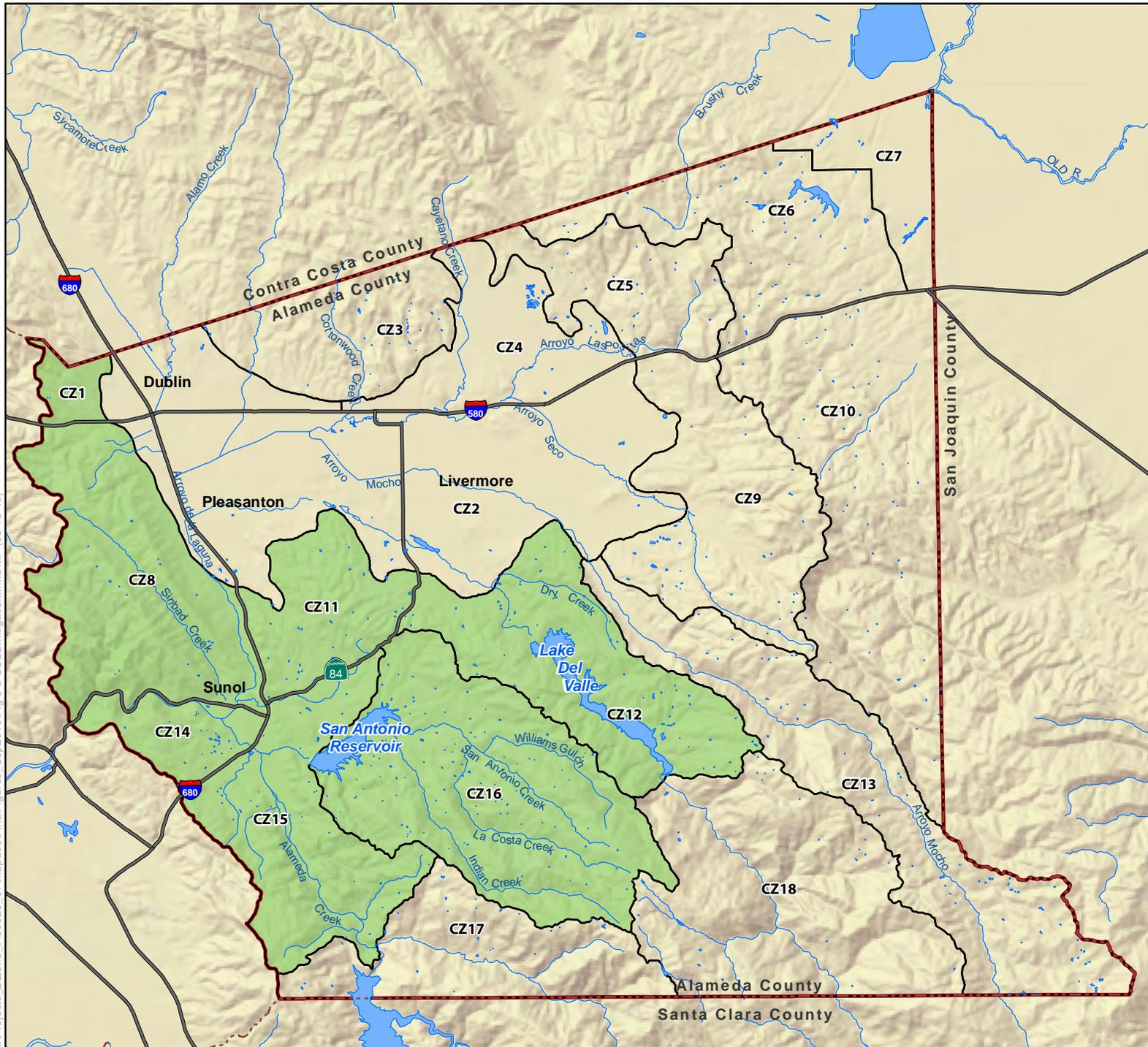
- Study Area Boundary
- Conservation Zones
- Critical Habitat
- Highways
- Streams
- Vernal Pool Recovery Unit: Altamont Hills

Source: California Spatial Information Library; FR listing and critical habitat documents.

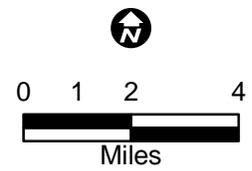


**Figure 3-8  
Callippe Silverspot  
Butterfly Standardized  
Mitigation Reference Map**

October 2010



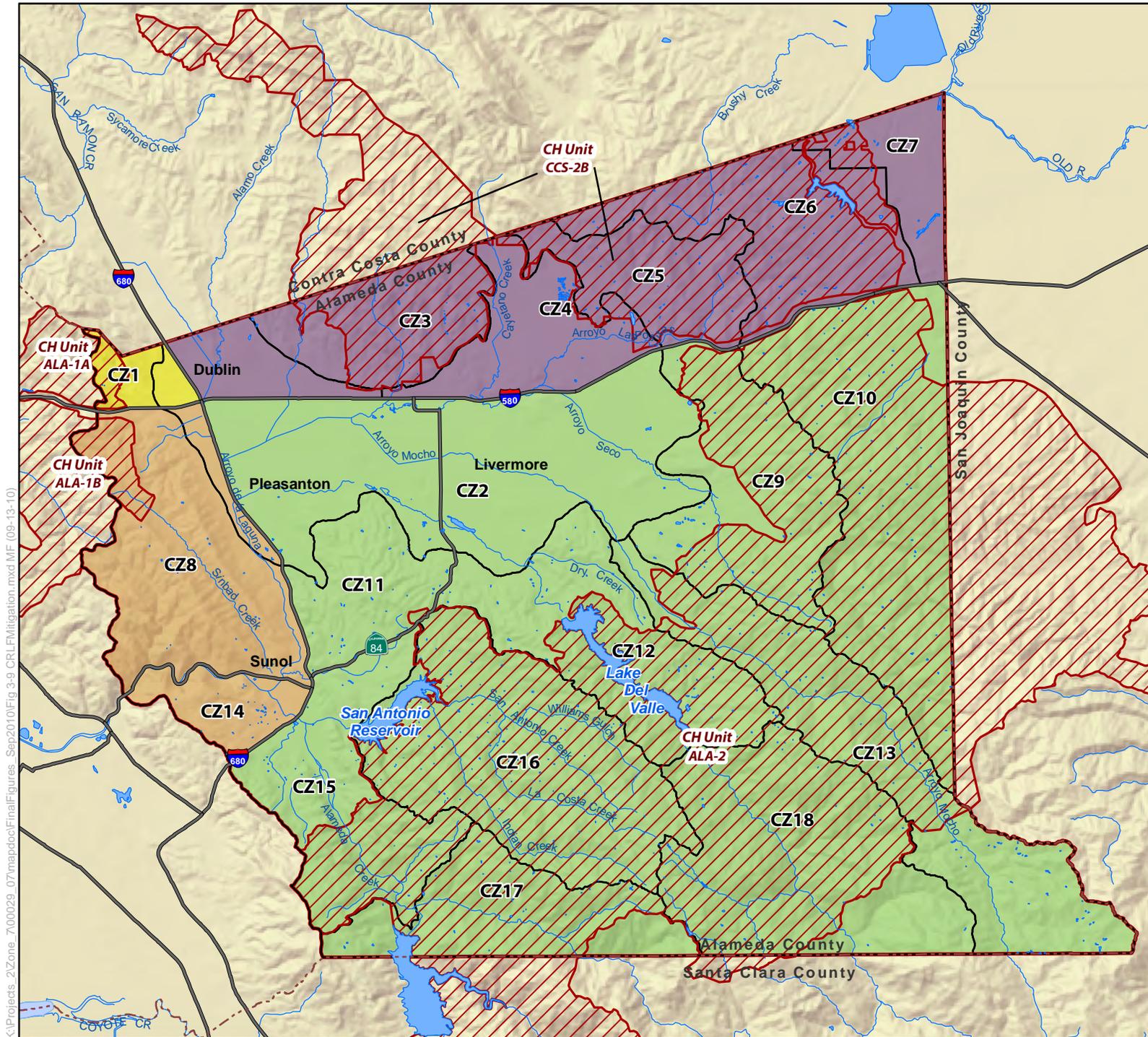
-  Study Area Boundary
-  Conservation Zones
-  Highways
-  Streams
-  Reservoirs
-  Callippe Silverspot Butterfly Mitigation Zones



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**Figure 3-9  
California Red-Legged  
Frog Standardized  
Mitigation Reference Map**

October 2010



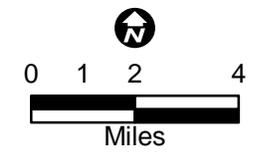
**Legend**

- Study Area Boundary
- Conservation Zones
- Critical Habitat
- Highways
- Streams
- Reservoirs

**Mitigation Areas**

- CRLF Northwest
- CRLF North
- CRLF West
- CRLF South

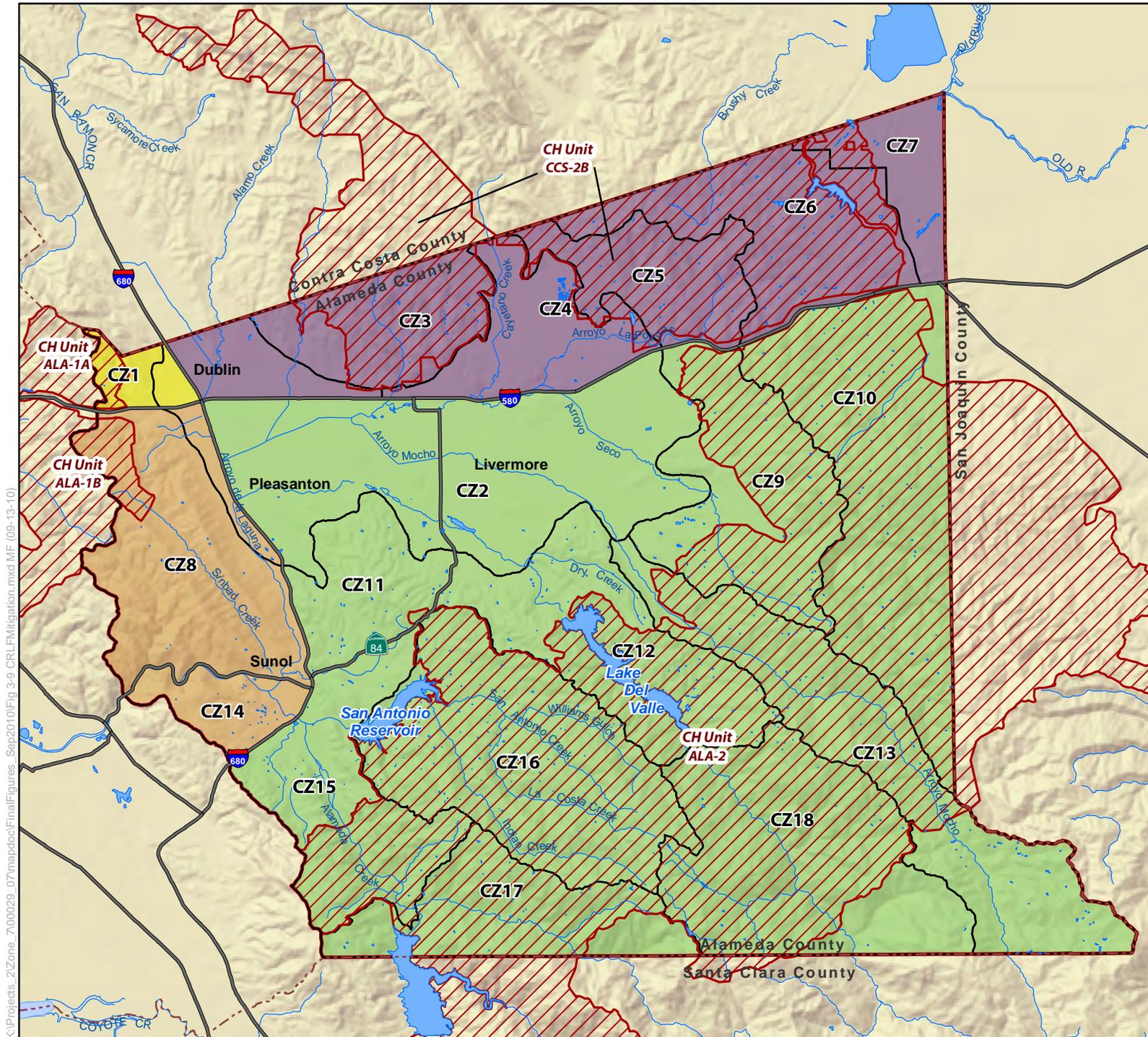
Source: U.S. Fish and Wildlife Service 2010



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**Figure 3-9  
California Red-Legged  
Frog Standardized  
Mitigation Reference Map**

October 2010



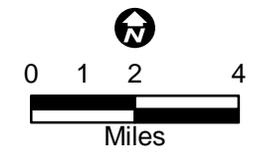
**Legend**

- Study Area Boundary
- Conservation Zones
- Critical Habitat
- Highways
- Streams
- Reservoirs

**Mitigation Areas**

- CRLF Northwest
- CRLF North
- CRLF West
- CRLF South

Source: U.S. Fish and Wildlife Service 2010



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**Figure 3-10  
California Tiger  
Salamander Standardized  
Mitigation Reference Map**

October 2010

**Legend**

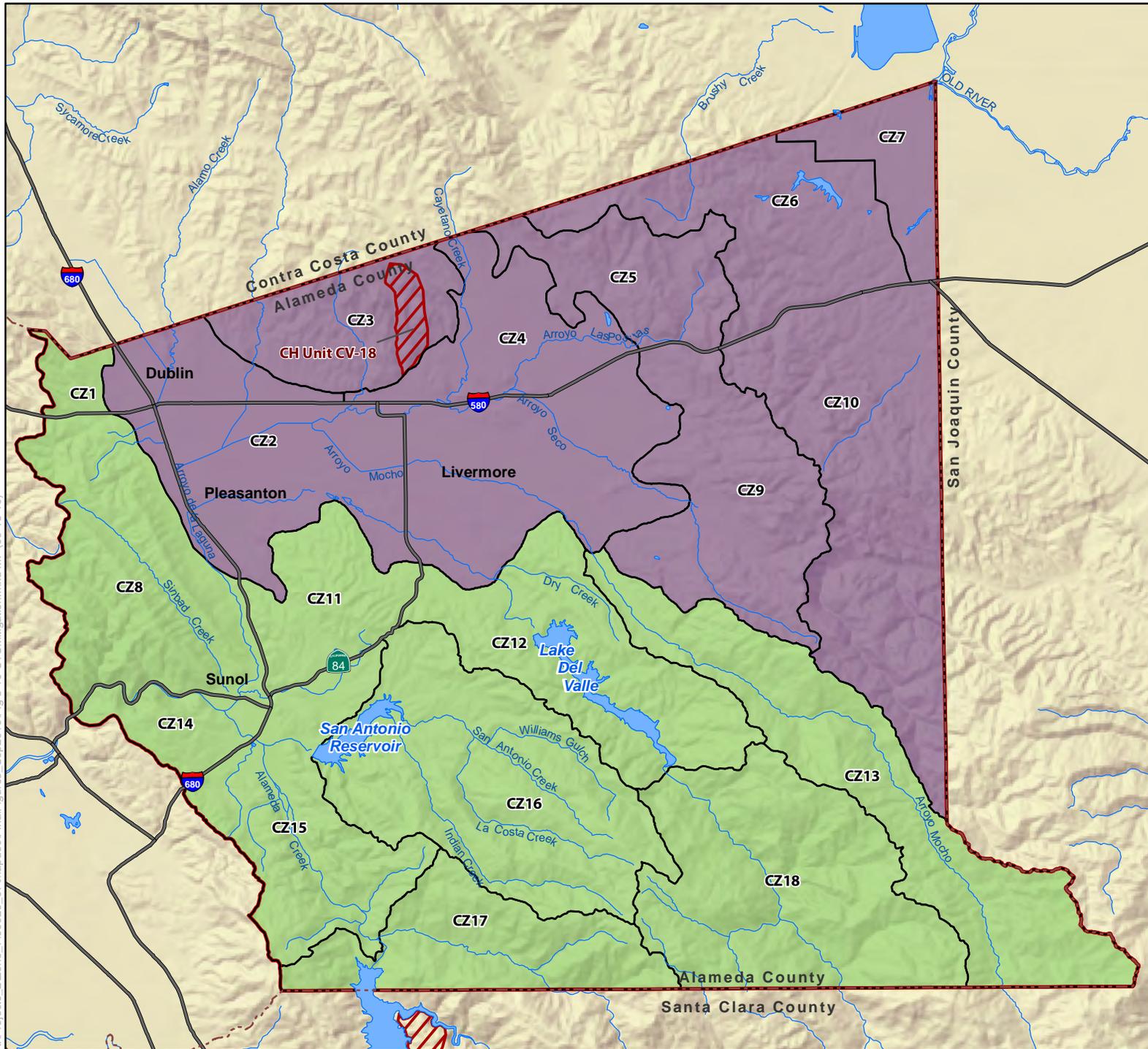
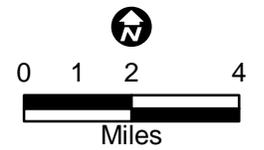
-  Study Area Boundary
-  Conservation Zones
-  Critical Habitat
-  Highways
-  Streams
-  Reservoirs

**Mitigation Areas**

-  CTS South
-  CTS North

Source: California Spatial Information Library; FR listing and critical habitat documents; California Gap Analysis, University of California Santa Barbara 1998.

Note: See Chapter 3 for explanation of Mitigation Areas.



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**Figure 3-11  
Plants and Non-listed  
Wildlife Species  
Standardized Mitigation  
Reference Map**

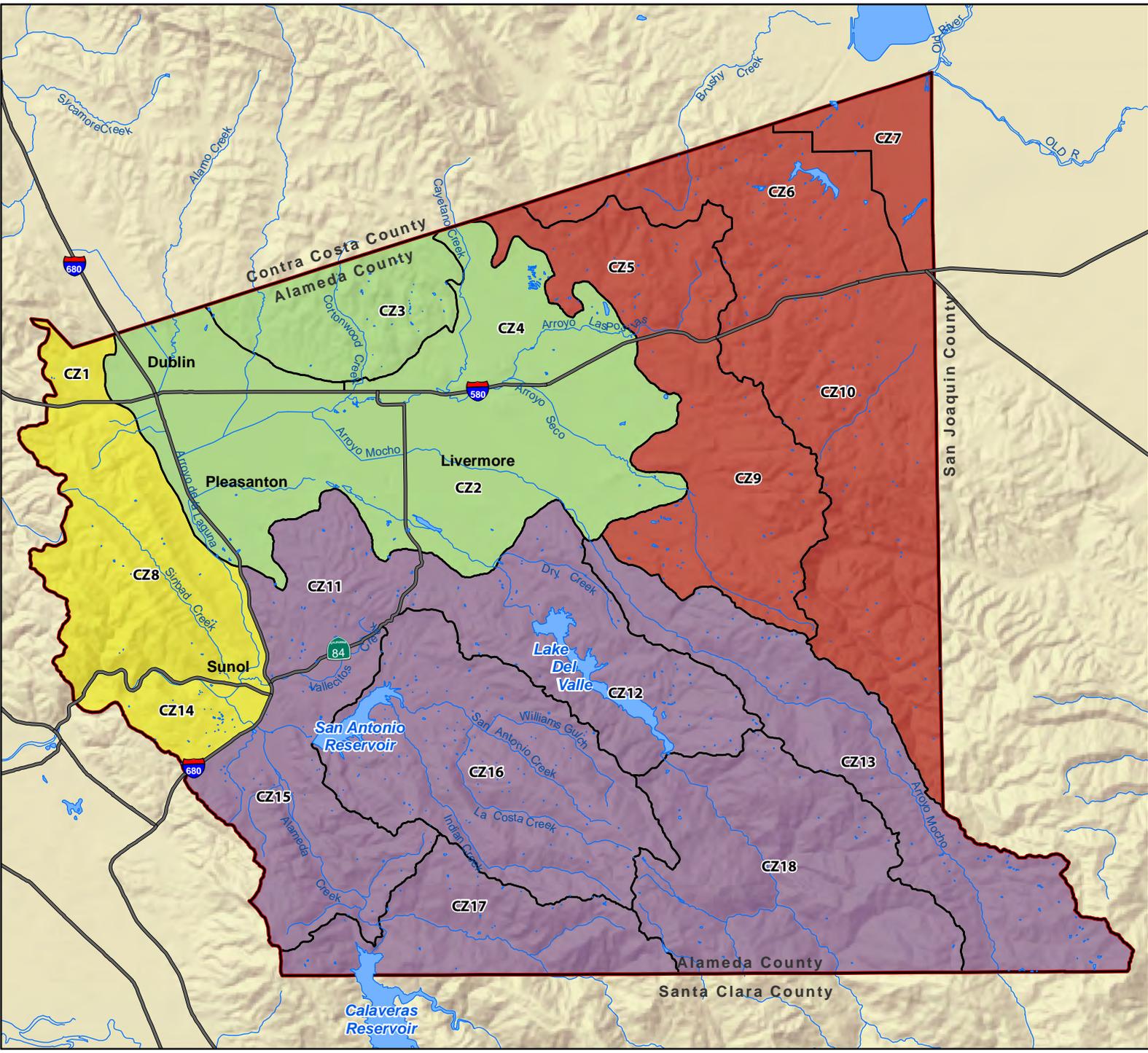
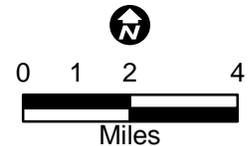
October 2010

**Legend**

-  Study Area Boundary
-  Highways
-  Streams
-  Reservoirs
-  Conservation Zones

**Non-listed Species Mitigation Areas**

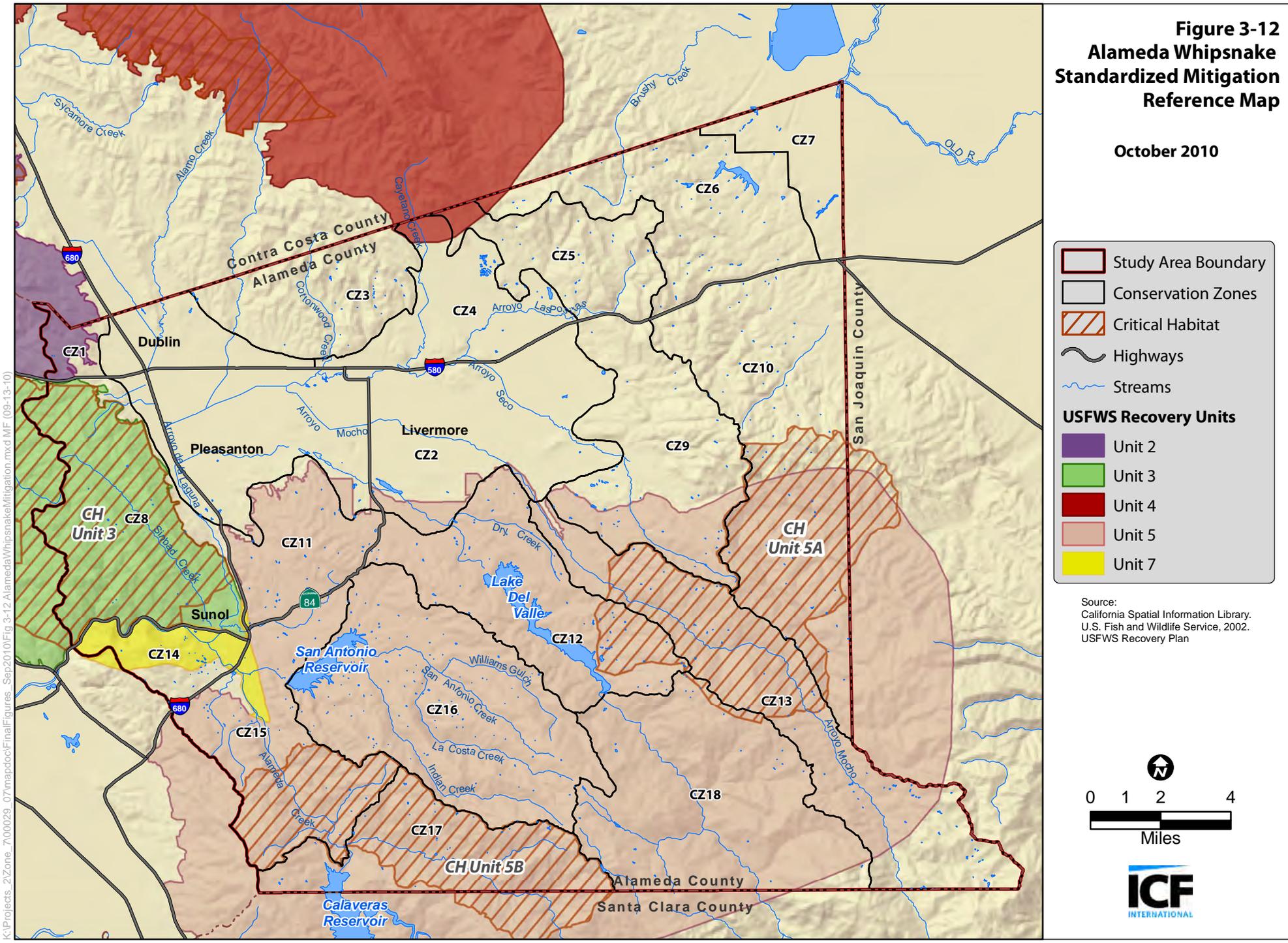
-  East Bay Hills
-  Livermore Valley
-  Altamont Hills
-  Northern Diablo Range



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**Figure 3-12  
Alameda Whipsnake  
Standardized Mitigation  
Reference Map**

October 2010



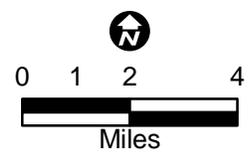
**Legend**

- Study Area Boundary
- Conservation Zones
- Critical Habitat
- Highways
- Streams

**USFWS Recovery Units**

- Unit 2
- Unit 3
- Unit 4
- Unit 5
- Unit 7

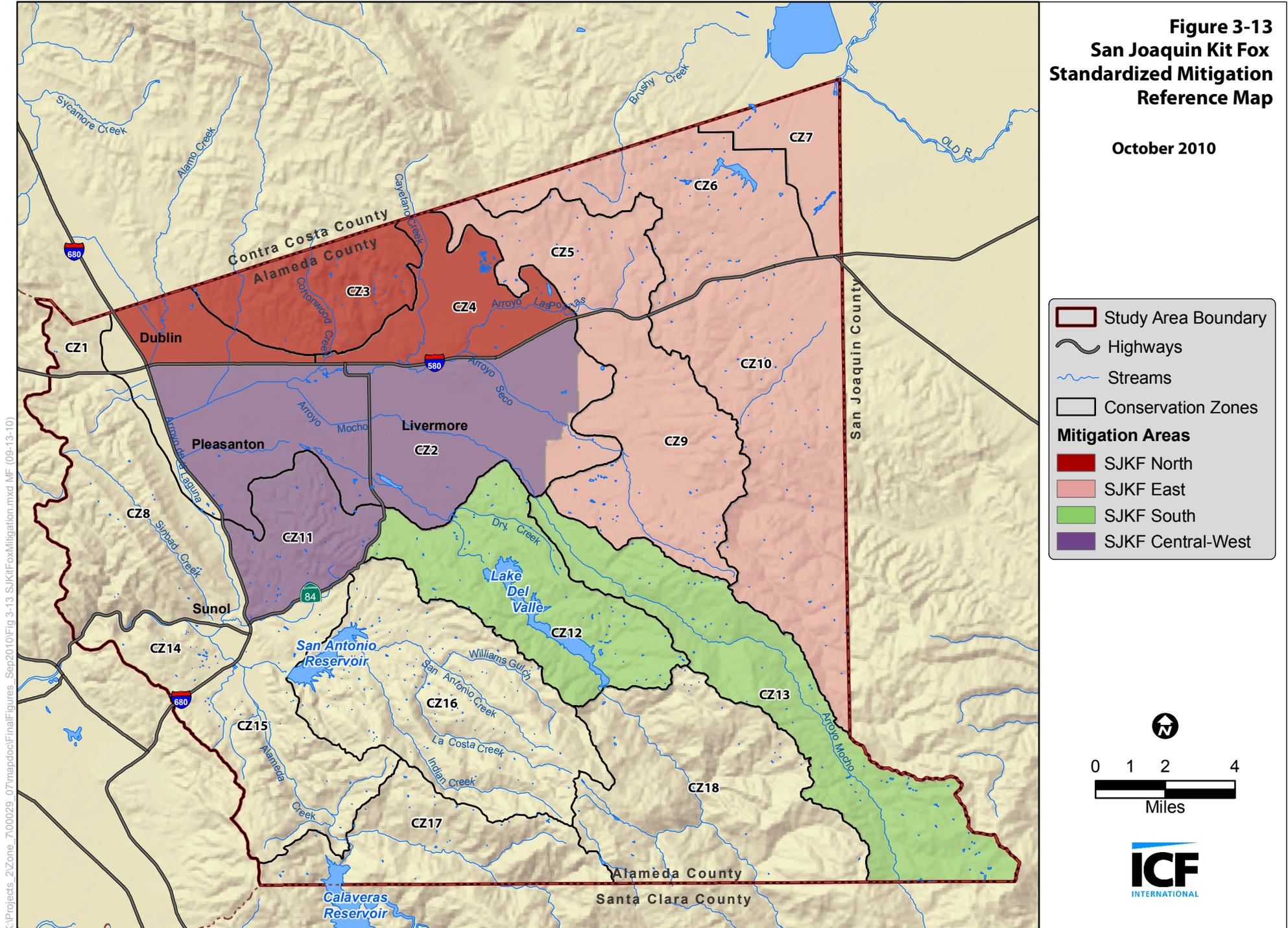
Source:  
California Spatial Information Library,  
U.S. Fish and Wildlife Service, 2002.  
USFWS Recovery Plan



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**Figure 3-13  
San Joaquin Kit Fox  
Standardized Mitigation  
Reference Map**

October 2010



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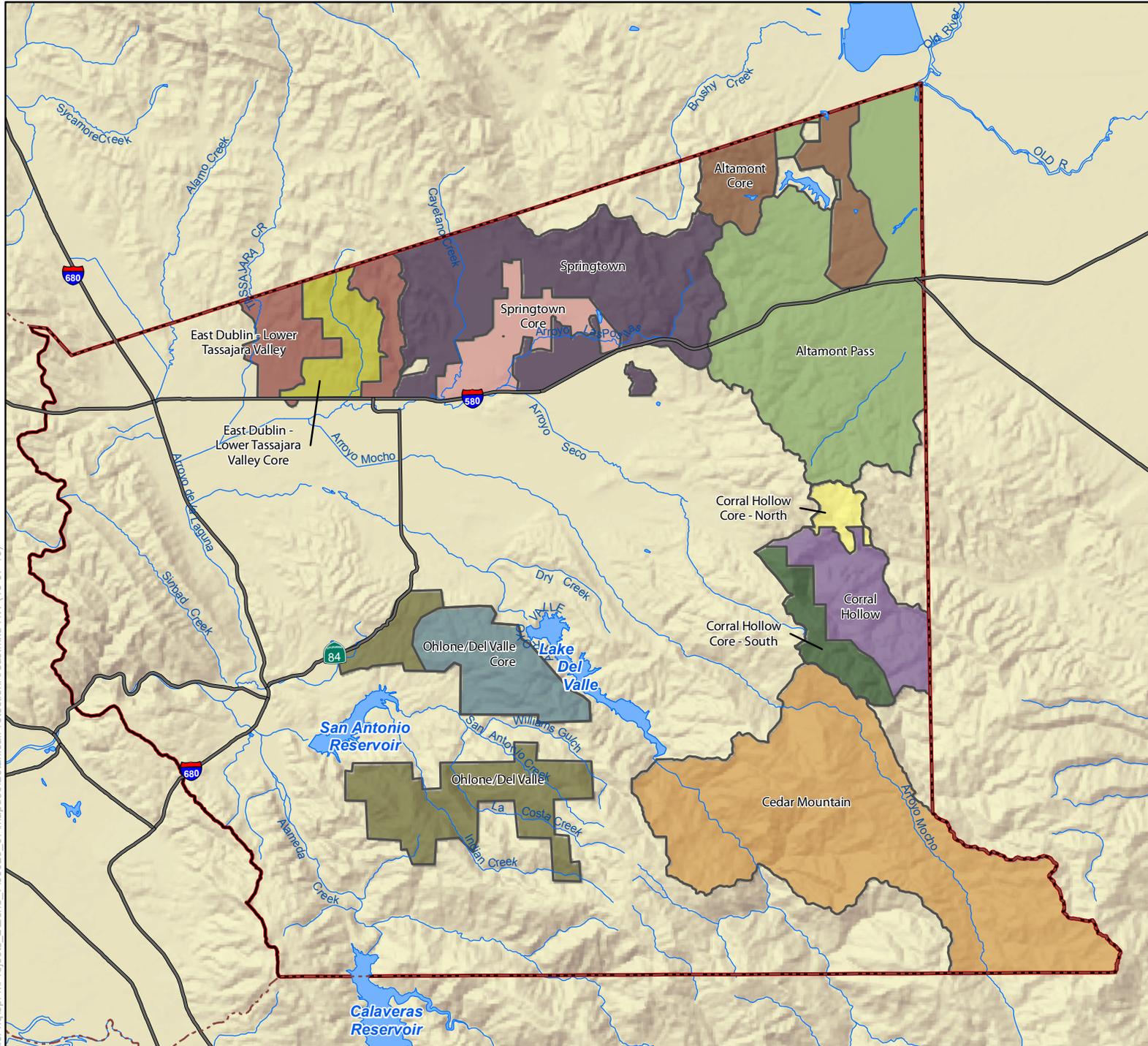


**Figure 3-14  
Eastern Alameda County  
Conservation Strategy**

**East Bay California  
Native Plant Society  
Core Botanical Protection  
Areas**

October 2010

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**Legend**

- Study Area Boundary
- Highway
- Stream
- Lake

